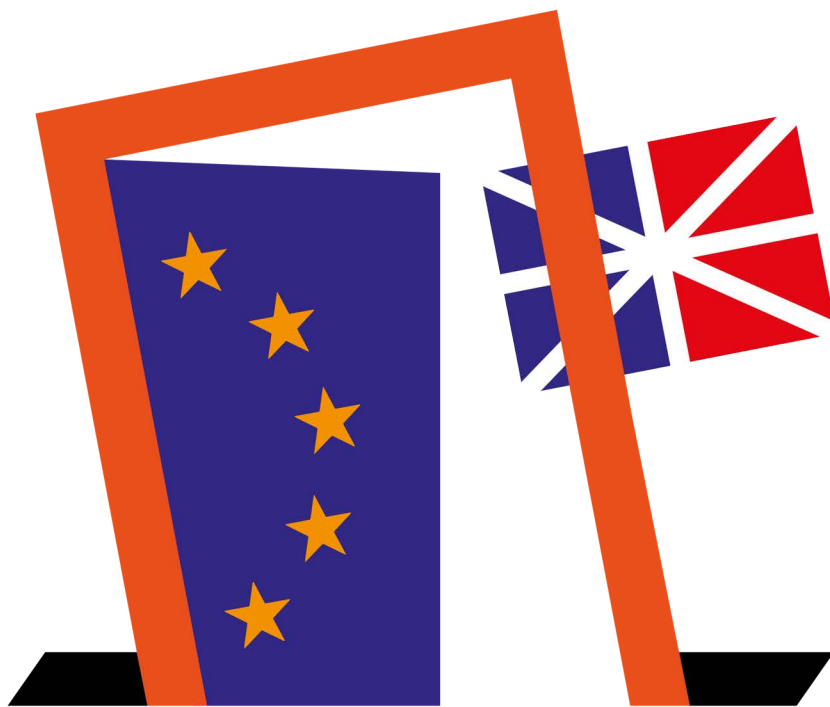


Who Bears the Pain? How the costs of Brexit would be distributed across income groups

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CEP BREXIT ANALYSIS No. 7

Who bears the pain?

How the costs of Brexit would be distributed across income groups

- All serious economic analysis finds that Brexit would have a negative impact on UK GDP per capita. But a popular view is that membership of the European Union (EU) only benefits elites and has not helped those in the middle or at the bottom of the income distribution.
- Our research uses data on household expenditure by different income groups and household types combined with estimates of changes in the prices of goods and services after Brexit to look at who would win and who would lose.
- We find that prices would go up most in transport (a price hike of between 4% and 7.5%), alcohol (4% to 7%), food (3% to 5%) and clothing (2% to 4%). These product groups rely a lot on imports. By contrast, prices for services would rise the least.
- We show that the living standard of every income group would be lower after Brexit due to these higher prices. Those on middle incomes would suffer slightly more in proportionate terms than the richest and poorest households.
- Looking solely at the ‘static’ short-run impact of trade, the income (*not* GDP) of the average UK household would drop by 1.8% (£754) per year in our most ‘optimistic’ scenario where the UK joins countries like Norway in the European Economic Area. Income would fall by 4% per year (£1,637) if the UK were to trade under World Trade Organization rules (in our more realistic ‘pessimistic’ scenario). If we take account of the longer-run dynamic effects of Brexit on productivity, the average household would lose between 6.1% and 13.5% of their real incomes per year (£2,519 to £5,573).
- For the poorest tenth of households (the bottom decile), real income losses would be 1.7% to 3.6% in the short run and 5.7% to 12.5% in the long run. For the richest households, the short-run losses would be 1.8% to 3.9% and the long-run losses 6% to 13.4%. These are only very slightly smaller than the losses suffered by the middle classes.
- Looking at specific households such as pensioners, families with children and single people, we find that the pain would also be widely shared. For example, even in the short run, pensioners would lose between 2% and 4% of their income.
- Including the effects of reduced immigration or changing patterns of industry demand after Brexit makes no material difference to our analysis of inequality.

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Introduction

There now is a consensus among economists that a UK referendum decision to leave the European Union (EU) would lead to significant losses in average national income (for example, HM Treasury, 2016; IFS, 2016; OECD, 2016; NIESR, 2016). But supporters of Brexit argue that the costs would only be borne by the elite and that most of the population, especially those on lower incomes, would be better off.

This report analyses the distributional effects of Brexit across different income groups and types of households. We look at how prices would change after Brexit due to changing trade patterns. We conclude that the pain of Brexit would be widely shared, with the middle classes being slightly harder hit than the richest and poorest.

We focus on the consequences of changes in trade barriers, which are the best-understood mechanism through which Brexit would affect the UK economy. But we also discuss potential impacts through reduced EU immigration and changes in skill demands.

Measuring the economic impact of Brexit

Brexit would lead to lower trade with the EU, resulting in reductions in average income. But not all households would be affected equally. If Brexit led to an increase in the trade barriers imposed on goods and services that are predominantly consumed by richer households, for example, such households would see their incomes decline more than others.

We use the same ‘computable general equilibrium’ model of the global economy developed by Dhingra et al (2016a) to study the consequences of Brexit, but focus on the impact across different income groups. We have 31 industries in the model, so we can track how the changes in trade after Brexit would affect prices across these sectors. Since people spend their money on different things, they would be differentially affected by the price changes.

