

# THINK ACT

BEYOND MAINSTREAM



May 2016

## Engineering Brexit

British industry must fight to "remain"

## THE BIG

# 3

### FDI #2

The UK's global ranking in stock of Foreign Direct Investment, both inward and outward; second only to the US, and over twice that of the US when compared to GDP.

Page 7

### 44% AND 10%

The percentage of UK exports achieved by Manufacturers, vs. their more modest share of GDP.

Page 11

### GBP 72,400,000,000

UK engineering-related exports to the EU in 2014 from the engineering-related exports of Aerospace, Automotive and Chemicals alone, over twice the UK's total trade deficit.

Page 12

# Engineering Brexit: Science- and engineering-related industries have a disproportionate amount to lose.

In June 2016 the UK will have a vote on whether or not to leave the EU, an entity with which it has been intimately associated since, in one of its few other experiments with direct democracy, the UK voted to remain in the European Economic Community in the 1975 referendum.

It is clear that the vote will be closer than the Conservative party might have anticipated when it conceived its manifesto promise before the last election, largely as a low-risk antidote to UKIP defections. Parallels with the Scottish referendum abound.

Public opinion of the EU has continued to harden in light of the economic tribulations of the Eurozone and the migrant crisis in which the EU is presently embroiled, and is now as "anti" as at any time since the 1980s. → **A**

As the largest strategy consultancy of European origin, Roland Berger might be expected to have a pro-European stand-point. However our frustration with the

run up to the Brexit referendum stems from the low profile of any data during the early stages of debate, not from the direction of travel. Independence, accuracy, and the correct use of data are much more important to us than politics.

For this reason we attempt in this document to collect and research some of the facts most relevant to our Science and Engineering sector clientele in the UK, and to offer these in a simple clear format, on a sector level.

This analysis tells us that these industries have a disproportionate amount to lose from Brexit, particularly in exports and FDI, that while the long term is unpredictable, the near term is all-too-predictably negative, and that the sector's leaders are even more implacably opposed to Brexit in private than in public.

From this analysis, we conclude that it is not sensible to vote for Brexit from the perspective of a Science and Engineering sector employer or employee.

