University of Strathclyde Business School

The Impact of a Reduction in Scotch Whisky Tariffs in India on the UK Economy

Fraser of Allander Institute

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The report was commissioned in June 2021 by The Scotch Whisky Association.

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Executive Summary

- The Scotch Whisky industry is a major contributor to the Scottish economy with exports of almost £5 billion in 2019 and supported £5.5 billion of UK GVA in 2018.
- One of the biggest export destinations for Scotch Whisky is India. In 2019, it was the second largest export destination for Scotch by volume and the seventh largest by value.
- Exports of Scotch to India stood at £166m in 2019. In 2020 this fell to £102m due to the pandemic, although this reduction is expected to be temporary.
- India is also a major export destination for the bulk trade of whisky, with Scotch exported in large quantities for use within Indian whiskies.
- Large tariffs are imposed on Scotch Whisky that is imported to India. These tariffs are currently set at 150%, leading to significantly higher prices for Indian consumers.
- This report examines four hypothetical reductions in Indian tariffs – down to 75%, 30%, 20% and 0%, with a central scenario of 30%.
- We estimate the expected uplift in Scotch exports from a reduction in tariffs from 150% to 30% to be between £15m and £80m.
- The range in values represents the uncertainty around the responsiveness of consumers in India to a fall in prices, and the uncertainty around the amount of tariff reduction passed through to consumers. We have provided a likely range based on academic literature.
- This increase in exports will support (per year) an additional £39m – £205m of GVA, £28m – £145m of output, and 240 – 1,300 jobs in the UK economy. This includes the impact on both Whisky exporters and on wider spill-over effects in the supply chain.
- Each additional £1m of Scotch Whisky exports supports 16 full-time equivalent jobs in the UK.

1. Introduction

Scotch Whisky is the world's most internationally traded spirit with exports worth almost £5bn annually. The Scotch Whisky Association (2018) estimates that Scotch supported £5.5 billion of gross value added (GVA) in the UK economy in 2018[1].

Some of the biggest Scotch whisky importers include the US and France, in both value terms and the number of bottles. Exports of Scotch to India have grown significantly over the decade and India is now the 7th largest export destination in terms of value in 2019.

In recent years, Scotch Whisky has also become one of the most tariffed products traded on the global market.

Exporting Scotch to India is particularly challenging due to the following factors –

- India has a complicated federal structure, with the legislation on alcohol governed by individual states, which has created multiple markets with different regulations, tax structures and legalities surrounding alcohol.
- In India, a 150% tariff is imposed on Scotch whisky, compared to 25% previously imposed in the US, and 5% currently imposed in China.

In June 2021, the Scotch Whisky Association commissioned the Fraser of Allander Institute to estimate the impact on the UK economy of additional whisky exports to India that could result from a reduction in tariffs.

This report includes 4 sections:

- A brief analysis of the Scotch Whisky industry;
- A review of the literature on the demand for whisky;
- Modelling results estimating the impact of a tariff reduction to 30% on Scotch Whisky; and
- Modelling results for alternative tariff scenarios.

[1] This is an updated figure based on a report by Cebr - "The UK alcohol industry – a Cebr report assessing the UK alcohol sector and its taxation structure". The figure has been calculated using data from the UK supply use tables to create an economic multiplier for spirits and apportioning the estimate to Scotch based on its direct GVA share. This estimate includes the direct sector GVA and the spill-over impacts on supply chains.

2. The Scotch Whisky Industry

Introduction

The Scotch whisky industry contributed £5.5bn in gross value added (GVA) to the UK economy in 2018.

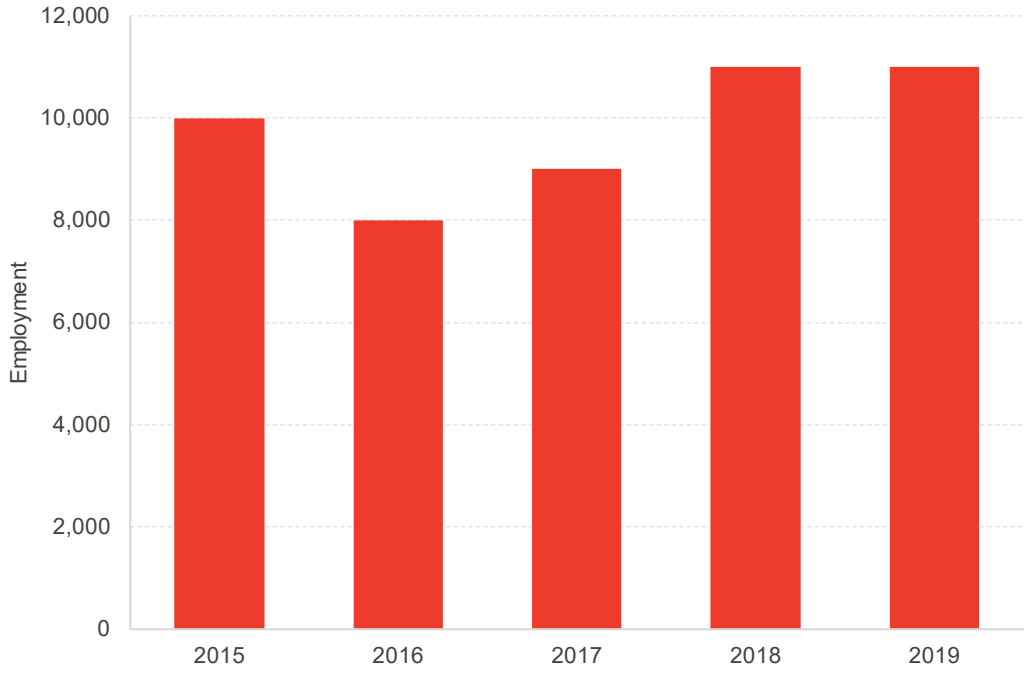
In 2019, Scotch Whisky accounted for around 21% of all UK food and drink exports and 1.4% of all UK goods exports, with global exports valued at £4.9bn in 2019, however this had fallen to a value of £3.8bn as of 2020.

However, it is not just the sale of whisky that generates economic benefits for the Scottish and UK economy, its production supports employment across the country.

This industry also directly employs over 10,000 people in Scotland and over 40,000 people across the UK.