As before, we consider an ‘optimistic scenario’, in which the UK remains a member of the European Economic Area (EEA) similar to Norway, and a ‘pessimistic scenario’, in which the UK is simply a member of the World Trade Organization (WTO). Currently, the Leave campaign appears to be rejecting the EEA model, so the pessimistic outcome is more likely.

Trade costs may increase after Brexit due to (i) higher tariff barriers between the UK and the EU; (ii) higher non-tariff barriers to trade (for example, arising from border controls, etc.); and (iii) non-participation in future steps the EU takes towards the reduction of non-tariff barriers.

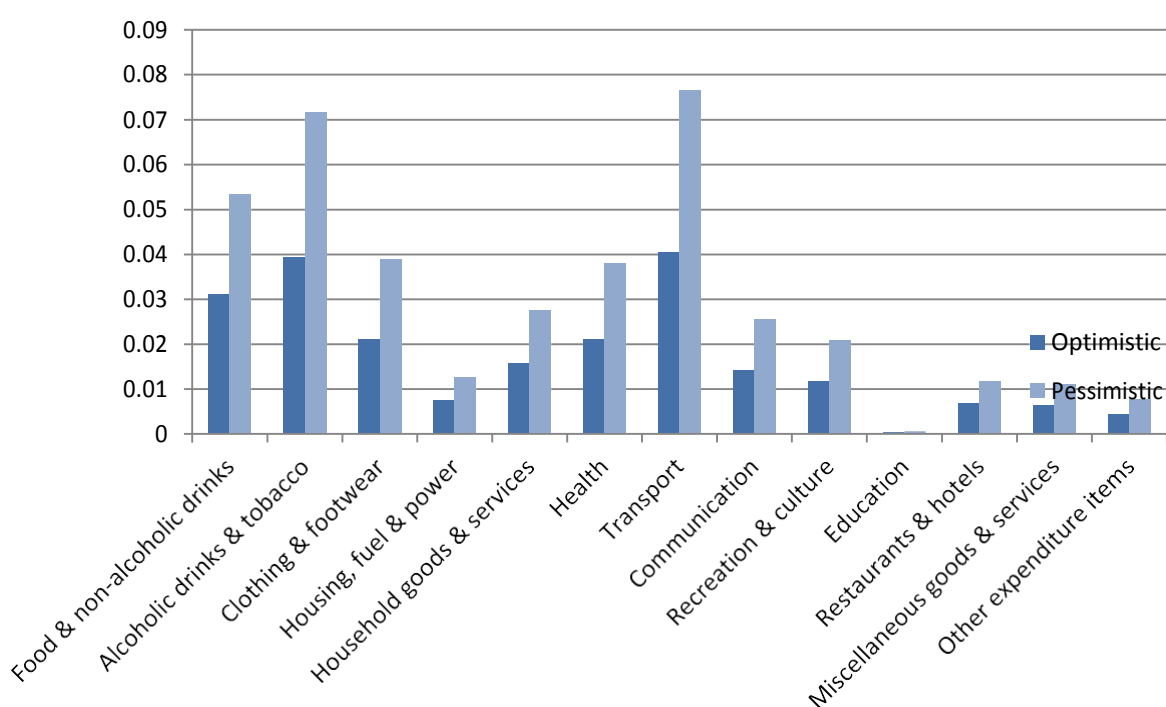
Distributional consequences of Brexit

Since our 31 sectors include business-to-business sales (intermediate inputs), which consumers do not directly purchase, we focus on the final goods and service price changes. Note that price changes for intermediates would also affect consumers indirectly. For example, in our pessimistic scenario, tariffs between the EU and the UK are 7.3% for transport equipment such as cars and 1.8% for basic metals such as steel. Higher tariffs on

transport equipment directly affect consumers because they raise the prices of imported cars. But higher tariffs on steel also raise the price of cars indirectly because they increase the production costs for domestic producers that import steel.

Figure 1 shows the overall predicted price changes for 13 broad groups of goods and services consumed by households. Groups that have a substantial share of tradeable products are predicted to see the largest price increases. Prices would rise most for transport (4% to 7.5%), alcohol (4% to 7%), food (3% to 5%) and clothing (2% to 4%). By contrast, service sectors such as education or hotels and restaurants would be less affected because they rely more on non-tradeable local inputs.