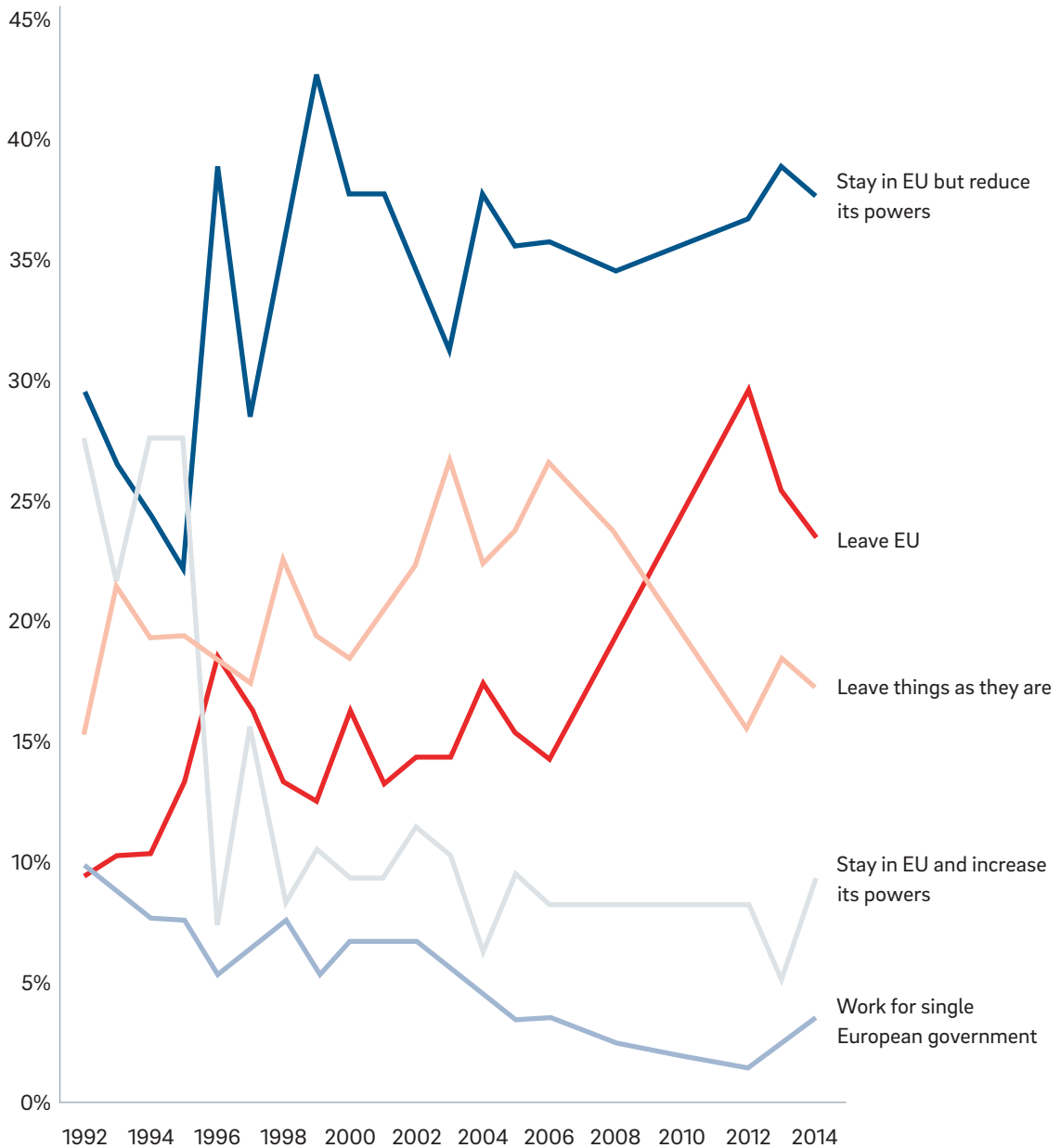
#### 4 THINK ACT

##### Engineering Brexit

## A

### PUBLIC ATTITUDES TOWARDS BRITAIN'S RELATIONSHIP WITH THE EU, 1992-2014 [%]