As of 2019, there was 11,000 people employed in the distilling, rectifying and blending of spirits sector in Great Britain, of which 73% were based in Scotland. See Chart 1.

Chart 1: Employment in Distilling, rectifying and blending of spirits (SIC 11.02), Great Britain, 2015 - 2019



Source: *BRES*

Scotch exports

In the past year, the Scotch whisky industry has not only been disproportionately hit by the introduction of higher tariffs by several countries, but also the Covid-19 pandemic.

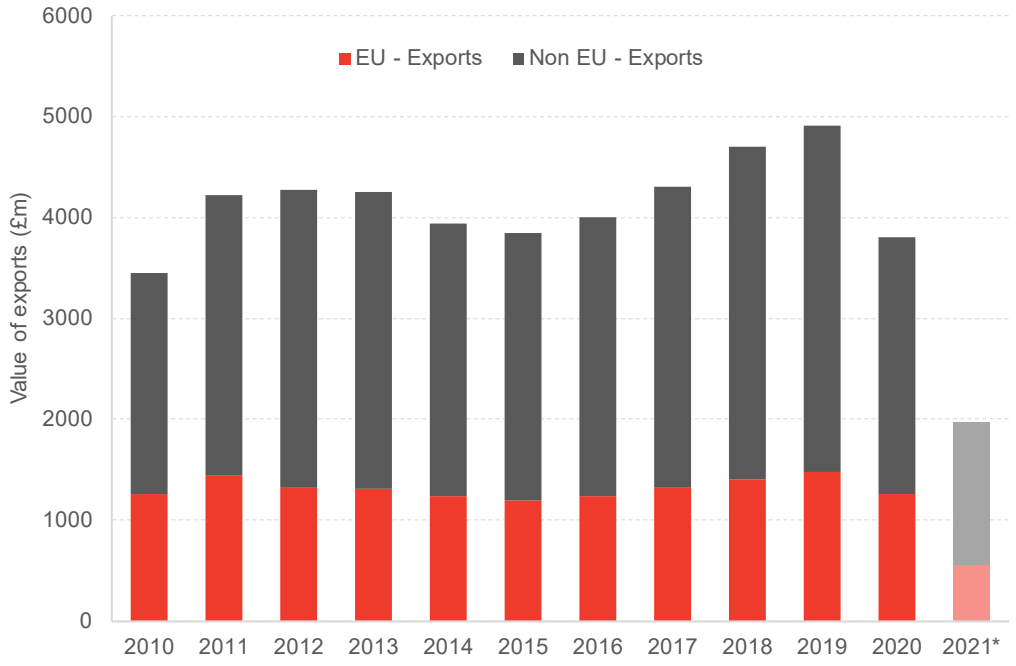
Global exports of Scotch whisky fell by over £1 billion last year, with the value of exports of whisky the lowest in a decade.

In 2020, there was a 13% decrease in the number of 70cl whisky bottles exported, resulting in the export value of Scotch whisky to contract by just under a quarter.

Over the past decade, the value of Scotch whisky exports made up from non-EU trade has been expanding. In 2010, the share of non-EU whisky exports was around 63%, a decade later this share increased by 4 percentage points to 67% and was as high as 70% in 2018.

After a difficult year for international supply chains in 2020, exports of Scotch have started picking up in 2021. Exports for January to June now stand at similar levels to those seen in 2018. See Chart 2.

Chart 2: Total UK Scotch whisky EU and non-EU exports, nominal, 2010 – 2021. *2021 includes January – June data only.



Source: *HMRC*

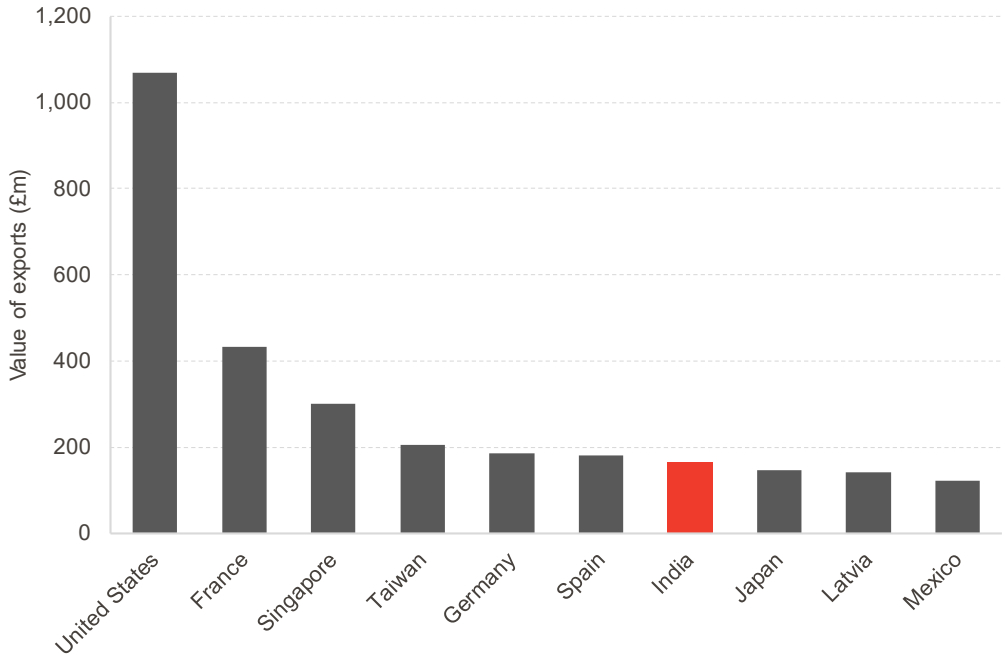
International export destinations

The United States is the largest export destination for Scotch whisky in value terms however, only the third largest export destination in terms of the amount of whisky exported. See Chart 3 and Chart 4.

But, whilst the US became a billion-pound market for Scotch Whisky in 2019, valued at £1.07 billion, the 25% tariffs – imposed in October 2019 – combined with the pandemic resulted in exports of Scotch to the US falling 32% in value terms between 2019 and 2020. This was compared to a 20% fall for non-US exports.

Chart 3 shows the top 10 exports destinations for Scotch Whisky. 2019 data is used as a more representative baseline for international trade than 2020.