Figure 1: Price increases of goods and services after Brexit

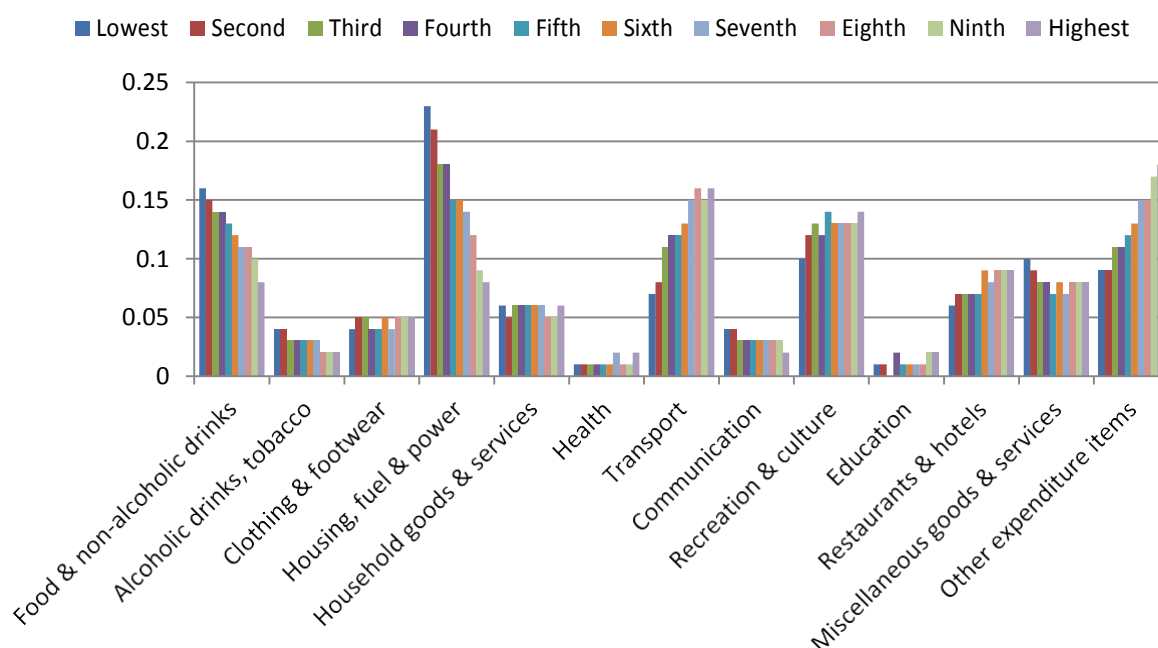


Notes: Predicted price increases are based on the model by Dhingra et al (2016a). See Table A1 in the Annex for the exact percentage changes for each product group.

We look at 10 income groups, from the poorest 10% to the richest 10% of household income in Figure 2. There are substantial differences in how they choose to spend their money as indicated by their expenditure shares across product groups. For example, the poorest 10% of households spend 16% of their income on ‘Food and non-alcoholic drinks’, whereas the richest 10% of households only spend around 8% on this category. This reflects the well-known fact that poorer consumers need to spend a larger proportion of their income on essentials.

By contrast, low-income households spend only 7% on ‘Transport’, which includes the purchase of vehicles as well as transport services such as rail and air travel; the richest 10% of households spend 16% of their income on transport.

Figure 2: Spending shares on goods and services by income deciles in the UK



Notes: Data from ONS (2012). Income deciles are based on gross household income.

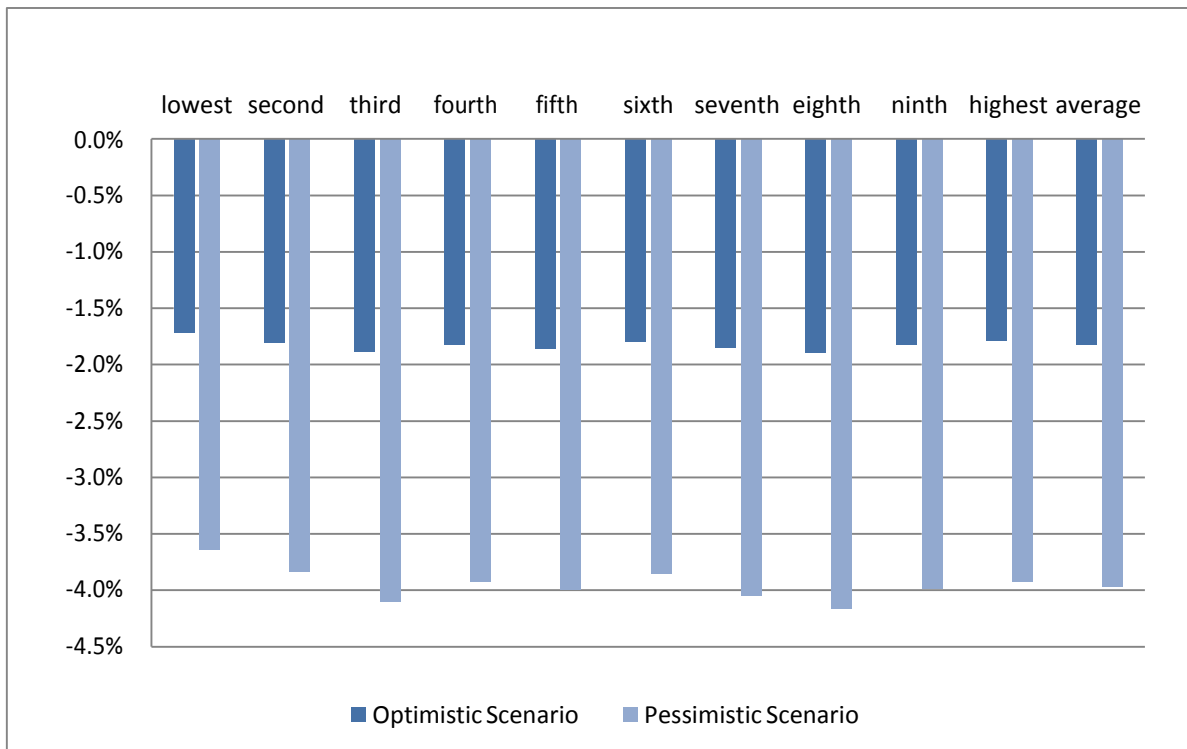
Figure 3 summarises the effect of the price changes following Brexit on the real incomes of the different household groups. In the optimistic scenario, the average household sees real income falls of 1.8%, whereas in the pessimistic scenario, this loss increases to 4%.¹ Looking across income groups, it seems that the drops are reasonably even. It is certainly not the richest 10% who do a lot worse. Households in the middle income groups are hit slightly harder, with income drops of up to 4.2%.