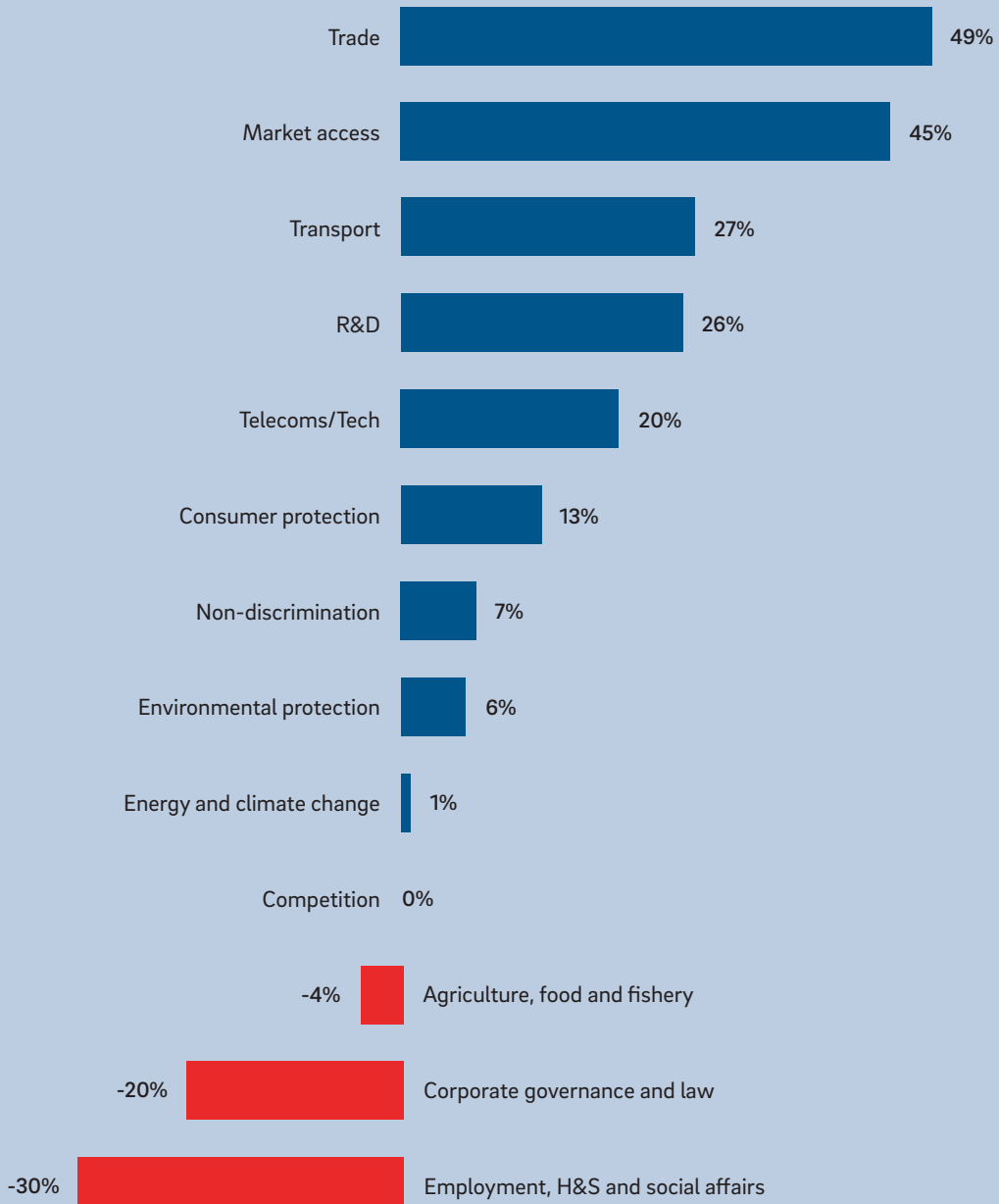
The proportion of "Brexiters" has more than doubled, but most people think we should stay in the EU and reduce its powers.