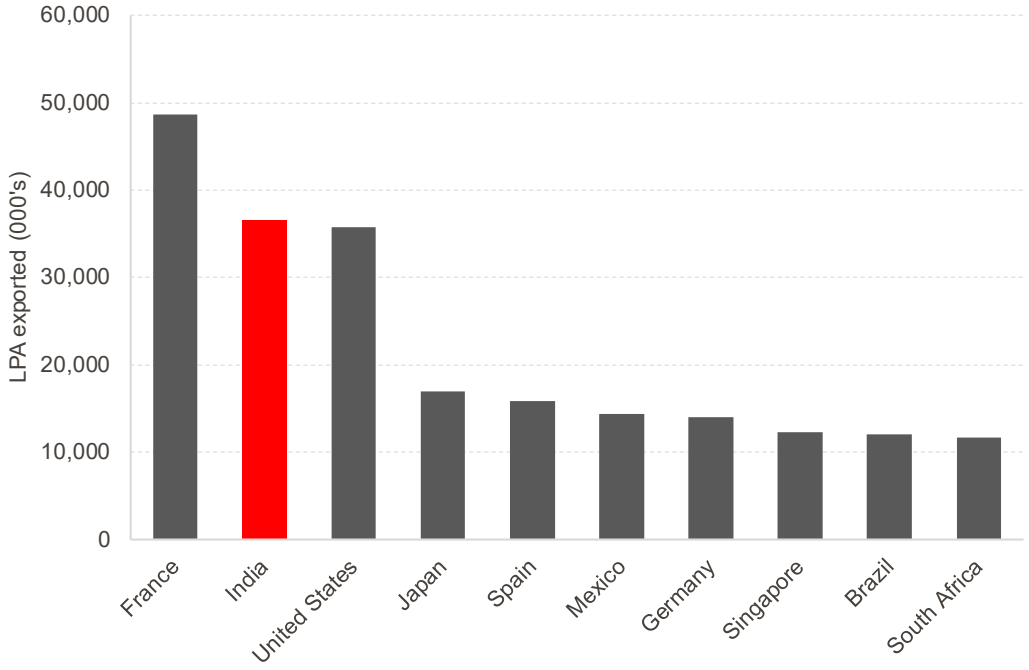
Chart 3: Export value by largest export destination, Scotch whisky, UK, 2019



Source: *HMRC*

India is the 7th largest Scotch export destination by value and the 2nd largest by litres of pure alcohol (LPA). These amount to 3.4% of export value and 10% of export volume. In terms of mass (kg), India drops to the third largest export destination for Scotch whisky, indicating that a large quantity of whisky exported to India is in bulk quantities.

Chart 4: Volume (LPA) of Scotch Whisky exported to top 10 export destinations, UK, 2019



Source: *HMRC*

Exports to India

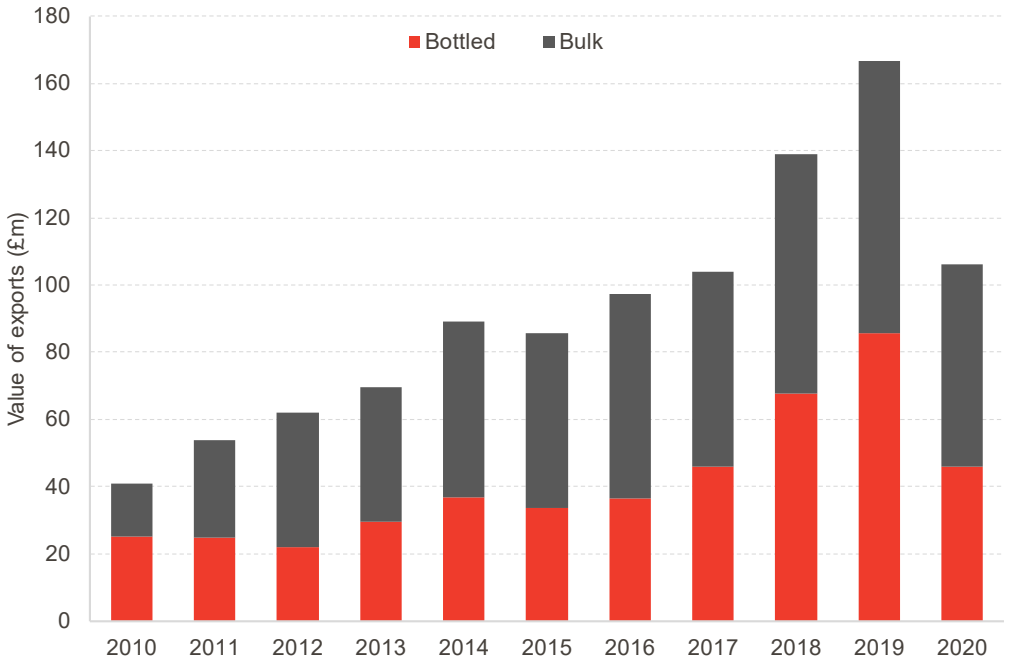
Between 2010 and 2019, whisky exports to India have more than quadrupled in value from £40m to £166m. See Chart 5.

This reflects two key trends seen in India. The first is increased consumer demand for Scotch whisky and the second is the increasing use of Scotch bought in bulk and used in Indian whiskies.

Total whisky exports to India totalled £102 million in 2020, 38% down on its value in 2019. The industry considers this to be a temporary effect due to the fragility of international supply chains during the period of the pandemic.

A large share of the whisky exported to India is shipped in bulk. Bulk Scotch represented 84% of export volume to India and 48% of export value in 2019. Around 31% of the bulk Scotch is directly bottled in India, while the remaining 69% is mixed with Indian whisky.

Chart 5: Exports of bottled and bulk Scotch, 2010 - 2020



Source: *HMRC*

3. Key literature for economic modelling

Modelling the impact of a reduction in Scotch tariffs on the UK economy can be broken down into two steps.

The first step is to understand how a reduction in tariffs can lead to an increase in Whisky exports. This impact of exports then feeds in to our model of the UK economy. These exports lead to greater purchases by the Whisky industry and we can use current patterns of purchases by the industry to understand the economy wide effects of this impact.