Another way of looking at the distributional effects of Brexit is to look across different types of households, such as pensioners, single households or households with children. The consumption expenditures of these different groups are unsurprising: pensioners spend more on ‘Health’ and families with children more on ‘Education’.

Overall, however, spending on the most important expenditure categories such as housing, transport and recreation is not too dissimilar across household groups. This explains why the effects of Brexit are similar across different types of households (Figure 4), with average losses ranging from 1.8% in the optimistic scenario to 4% in the pessimistic scenario. The only exception is single households, which lose slightly less (1.7% and 3.6%) because they spend relatively less on ‘Food and non-alcoholic drinks’, a product group that we predict to see large price increases after Brexit.

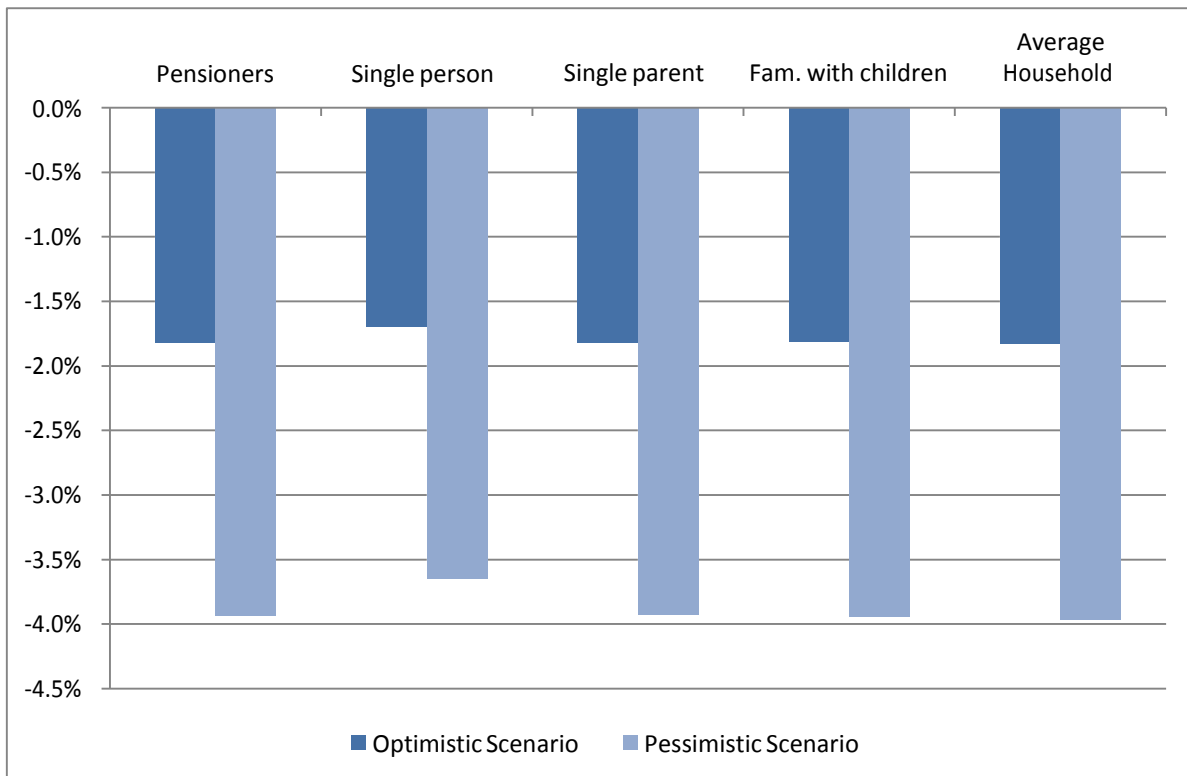
¹ Note that these changes take into account the net savings from lower EU contributions (see Dhingra et al, 2016b) for details. We assume that these are evenly spread across the population in proportion to gross income.

Figure 3: Real income losses by household income decile (%)



Notes: Predicted real income losses based on the model by Dhingra et al (2016a). See Table A2 in the Annex for the exact percentage changes for each income decile.