## B

### BUSINESS' ATTITUDE TO EU MEASURES ON VARIOUS SOCIOECONOMIC TOPICS, 2014 [%]

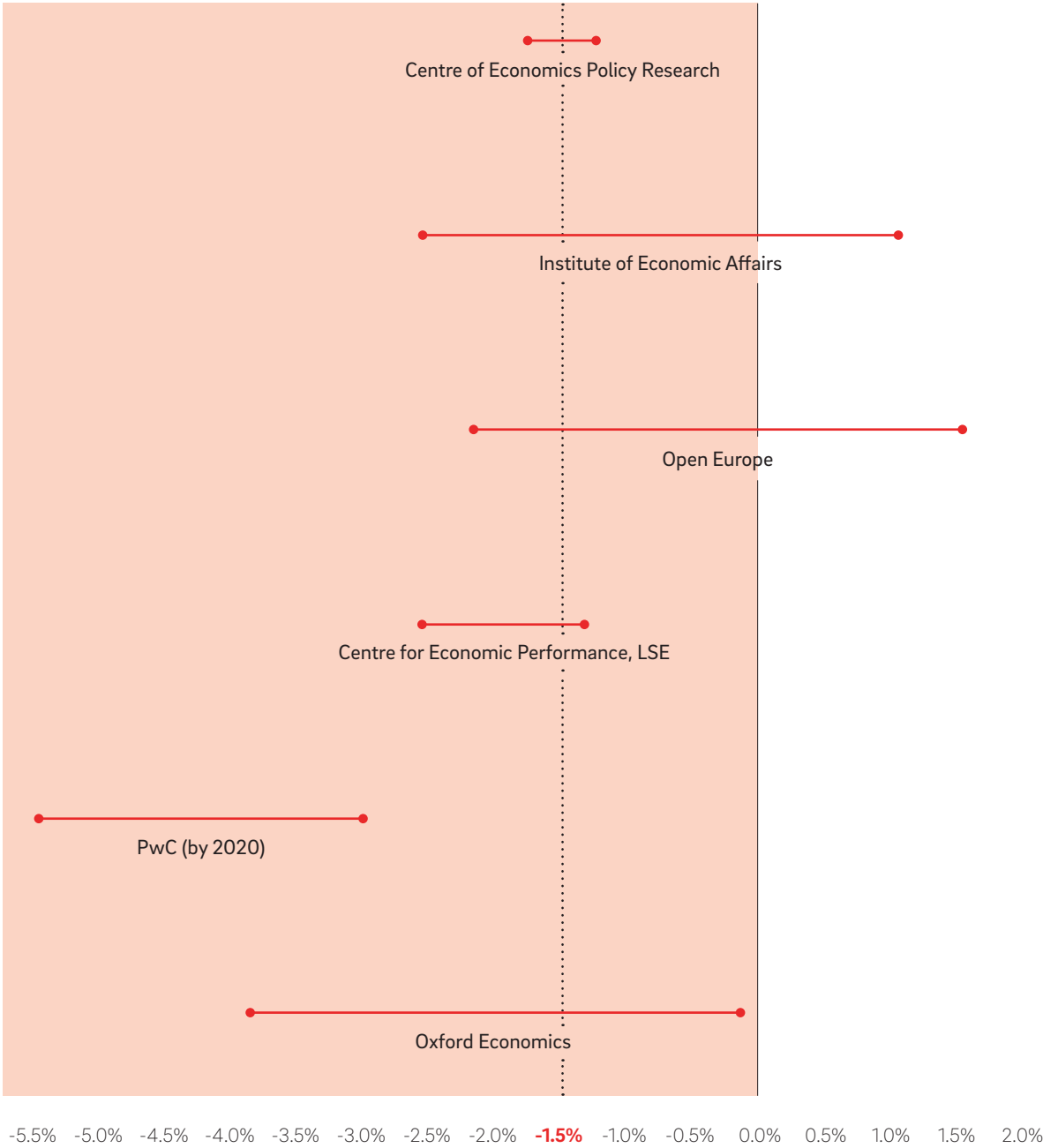
A large sample of over 1,000 business leaders shows a net positive view of the EU's impact on 9 out of 13 measures.



C

FORECASTS OF BREXIT'S SHORT TERM IMPACT ON BRITAIN'S GDP [%]

Consensus of qualified independent observers points to a short term negative impact of 1.5% of GDP.



Note: Partisan forecasts for the Treasury (for) and Capital Economics (against) are outliers, and are not presented

Source: The Economist

The referendum risks becoming a lightning rod for the many disparate voices of disaffection to the left and right that are increasingly emerging in mature democracies.

It is improbable that this document, likely as it is to be found in the hands of the establishment, will greatly affect this sentiment.

It is also clear that "business" remains broadly supportive of the EU, and critical of its contribution in only a few areas. → **B**

"Independence" is a difficult measure in a debate couched as the incumbents vs. plucky outsiders so beloved of British culture, but qualified economic observers who we would deem to be independent seem also to have a consensus that Brexit would be bad for the UK economy, as do 75 of the 100 Economists interviewed by the FT in January (vs. 8 in favour). → **C**

The position of Sterling in currency markets seems to reflect this broad concern, with the Pound having fallen around 10% (including 3% on the day of Boris

Johnson's opportunistic entry into the debate), with a further 7% fall forecast on Brexit, vs. a 4% recovery in the event of the status quo.