In this section, we analyse evidence in the academic literature for two critical assumptions to the export uplift estimated in the first step. These are:

- The pass through rate of a tariff cut. If tariffs fall, the prices that consumers pay do not necessarily fall by the same amount. For instance, some firms may choose to absorb some of the tariff reduction in the form of additional profits.
- The price elasticity of demand for Scotch. In other words, the extent that consumers respond to a fall in the price of Scotch by increasing their demand.

Price elasticity of demand for whisky – empirical estimates

Literature on the demand elasticities of whisky in India is less common than research into the elasticities of aggregated products, i.e. spirits, due to this research question being very specific.

There is a significant variety of alcohol on the global market. Therefore, for the purpose of modelling demand elasticities, many of these alcoholic drinks are grouped together (Gallet, 2007). While this eases some modelling difficulties, it means that the literature consists mostly of demand elasticities for broad alcohol groups, like 'Spirits'.

It is therefore important to consider how similar Scotch is to other spirits. Similarities between some spirits, such as gin, are more obvious than typically low priced spirits such as vodka.

As a result of the challenges in identifying exact Scotch elasticities, this literature review aims to provide a likely range of demand elasticity estimates.

Before, we get started, what do we mean by the 'Price Elasticity of Demand' (PED)?

The PED shows the percentage change in the quantity demanded of a good, resulting from a 1-percent increase/decrease in its price.

Why is this important?

When tariffs (prices) are increased/decreased, the change in the quantity demanded will not always increase one-for-one. Instead, different goods will have different elasticities –

- Perfectly inelastic demand (PED = 0): quantity demanded does not change when price changes;
- Unitary elastic demand (PED = 1): quantity demanded changes one-for-one with the price change;

- Relatively elastic demand (PED › 1): quantity demanded changes more than the change in price; and,
- Relatively inelastic demand (PED ‹ 1): quantity demanded changes less than the change in price

Most of the literature analyses the response of demand to price increases – typically due to tax hikes – therefore, they typically discuss negative PEDs.

John (2005) uses data from the National Sample Survey Organization in India. They studied aggregated elasticities for all types of alcohol and found elasticities close to -1; unitary elastic demand. The paper also finds that alcohol demand is more price elastic in urban India and inelastic in rural India.

Musgrave and Stern (1988), using NSS surveys for Karnataka in India from 1973–1974 and 1977–1978, estimate price elasticities of country spirits to be in the range of –0.47 and –0.62; relatively inelastic.

Another study looking specifically at Indian data is from Reddy et al. (1999). They found an elasticity of demand for arrack (local liquor) in the range of –1.23 to –1.36; relatively elastic. However, their sample only had 86 moderate-to-heavy alcohol consumers of arrack in Andhra Pradesh. Therefore, it is very difficult to infer what this means for the whole Indian population.

Kumar (2016) uses data from the Survey of Unrecorded Alcohol in India to estimate price elasticities of demand for different types of alcohol. The research finds a price elasticity of demand of -0.14 for spirits, -0.46 for country liquor, and -0.33 for beer. However, this only included unrecorded (i.e. illicit) alcohol sales.

There are several papers which examine the elasticity of demand for alcohol in other countries. Meng et. al (2014), using data from the UK's Living Costs and Food Survey, find that beer and cider are the most price elastic types of drinks (-1.27 and -0.98 respectively). They find that off-trade spirits and on-trade ready-to-drinks are least elastic (-0.08 and -0.19).

Additionally, Clements, Yang, and Zheng (1997) study price elasticity of demand across a group of 7 developed countries. Across these 7 countries, they find mean price elasticities ranging from -0.98 for spirits to -0.35 for beer.

However, according to the Euromonitor (2014) consumers in developed markets tend to react more to price increases than consumers in developing markets. Specifically, for single malt Scotch whisky, they find an elasticity of around-0.5 in developed countries and only -0.1 in developing countries.

Araya and Paraje (2018), using the Family Budget Survey in Chile, find an elasticity of -0.14 for spirits. Comparing this to the Clements, Yang, and Zheng (1997) and the Euromonitor (2014) studies, this paper provides further evidence for more inelastic demand in developing countries.

Gallet (2007) conducted a meta-analysis of 132 different studies which analysed elasticities across different types of alcohol. Using a meta-regression, they found a price elasticity of -0.26 for spirits, -0.28 for wine and -0.26 for all categories of alcohol.

Finally, Wagenaar et. al (2009) conducted a meta-analysis of 112 different studies and found average elasticities of -0.80 for spirits, -0.69 for wine, and -0.46 for beer.

Factors affecting the elasticity of demand for whisky

Some of the key factors which influence Scotch elasticities are:

- Availability of near substitutes (both in product quality and price)
- The availability of illicit alcohol as a substitute
- Income levels relative to the price of whisky
- Habit formation and alcohol dependency
- Indian consumer preferences for different types of alcohol
- The time period under consideration - consumers are typically more inelastic over shorter periods

The price of Scotch and availability of substitutes

A major factor affecting the price elasticity of demand is the availability of near substitutes. If there are more substitutes available, demand for whisky will be more elastic. This is because consumers are happy to switch to the lower priced alternative after a price decrease. On the other hand, if there are fewer substitutes available, demand will be less elastic.

Scotch Whisky exports to India can be exported as bottled Scotch Whisky, exported in bulk to be bottled as Scotch in India, or exported in bulk to be used in Indian-made Foreign Liquor (IMFL).For this section on elasticities, we shall refer to the first two as Scotch, and the latter as IMFL.

When looking at the price that consumers face, Scotch is priced considerably higher than IMFL. It's primary substitutes are other imported spirits which are, in general, comparably priced.

Conversely, Indian whisky (including IMFL) is priced competitively ($4.60 in 2019) compared to other domestically produced Indian alcohol ($4 - $6). Not only does IMFL therefore compete with many other low priced spirits in India but it also competes with illicit alcohol.

India, in particular, has a significant illicit alcohol market. The World Health Organization (2014) estimates that 51% of all alcohol sold in India was unrecorded.

Goods with more available substitutes are more price elastic. A small reduction in price for an alcohol with many substitutes can result in many consumers switching over from similar products. Looking at the evidence above on prices and illicit alcohol, IMFL appears to face more potential substitutes than Scotch, contributing to a higher expected elasticity.

Luxury or necessity?