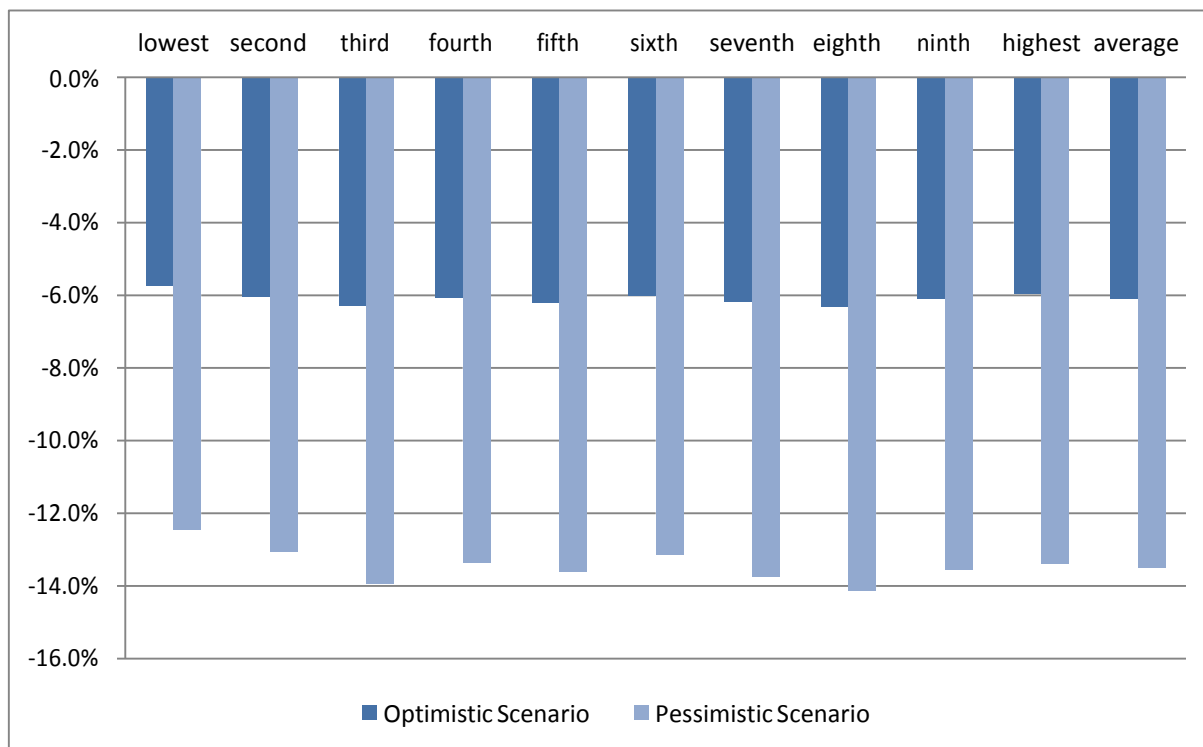
Figure 4: Real income losses by demographic groups (%)



Notes: Predicted real income losses based on the model by Dhingra et al (2016a). See Table A3 in the Annex for the exact percentage changes for each household group.

The effects analysed so far are ‘static’, so they ignore the effects of trade on productivity as well as the impact of Brexit on foreign direct investment (FDI), which is substantial. Incorporating these effects more than triples the magnitude of the income losses, as demonstrated in Dhingra et al (2016a). We illustrate this in Figure 5. We summarise the equivalent figures in cash (2016 prices) as well as percentage terms in Table 1 with more details in the Annex (Table A2). Note that these are all in terms of household gross income (not GDP).

Figure 5: Long-run real income losses by household income decile (%)



Notes: Predicted real income losses based on the model by Dhingra et al (2016a). See Table A2 in the Annex for the exact percentage changes for each income decile.

Looking solely at the static impact of trade, the income of the average UK household drops by between 1.8% (£754) per year and 4% (£1,637) per year. If we take into account the longer-run dynamic effects of Brexit on productivity, average households lose between 6.1% and 13.5% per year of their real incomes per year (£2,519 to £5,573). For the poorest tenth of households (bottom decile), real income losses are 1.7% to 3.6% in the short run and 5.7% to 12.5% in the long run. For the richest households, the short-run losses are 1.8% to 3.9% and the long-run losses are 6% to 13.4%.

Table 1: Summary of distributional effects of Brexit in cash terms

		Static Optimistic		Static Pessimistic		Dynamic Optimistic		Dynamic Pessimistic	
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Group	Average Gross Income	%	£	%	£	%	£	%	£
Poorest 10%	£10,019	-1.7%	-£172	-3.6%	-£365	-5.7%	-£575	-12.5%	-£1,248
Average	£41,238	-1.8%	-£754	-4.0%	-£1,637	-6.1%	-£2,519	-13.5%	-£5,573
Richest 10%	£110,228	-1.8%	-£1,968	-3.9%	-£4,329	-6.0%	-£6,578	-13.4%	-£14,744

Notes: 2015-16 gross incomes figures projected from ONS (2012, 2014). Optimistic is the EEA model and Pessimistic is the WTO model. Dynamic model includes productivity effects of trade and FDI, static model does not. Summarised version of Table A2 in Annex.

Incorporating other distributional effects of Brexit

The calculations so far focus on price changes and therefore the effects on real income, implicitly assuming that nominal wage changes are proportional across income groups (that is, the percentage changes are the same). This seems to be a reasonable assumption. The changes in prices across sectors predicted by our model are not significantly correlated with average skills (as measured by earnings) across sectors (Annex).