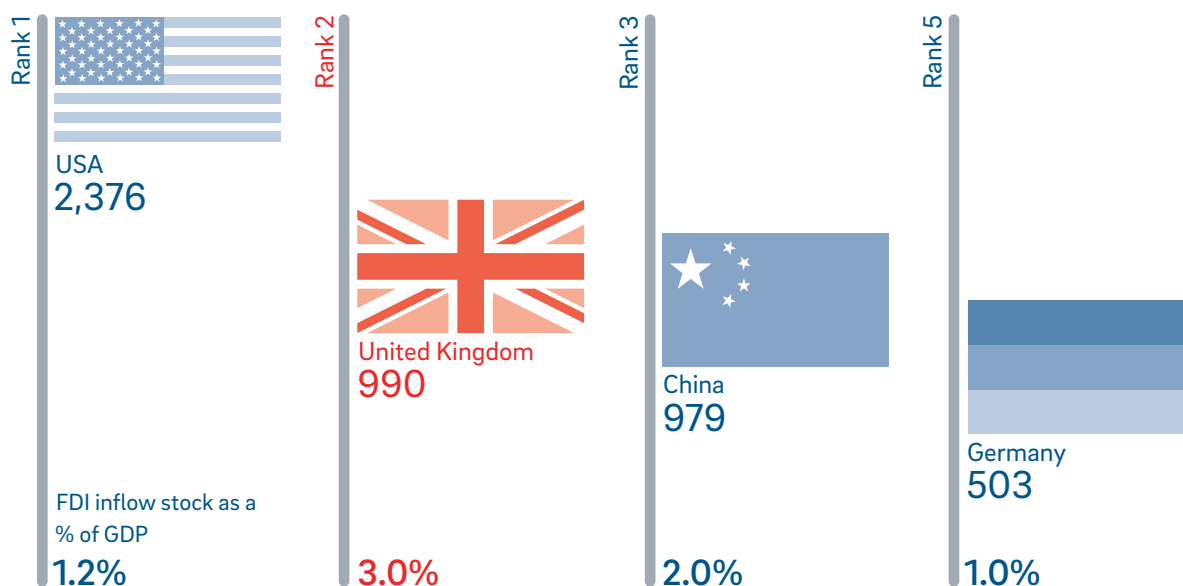
Beyond the health of the economy, and the weakening of the Pound, we believe that Brexit considerations have a direct bearing on exports and Foreign Direct Investment.

FDI, for reasons of history, language and cultural openness, is a little celebrated beacon of success for the UK economy. The UK has been around the top ten of world economies for many years, but performs more strongly again in league tables of both inward and outward capital investment. British businesses and individuals are confident investors in overseas assets, and similarly overseas investors are enthusiastic to deploy their capital in companies and physical assets in the UK, investing over GBP 50 bn a year. Indeed it is fair to assert that the UK is a long term world leader in FDI. → **D**

## D

### GLOBAL RANKING OF FDI INWARD STOCK, 1977-2014 [GBP BN]

The UK has the second highest FDI stock of any country, and the highest relative to GDP of any major economy.