In general, luxury goods usually have a high price elasticity of demand while necessities are relatively inelastic. For example, a 50% price reduction for a car is likely to open the potential pool of purchasers up further than a 50% price reduction for loaf of bread. It's therefore important to consider if a reduction in price for IMFL or Scotch could unlock a consumer based that was previously priced out.

However, this is not always true if the product is disproportionately bought by consumers on very high incomes. While middle and low income consumers are sensitive to changes in price for expensive goods, very high income consumers typically have inelastic responses. The degree to which Whisky consumption is spread across income groups in India represents an uncertainty in our modelling.

The relatively expensive price of Scotch and low price of IMFL initially points to the former being a luxury good, however other factors can affect their status.

For alcohol in particular, cultural preferences and the prevalence of heavy drinking can play a key role in their elasticity. For example, wine is price inelastic in countries where it is culturally common to drink wine with a meal. In other countries, alcohol may be more likely to be used as an intoxicant.

Countries that drink wine with meals are more likely to switch to water than they are to home-distilled spirits. In effect, home-distilled spirits are not seen as a true substitute for wine. Conversely, in countries where alcohol is mainly used as an intoxicant, an increase in alcohol prices is more likely to lead to an increase in home-distilling or illicit drugs – the selection of substitutes is wider (Österberg, 2012).

The impact of different levels of alcohol consumption on elasticities is mixed. Chaloupka et al. (2002) finds that higher levels of consumption can lead to higher long-term elasticities due to future dependency being related to current heavy drinking. However, a more comprehensive meta analysis of 112 studies found that average alcohol elasticities associated with heavy drinking are -0.28 compared to -0.51 for alcohol as a whole (Wagenaar et al, 2009).

Many of the elasticity studies seen earlier for specific types of alcohol are undertaken in European and North American countries. However, evidence suggests that India has a different cultural view of whisky (and alcohol as a whole) to many of these countries.

In 2010 almost 75% of adults (15+) in India said that they have never drank alcohol. This compares to 15% in the UK and 12% in the US. Secondly, heavy drinking is also less common in India (Ritchie and Roser, 2018). Overall, evidence suggests that India culturally views alcohol differently to many of the countries in which alcohol elasticities are studied. Based on the evidence from Wagenaar et al. (2009), the lower proportion of alcohol consumption and heavy drinking in India suggests higher elasticities for alcohol.

In terms of consumer preferences, Scotch accounts for only a small share of the Indian alcohol market. However, spirits (including Indian Whisky) are a significantly larger component of alcohol consumption in India than many other countries and this presents an important distinction between Indian preferences and European and US preferences. In this respect, spirits are more of a stable of Indian alcohol consumption, but Scotch is not likely to be a staple itself.

Overall, we believe that, on a scale of necessity to luxury, Indian consumers view sales of Scotch as more of a luxury than consumers in Europe and the US do. In general, this would imply that the demand for aggregate Scotch and IMFL may be more elastic in India than in Europe and the US.

However, the elasticities of Scotch are highly likely to differ from those of IMFL. While it is possible to argue that either is the most elastic, we believe that the significant amount of close substitutes that IMFLis competing with is likely to make it the more elastic of the two, resulting in an elasticity for combined Scotch and IMFL that is much higher than those seen in Europe and the US. Conversely, we believe that Scotch, unless a lower price unlocks a significant amount of consumers, is likely to be more inelastic.

Pass-through rates

The size of the economic impact of reducing whisky tariffs will depend both on the elasticity of demand and on the "pass through rate". That is, if tariffs were to fall by the full 150%, the price may not drop by the same amount. Firms can choose to pass on the full tariff reduction in the form of lower prices (100% pass through), part of the reduction and absorb the remainder as profits, or absorb the whole reduction as additional profits (0% pass through).

This can affect the beneficial effects of a tariff cut to a large degree. A situation where, on aggregate, only half of the tariff cut is passed through will result in a halving of the expected export increase in terms of volume.

Not many academic papers study the pass-through rates of tariffs directly. However, there is a vast literature which examines the pass-through rates of excise taxes on alcohol to prices which can provide relevant insights.

Shang, Ngo, and Chaloupka (2019) study the pass-through rates of alcohol taxes to prices for 27 OECD countries. They find a pass-through rate of 1.14 for Scotch Whisky. This implies that for every 1 percentage point increase in the tax rate, the price of Scotch Whisky will increase by 1.14%. This suggests that for Whisky there may be an 'over-shifting' of excise taxes to prices.

Nelson and Moran (2019) carried out a meta-analysis of 30 empirical studies that examined the pass-through of increased taxes to prices. They find 18 studies that estimate pass-through rates for spirits. Only five studies support over-shifting (raising prices beyond the level of the tax increase); one study supports full shifting; six studies indicate under-shifting products (raising prices below the level of the tax increase); and mixed results are found in six studies.

Overall Nelson and Moran (2019) find a range of pass through rates to be around 0.70 to 3.28, with a mean of 1.04[2]. This study indicates that a pass through of 100% for tax rises is most common, with some businesses over-shifting and some under-shifting the tax hike.

In another meta-analysis Wagenaar et. al (2009) find that pass through rates, in the case of tax rises, can exceed one – providing some further evidence that businesses may over-shift when faced with tax hikes.

Ally et. al (2014) analyse the pass-through rates of excise taxes to prices in the UK using product-

[2] Under a fixed effects regression this implies a 95% confidence interval of 1.00 – 1.08. Under a random effect regression, the 95% confidence interval is slightly wider at 0.93 – 1.17.

level supermarket price data for 254 alcohol products. They find that alcohol retailers in the United Kingdom appear to respond to increases in alcohol tax by under-shifting their cheaper products and over-shifting their more expensive products.

Ally et. al (2014) also find that the level of under-shifting is greatest for beer (0.79 – 0.92) than spirits (0.83 – 0.89).

Additionally, Gehrsitz et. al (2020) use US scanner data from stores and find a pass-through rate of alcohol excise taxes for spirits of 1.5, implying over-shifting.

Given that these pieces of literature that indicate evidence of over-shifting for spirits focus on tax rises, what are the implications for tax (and particularly tariff) cuts?

Bergman and Hansen (2010) find evidence, during their study of tax cuts and hikes in Denmark (1997 – 2005), that over-shifting occurs during tax increases and under-shifting occurs during tax cuts. This makes sense for countries where alcohol elasticities are inelastic, and the increase in demand from a price reduction will be smaller than the price reduction itself.