Economists for Brexit (2016) recommend that the UK unilaterally abolishes all trade barriers after leaving the EU. They claim that this will increase UK trade and incomes. Their model predicts extremely large increases in wage inequality, which would mean that lower income groups would lose out much more from Brexit than we find. Dhingra et al (2016c) show that the modelling approach used by Economists for Brexit is unreliable as it is inconsistent with the most basic empirical evidence on how countries trade (for example, their model implies that the UK could cease exporting to the EU entirely at no cost). When we examine the impact of trading under WTO rules and moving unilaterally to free trade, the losses in real income would still be substantial.

We do not model adjustment costs arising from the need to move workers across different sectors because it is difficult to know what the exact effects would be. As there are likely to be such adjustment costs from the Brexit shock, this would magnify the income losses discussed here.

There is a view that EU immigration has had a negative effect on the labour market and that Brexit would help this by reducing migration. But as Wadsworth et al (2016) show, EU immigration has not increased unemployment or reduced the wages of the UK-born living in the areas where immigration has risen the most. Nor is there any robust evidence that the low-waged were hurt by much more than those at the top of the income ladder (Centre for European Reform, 2016). In fact, the most likely impact of EU immigration on wages is a

positive one due to improved productivity. So it is unlikely that changes to immigration patterns would materially alter the pattern of income losses reported here.

Conclusions

Economists consistently find that Brexit would lower real incomes in the UK. The cost of lower trade and foreign investment would not be outweighed by a reduction in the net fiscal transfer to other parts of the EU.

This report shows that the economic cost of Brexit would not be just born by the rich. The pain would be evenly shared across the income distribution – every group would lose by broadly similar proportions. Those in the middle would lose slightly more than others, with average losses of between 1.8% (£754 per year) and 13.5% (£5,573 per year).

When it comes to the pain from leaving the EU, it appears that no one would be spared.

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For further information

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Further reading

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Annex: More details of the calculations

To calculate the implied effects of Brexit across the income distribution and different demographic groups, we start with the estimated effects on industry prices from our structural computable general equilibrium model in Dhingra et al (2016a). For different assumptions over post-Brexit trading relationships, we estimate what effect this will have on industry prices and average nominal wages. In our model, Brexit-induced price changes vary across sectors for three reasons:

- First, trade barriers increase by different amounts across sectors.
- Second, a given increase in barriers will lead to different price changes in different sectors, depending on how much of the trade cost change is passed on to consumers.
- Third, all sectors use inputs from other sectors, so that they are also affected by changing trade barriers in those other sectors through input-output relationships.

The end result of our model simulations is a list of price changes for each of the 31 sectors from the World Input Output Data (WIOD), shown in Table A1 below.

Data for household expenditure on goods and services by income and demographic groups are available from the 2012 edition of the Office for National Statistics (ONS) Living Costs and Food Survey (Tables A5, A6 and A17). Figure 1 shows expenditures of each income decile on 13 broad groups of final goods and services. We map the 31 WIOD sectors onto these 13 expenditure groups using correspondences provided by OECD (2001). As explained in the main text, households do not directly consume some of the intermediate input sectors in WIOD (for example, basic metals such as steel) but are still affected by the corresponding price changes as it feeds into the prices of final goods that they do buy (for example, cars).

Figure A2 shows the correlation between average weekly earnings by sector and the price changes from Table A1. Average weekly earnings are from ONS (2016). The fitted line in Figure A2 is based on an OLS regression of price changes on average weekly earnings. The slope of the fitted line is 0.0009 and the corresponding robust standard error is 0.0013. Because the slope coefficient is not statistically significantly different from zero, we assume in our analysis that there is no differential impact of Brexit on nominal wages.

Table A2 gives the details on the exact proportionate losses by income groups and their cash equivalents shown in the Figures and Table 1. We update the level of income from ONS (2014), which has 2013-14 data to 2015-16 values using the growth in income of 5.2% over the two years from ONS. Note that although the numbers are similar to those in Dhingra et al (2016a) they are not identical for two main reasons.

First, we are looking at the effects on real incomes of final consumers. The average price increase in Figure 1 is larger than in Table A1 because the effects of Brexit are greater on prices of final goods and services that households directly spend money on (like food) than they are for intermediate goods (like non-metallic minerals).

Second, we are looking at household income and spending rather than GDP (average GDP per household is higher than average income per household). For example, households report

spending only small amounts on health and education as these are provided as free public services by the state. Since the prices of health and education do not rise much, there appears to be little negative effect on these items. This is why looking at overall GDP, which includes government spending (as we did in Dhingra et al, 2016a), is in some respects preferable to looking at just household spending and income patterns.

The long-run calculations are based on calculations in Dhingra et al (2016a). There we find a long-run reduced form impact reduction of real GDP per capita of between 6.3% and 9.5% compared with 1.3% (optimistic) and 2.6% (pessimistic) in the short-run static model. Using the midpoint of the static effects (1.95%) and a conservative lower bound of 6.3% for the dynamic effects, this implies a ratio of 3.23 ($=6.3/1.95$) between static and dynamic. We pro-rata up the static effects by this ratio to calculate the dynamic effects in Figure 5.