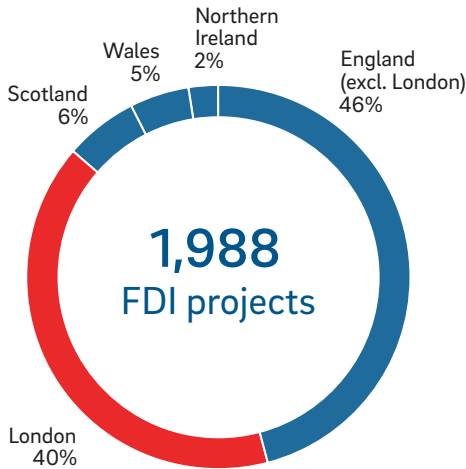


## E

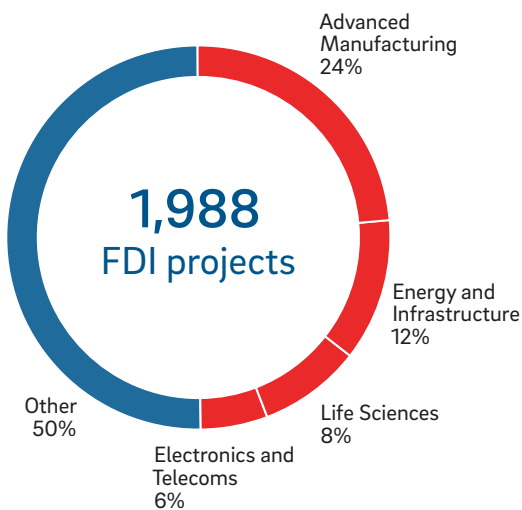
## ONGOING FDI PROJECTS, 2014 [%]

Regional and sectoral distribution.

## REGIONAL DISTRIBUTION



## SECTORAL DISTRIBUTION



All sectors and regions benefit from inward FDI, with an estimated 84,000 jobs being created in 2015 alone. Conversely UK businesses have also invested GBP 1.0 tn overseas, from which they earn GBP 65 bn each year. Whilst London appears to fare well from FDI, this is partially because of FDI in Financial Services and partially a difficulty of measurement (much M&A being centred on London); the English provinces and, disproportionately, engineering-related sectors are major beneficiaries. → E

There is a clear impact of Brexit on UK FDI, principally because surveys consistently show over half of all inbound FDI to be directly targeted at serving the EU market, and the UK to have been the main European beneficiary of funds from all sources. → F

But why does all this matter to the Science and Engineering sectors, and why does the sector matter anyway?

The UK's "Science- and Engineering-related Sector" remains a backbone of the nation's economy, and a direct employer of 2.6 million, mostly highly skilled workers. Even manufacturing, which has famously declined from 25% of the economy in 1980 to half of that today, has still grown at an average rate of 1.5% per annum since 1948, and remains the #11 manufacturing economy worldwide.

The sector relies upon innovation. Research funding for STEM subjects and technical disciplines is an area where the EU has been helpful for the UK's Engineering and Higher Education sector. The EUR 8.8 bn received over the past five years (vs. the EUR 5.4 bn put into the pot), has provided almost a quarter of all governmental research funding, and has been growing at a time when HMG funding has been falling. Whilst modest, this direction, coincidentally under the Research leadership in Brussels of a British engineer, is helpful.

Most importantly in the context of a Brexit decision, Engineering sectors are the country's export engine, and the EU is the Engineering sectors' main market. With a trade deficit of GBP 34 bn, the UK can ill afford to jeopardise this export revenue.