Evidence around VAT reductions also suggests that, in cases where there is an undershifting, this may disappear over time and eventually converge to a full pass through.

Finally, it is worth noting that India's states have independent regulatory powers over the pricing of alcohol. This makes it possible that the pass through rates could be set by the local government rather than market forces.

Range of scenarios

In the following section, we model the impact of a 120% tariff cut on whisky exports from the UK to India.

As part of this modelling, we provide a range of scenarios, based upon the literature discussed in this section, of plausible PED and pass through rates for whisky exports to India.

We believe that the most likely range for the elasticity of Scotch lies between 0.25 and 1. The expectation is for bottled Scotch to lie towards the lower end of this range while bulk Scotch lies towards the upper end.

It is difficult to assess the impact of the large illicit alcohol market in India on the elasticity and so, outside of the most likely range, a surprise on the upside is more likely than a surprise on the downside. For example, some evidence from within the Scotch industry suggests aggregate elasticities closer to 1.

Additionally, the literature suggests that some undershifting would be expected under a tariff (price) cut scenario. Therefore, our range of pass through rates are most probably between 75% and 100%.

Pass through rates are typically seen to increase over time, for example as suppliers adjust production and new competition enters the market.

Using a range of possible (light green) and likely (dark green) elasticities and pass through rates, we have modelled the impact of a tariff reduction from 150% to 30% on additional Scotch exports. As the literature had evidence of inelastic and elastic PED, and varying pass through rates, the following table provides a range of estimates outside these 'most probable' scenarios.

Table 1: Additional exports due to a Scotch tariff reduction to 30%, £ million

		Price elasticity of demand						
		0.00	-0.15	-0.25	-0.50	-0.75	-1.00	-1.25
Pass through rate	0.00	-	-	-	-	-	-	-
	0.25	-	3	5	10	15	20	25
	0.50	-	6	10	20	30	40	50
	0.75	-	9	15	30	45	60	75
	1.00	-	12	20	40	60	80	100

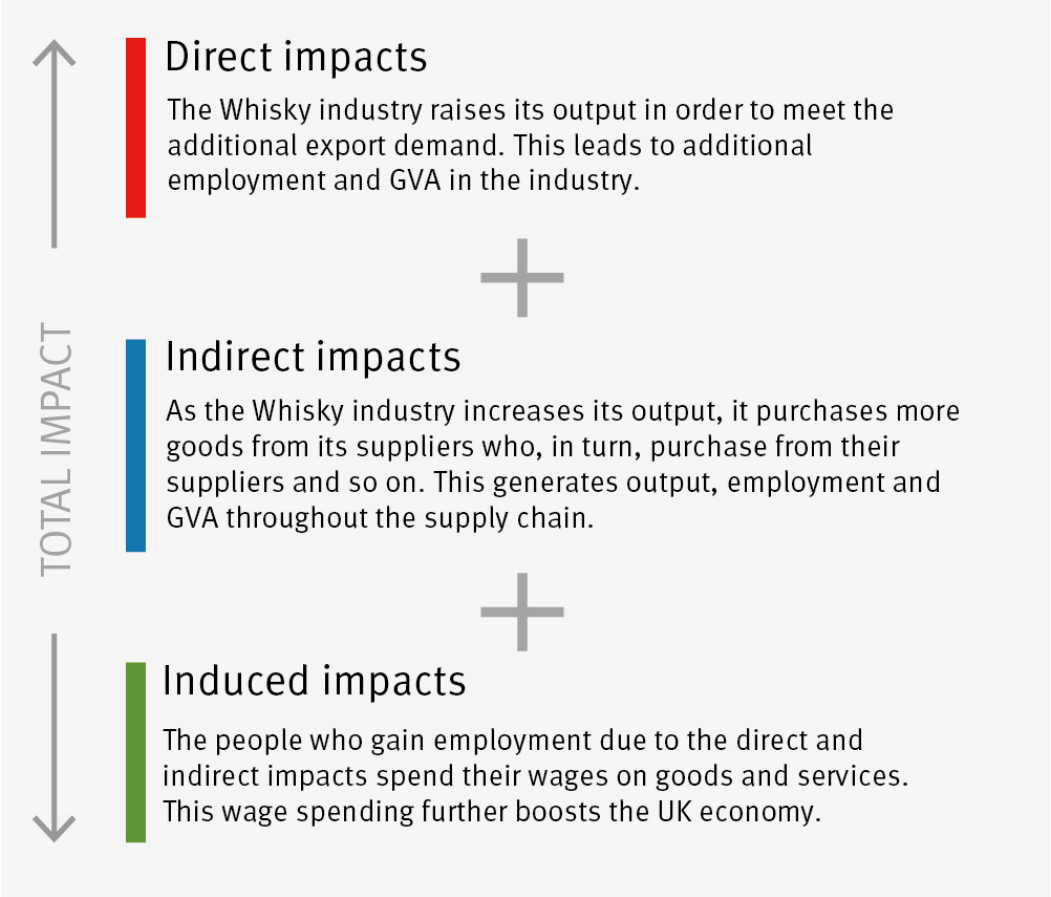
Source: *FAI Calculations*

4. The Impact of a tariff reduction in India on the UK economy

Our estimates show that a tariff reduction on imports of Scotch to India is likely to boost UK exports. This additional demand will impact on the domestic economy in the UK. In this section we quantify this impact using our model of the UK economy.

The model examines three types of impacts that result from an uplift in UK exports. These are termed 'direct', 'indirect' and 'induced' effects. Indirect impacts and induced impacts are often collectively referred to as spill-over impacts.

Diagram 1: Direct, indirect and induced effects explained.



Source: *Fraser of Allander Institute*

Total results of a reduction in Scotch tariffs from 150% to 30%

We have modelled the impact of a reduction in Scotch tariffs in India for five pass through rates and nine price elasticities for a total of 45 modelling combinations.

These figures are based on 2019 data for Scotch exports to India – £166 million in 2019 and the current Scotch tariff rate of 150%. Given the impact of the Covid-19 pandemic on trade and stock effects in 2020, we opted to use the 2019 figures as we believe they better represent a post-pandemic level of trade.