Table A1: Price changes by product groups shown in Figure 1

Product group	Optimistic scenario	Pessimistic scenario
Food and non-alcoholic drinks	3.1%	5.3%
Alcoholic drinks and tobacco	3.9%	7.2%
Clothing and footwear	2.1%	3.9%
Housing, fuel and power	0.8%	1.2%
Household goods and services	1.6%	2.8%
Health	2.1%	3.8%
Transport	4.0%	7.7%
Communication	1.4%	2.6%
Recreation and culture	1.2%	2.1%
Education	0.0%	0.1%
Restaurants and hotels	0.7%	1.2%
Miscellaneous goods and services	0.6%	1.1%
Other expenditure items	0.4%	0.8%

Notes: Table shows the exact price changes underlying Figure 1.

Table A2: Change in household income by decile group

		Static Optimistic		Static Pessimistic		Dynamic Optimistic		Dynamic Pessimistic	
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Decile	Average income	%	Amount	%	Amount	%	Amount	%	Amount
Lowest	£10,019	-1.7%	-£172	-3.6%	-£365	-5.7%	-£575	-12.5%	-£1,248
Second	£17,155	-1.8%	-£310	-3.8%	-£658	-6.0%	-£1,036	-13.1%	-£2,243
Third	£21,399	-1.9%	-£403	-4.1%	-£878	-6.3%	-£1,346	-13.9%	-£2,984
Fourth	£25,192	-1.8%	-£459	-3.9%	-£989	-6.1%	-£1,532	-13.4%	-£3,370
Fifth	£30,463	-1.9%	-£568	-4.0%	-£1,217	-6.2%	-£1,895	-13.6%	-£4,143
Sixth	£36,059	-1.8%	-£650	-3.9%	-£1,389	-6.0%	-£2,171	-13.1%	-£4,736
Seventh	£43,261	-1.9%	-£802	-4.0%	-£1,751	-6.2%	-£2,678	-13.8%	-£5,953
Eighth	£52,627	-1.9%	-£997	-4.2%	-£2,192	-6.3%	-£3,327	-14.1%	-£7,445
Ninth	£65,982	-1.8%	-£1,207	-4.0%	-£2,629	-6.1%	-£4,030	-13.6%	-£8,949
Highest	£110,228	-1.8%	-£1,968	-3.9%	-£4,329	-6.0%	-£6,578	-13.4%	-£14,744
Average	£41,238	-1.8%	-£754	-4.0%	-£1,637	-6.1%	-£2,519	-13.5%	-£5,573

Notes: ‘%’ is the implied percentage change in gross income from the static structural model in columns (1) and (3) and ‘£’ the cash equivalent of that change (2016 prices). ‘Dynamic’ takes into account long-run productivity effects. 2013/14 Gross income figures from ONS (2014) projected forward by 5.2% for 2015/16 to account for income growth.

Table A3: Change in household income by household groups (Figure 4)

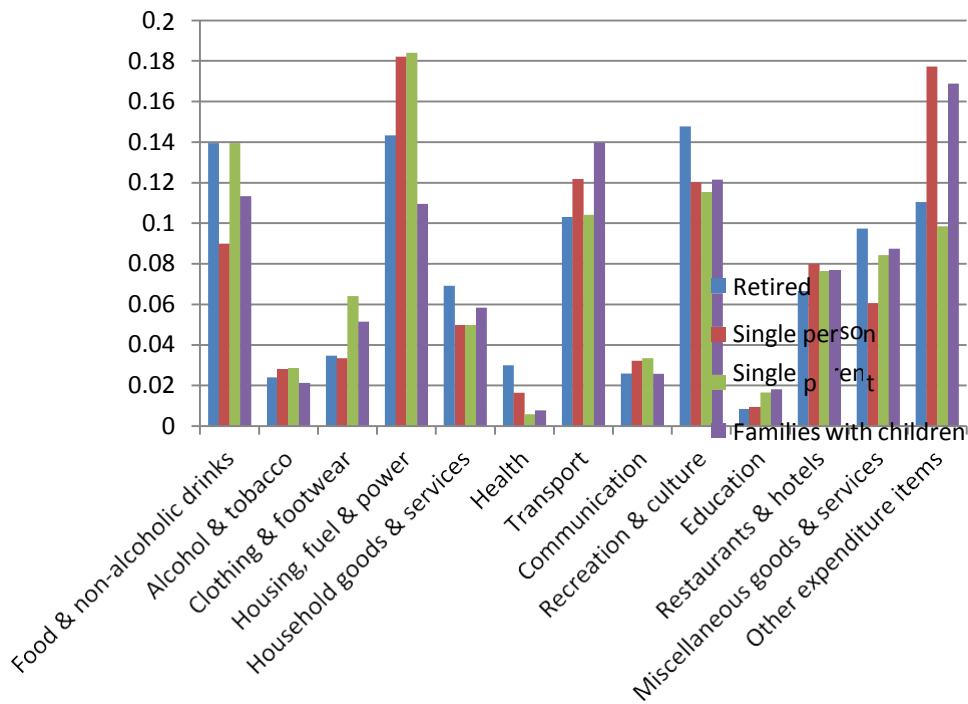
Household group	Pensioner	Single person	Single parent	Families with children
Optimistic scenario	-1.8%	-1.7%	-1.8%	-1.8%
Pessimistic scenario	-3.9%	-3.6%	-3.9%	-3.9%

Notes: Table shows the exact real income changes underlying Figure 4.