Main results

Overall, we find that a 120% tariff reduction from 150% to 30% will most likely support additional UK output (similar to turnover) of between £39m and £205m. This corresponds with supporting between 240 to 1300 additional UK jobs. Additionally, we find the range of GVA supported to be £28m to £145m[3].

We use value rather than volume figures to generate our estimates. Exports to India amount to 3.4% of Scotch export value and 10% of export volume.

The central rate of 30% was selected after discussions with the Whisky industry on likely tariff reductions. We also model larger tariff reductions, down to 20% and 0% and a smaller tariff reduction to 75%. The results for these other tariff levels are shown in chapter 5.

While we have given a more probable range for estimates (shown in dark green) based on available evidence, it is possible that the results can be larger or smaller than this range. This will be dictated by the elasticities and pass through rates.

Detailed results

We find that for every £1 million of additional Scotch exports, 16 full-time equivalent jobs are supported in the UK economy.

The total (direct, indirect and induced) impact of a tariff reduction are laid out below.

Table 2: Total impact of tariff reduction to 30% on UK output, 2019 prices, £ million

		Price elasticity of demand						
		0.00	-0.15	-0.25	-0.50	-0.75	-1.00	-1.25
Pass through rate	0.00	-	-	-	-	-	-	-
	0.25	-	8	13	26	39	51	64
	0.50	-	15	26	51	77	103	128
	0.75	-	23	39	77	116	154	193
	1.00	-	31	51	103	154	205	257

Source: *FAI Calculations*

[3] Output, Employment and GVA ranges are based on 'most probable' scenarios in Tables 1-3.

Table 3: Total impact of a tariff reduction on UK full-time equivalent jobs, rounded to the nearest 10

		Price elasticity of demand						
		0.00	-0.15	-0.25	-0.50	-0.75	-1.00	-1.25
Pass through rate	0.00	-	-	-	-	-	-	-
	0.25	-	50	80	160	240	325	410
	0.50	-	100	160	325	490	650	810
	0.75	-	150	240	490	730	980	1,220
	1.00	-	195	325	650	980	1,300	1,630

Source: *FAI Calculations*

Table 4: Total impact of a tariff reduction on UK GVA, 2019 prices, £ million

		Price elasticity of demand						
		0.00	-0.15	-0.25	-0.50	-0.75	-1.00	-1.25
Pass through rate	0.00	250	250	250	250	250	250	250
	0.25	187	191	194	201	208	215	222
	0.50	125	133	139	152	166	180	194
	0.75	62	75	83	104	124	145	166
	1.00	-	17	28	55	83	110	138

Source: *FAI Calculations*

Sensitivity to elasticities, pass through rates and bulk trade

In general, if Indian consumers are more price responsive than expected, this will greatly increase the impact on UK jobs, output and GVA. And vice versa for less price responsiveness.

However, lower pass-through rates than expected will have a mixed outcome. On the one hand, lower pass-through rates would lead to a smaller increase in exports and so less of a positive knock on to the UK economy in terms of jobs, output and GVA. On the other hand, lower pass-through rates may mean greater profits for Whisky firms, a component of GVA, and this can more than mitigate the smaller amount of GVA due to exporting. The relationship between pass through rates and GVA is therefore more complex than the relationship with jobs.

It should be noted that India has an unusual market for alcohol where local government can set prices. Therefore, the pass through rate may not necessarily be dictated by the market.

Furthermore, it is also likely that as any tariff reduction becomes permanent, over time the pass through rate will increase.

The higher volume of bulk trade may mean less bottling and other supply chain processes in the UK, leading to our results over-estimating the impact of this trade when using typical Whisky supply chain processes. However, the significantly larger volume of exports to India compared to value will result in more domestic economic activity, and thus an under-estimate. The impact of this bulk Scotch trade on the estimates is therefore ambiguous.

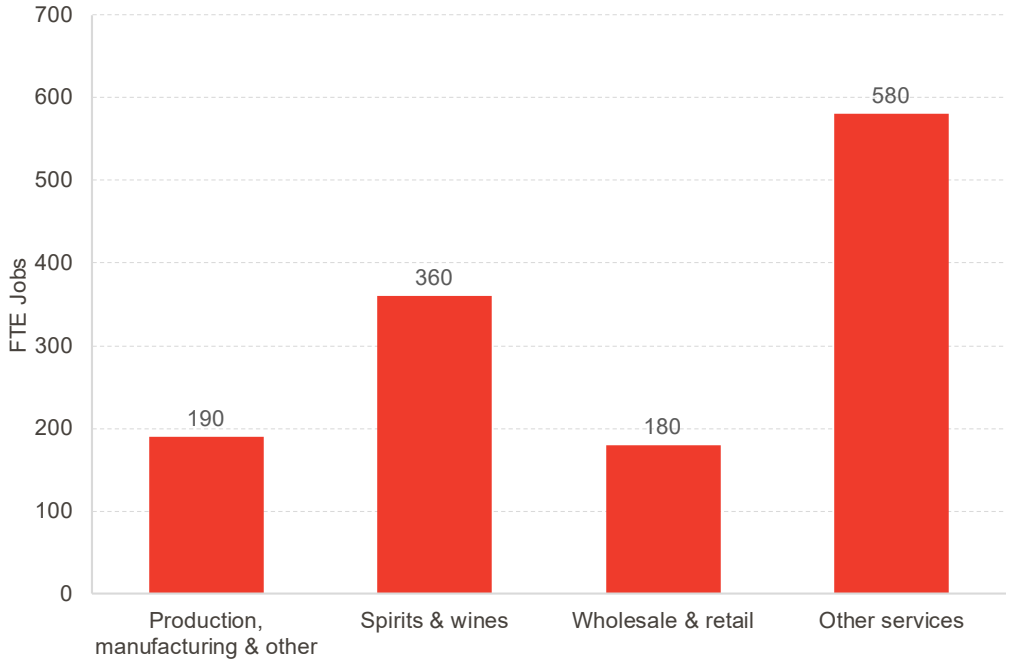
The impact of a tariff reduction on UK sectors

In this section we look at the impact of a reduction in Scotch tariffs on individual sectors of the UK economy. To do this, we look at a single modelling result – a pass through rate of 100% and price elasticity of demand of 1.