Table A4: Price changes by WIOD sector

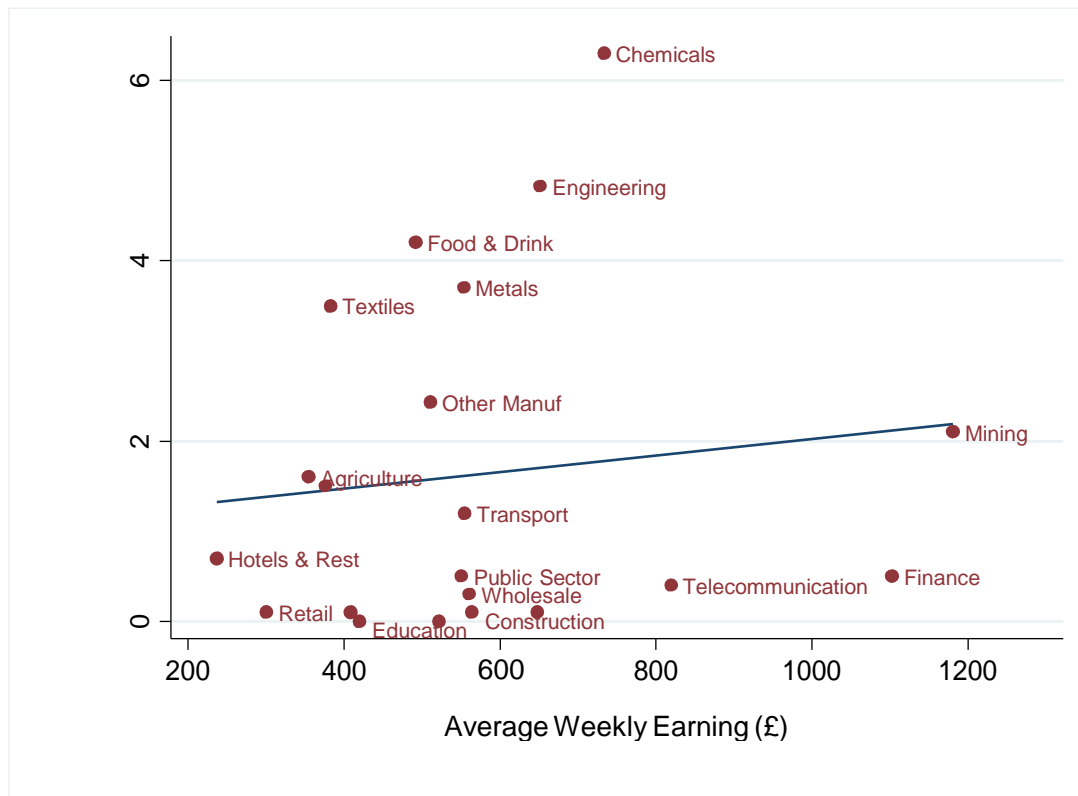
WIOD31	Sectors	Price Change: Optimistic	Price Change: Pessimistic
1	Agriculture, Hunting, Forestry and Fishing	1.60%	2.00%
2	Mining and Quarrying	2.10%	3.20%
3	Food, Beverages and Tobacco	4.20%	7.70%
4	Textiles and Textile Products; Leather, Leather and Footwear	3.50%	5.10%
5	Wood and Products of Wood and Cork	1.60%	2.50%
6	Pulp, Paper, Paper , Printing and Publishing	1.60%	3.00%
7	Coke, Refined Petroleum and Nuclear Fuel	3.30%	3.80%
8	Chemicals and Chemical Products	6.30%	12.30%
9	Rubber and Plastics	2.50%	4.80%
10	Other Non-Metallic Mineral	1.40%	2.60%
11	Basic Metals and Fabricated Metal	3.70%	6.50%
12	Machinery, NEC (Not Elsewhere Classified)	4.20%	8.50%
13	Electrical and Optical Equipment	5.70%	10.10%
14	Transport Equipment	6.60%	13.90%
15	Manufacturing, NEC; Recycling	2.80%	5.20%
16	Electricity, Gas and Water Supply	0.10%	0.30%
17	construction	0.10%	0.20%
18	Retail Sale of Fuel; Wholesale Trade, Commission Trade, including Motor Vehicles and Motorcycles	0.30%	0.60%
19	Retail Trade, Except for Motor Vehicles and Motorcycles; Repair of Household Goods	0.10%	0.20%
20	Hotels and Restaurants	0.70%	1.20%
21	Inland Transport	0.30%	0.40%
22	Water Transport	1.70%	2.80%
23	Air Transport	2.50%	4.90%
24	Other Supporting and Auxiliary Transport Activities; Activities of Travel Agencies	0.30%	0.50%
25	Post and Telecommunications	0.40%	0.70%
26	Financial Intermediation	0.50%	0.90%
27	Real Estate Activities	0.00%	0.10%
28	Other Business Activities and renting of equipment	1.50%	2.70%
29	Education	0.00%	0.10%
30	Health and Social Work	0.10%	0.10%
31	Public Admin, Defence, Social Security and other public service	0.50%	1.00%

Figure A1: Spending shares on goods and services by demographic groups in the UK



Notes: Data from ONS (2012). Income deciles are based on gross household income.

Figure A2: Average sectoral earnings and Brexit-induced price changes



Notes: Average weekly earnings from ONS (2016), predicted price changes based on the model by Dhingra et al (2016a).