This choice should not be seen as selection of a central estimate, but rather as a result which is used to illustrate the spill-over effects of Scotch exports on the UK economy.

We find that there are large positive spill-overs on other sectors of the UK economy. 360 jobs are supported in the spirits & wines sector itself, with a further 950 jobs supported in other parts of the economy.

Chart 6: Full-time equivalent UK jobs supported by a Scotch tariff reduction



Source: *FAI Calculations*

Data and methodology

Our model is built using the latest input output tables for the UK (2017), produced by the ONS. Input output tables detail the sales and purchases of all sectors of the economy, and their relationship with labour and sources of final demand (e.g. exports).

Data on total Scotch exports to India is sourced from HMRC trade statistics, with the latest year of data referring to 2019. This has been combined with a range of elasticities and pass through rates to calculate an overall increase in demand for UK exports of Scotch due to a price reduction for Indian consumers.

These additional exports provide the shock to our model which we use to generate our estimates of the additional output, jobs and resulting GVA which are needed to support this boost in exporting.

In order to best represent the purchases and sales of the Whisky industry itself, we have disaggregated the UK "Manufacture of alcoholic beverages & tobacco products" sector into a "Scottish spirits & wines" sector and a sector representing the remainder. The Scottish spirits and wines sector are sourced using data from the Scottish Government's input output table.

These two data sources are closely linked but differ in compilation in some areas. We have worked to the strengths of each data source and prioritised the purchasing patterns from the UK tables – which better capture the sectoral detail in purchases across the UK. We have prioritised the data from Scottish tables on spirits & wines sector aggregates, we believe the sector's current levels of exports found in the Scottish tables are the more likely of the two estimates, given the size of exports by Scotch products.

5. Alternative scenarios

0% tariff end rate

Table 5: Total Impact of a 150% tariff reduction on UK output, 2019 prices, £ million

		Price elasticity of demand						
		0.00	-0.15	-0.25	-0.50	-0.75	-1.00	-1.25
Pass through rate	0.00	-	-	-	-	-	-	-
	0.25	-	10	16	32	48	64	80
	0.50	-	19	32	64	96	128	161
	0.75	-	29	48	96	144	193	241
	1.00	-	39	64	128	193	257	321

Source: *FAI Calculations*

Table 6: Total Impact of a 150% tariff reduction on UK full-time equivalent jobs, rounded to the nearest 10

		Price elasticity of demand						
		0.00	-0.15	-0.25	-0.50	-0.75	-1.00	-1.25
Pass through rate	0.00	-	-	-	-	-	-	-
	0.25	-	60	100	203	305	410	510
	0.50	-	120	200	410	610	810	1,020
	0.75	-	180	305	610	915	1,220	1,525
	1.00	-	240	410	810	1,220	1,630	2,030

Source: *FAI Calculations*

Table 7: Total Impact of a 150% tariff reduction on UK GVA, 2019 prices, £ million

		Price elasticity of demand						
		0.00	-0.15	-0.25	-0.50	-0.75	-1.00	-1.25
Pass through rate	0.00	250	250	250	250	250	250	250
	0.25	187	192	196	205	213	222	230
	0.50	125	135	142	159	177	194	211
	0.75	62	78	88	114	140	166	192
	1.00	-	21	34	69	103	138	172

Source: *FAI Calculations*

20% tariff end rate

Table 8: Total Impact of a 130% tariff reduction on UK output, 2019 prices, £ million

		Price elasticity of demand						
		0.00	-0.15	-0.25	-0.50	-0.75	-1.00	-1.25
Pass through rate	0.00	-	-	-	-	-	-	-
	0.25	-	8	14	28	42	56	70
	0.50	-	17	28	56	83	111	139
	0.75	-	25	42	83	125	167	209
	1.00	-	33	56	111	167	223	278

Source: *FAI Calculations*

Table 9: Total Impact of a 130% tariff reduction on UK full-time equivalent jobs, rounded to the nearest 10

		Price elasticity of demand						
		0.00	-0.15	-0.25	-0.50	-0.75	-1.00	-1.25
Pass through rate	0.00	-	-	-	-	-	-	-
	0.25	-	50	90	180	260	350	440
	0.50	-	110	180	350	530	705	880
	0.75	-	160	260	530	790	1,060	1,320
	1.00	-	210	350	705	1,060	1,410	1,760

Source: *FAI Calculations*

Table 10: Total Impact of a 130% tariff reduction on UK GVA, 2019 prices, £ million

		Price elasticity of demand						
		0.00	-0.15	-0.25	-0.50	-0.75	-1.00	-1.25
Pass through rate	0.00	250	250	250	250	250	250	250
	0.25	187	192	195	202	210	217	225
	0.50	125	134	140	155	170	185	200
	0.75	62	76	85	107	130	152	174
	1.00	-	18	30	60	90	119	149

Source: *FAI Calculations*

75% tariff end rate

Table 11: Total Impact of a 75% tariff reduction on UK output, 2019 prices, £ million

Pass through rate	Price elasticity of demand						
	0.00	-0.15	-0.25	-0.50	-0.75	-1.00	-1.25
0.00	-	-	-	-	-	-	-
0.25	-	5	8	16	24	32	40
0.50	-	10	16	32	48	64	80
0.75	-	14	24	48	72	96	120
1.00	-	19	32	64	96	128	161

Source: *FAI Calculations*

Table 12: Total Impact of a 75% tariff reduction on UK full-time equivalent jobs, rounded to the nearest 10

Pass through rate	Price elasticity of demand						
	0.00	-0.15	-0.25	-0.50	-0.75	-1.00	-1.25
0.00	-	-	-	-	-	-	-
0.25	-	30	50	100	150	200	250
0.50	-	60	100	200	305	410	510
0.75	-	90	150	305	460	610	760
1.00	-	120	200	410	610	810	1,020

Source: *FAI Calculations*

Table 13: Total Impact of a 75% tariff reduction on UK GVA, 2019 prices, £ million

Pass through rate	Price elasticity of demand						
	0.00	-0.15	-0.25	-0.50	-0.75	-1.00	-1.25
0.00	250	250	250	250	250	250	250
0.25	187	190	192	196	200	205	209
0.50	125	130	133	142	151	159	168
0.75	62	70	75	88	101	114	127
1.00	-	10	17	34	52	69	86

Source: *FAI Calculations*

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