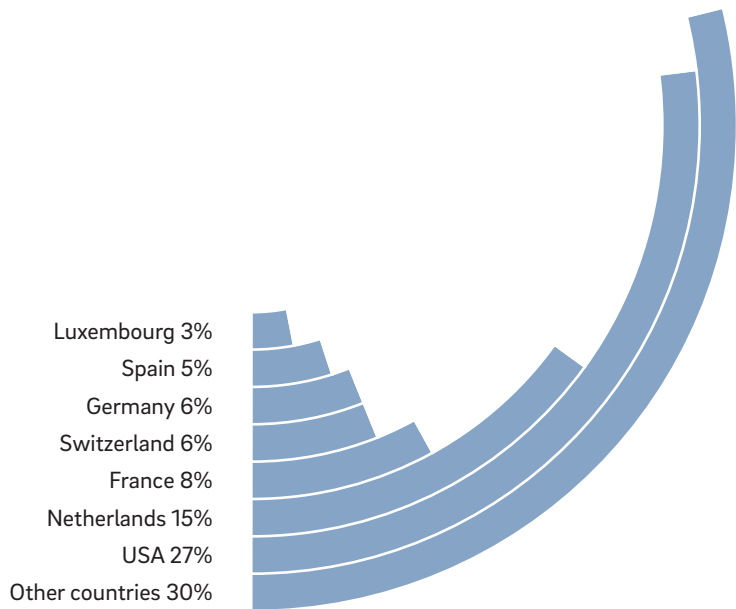
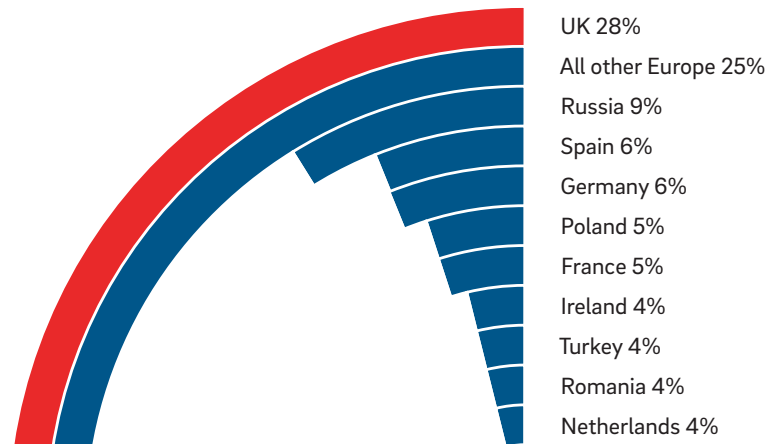
# F

## INWARD FDI TO EUROPE, AND SOURCE OF FDI INTO UK, 2014 [%]

In a typical year the UK attracts more inward FDI than the next five EU states combined, with funding from all over the world.

### CAPITAL INVESTMENT FLOWS INTO EUROPE

(FDI project values)



### UK INWARD FDI STOCK

# Engineering exports vs. national average: Does the EU really matter for exports?

Global exports are at an all-time high, and Barriers to international trade at an unprecedentedly low level, encouraged by the works of the World Trade Organization (WTO). → **G**

It is often forgotten that the WTO was only formed in 1995, within the career of most readers, and long after the EU. The WTO now has 162 members export-

ing USD 18 tn of merchandise and USD 5 tn of services each year, numbers which have risen from 20% to 30% of global GDP over the past 20 years.

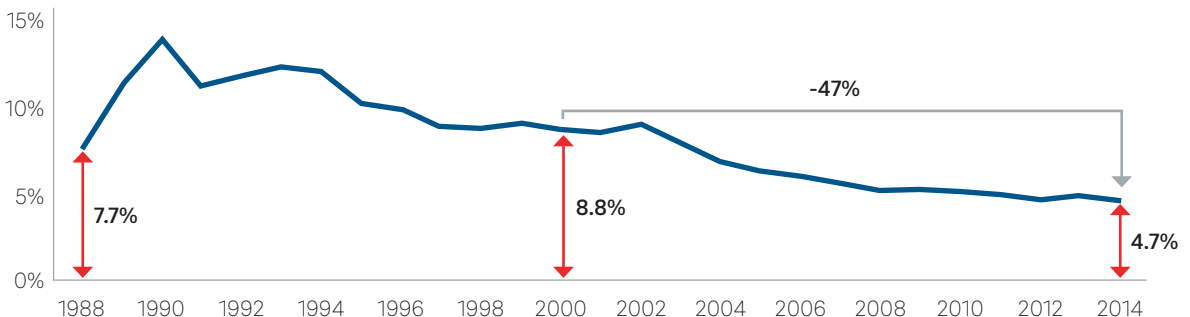
These figures are used casually by both sides of the Brexit debate.

Pro-Brexit observers state that world trade makes the EU redundant and that the EU is "negligible" and

## G

### WEIGHTED EFFECTIVELY APPLIED TARIFF, 1988-2014 [%]

World AHS weighted average has almost halved since the beginning of the century.



"ailing". Britain's position as a trading nation clearly predates the European Union, and the pro-Brexit lobby has a long memory, harking back to a period when British exports to its Empire and other countries dominated global trade.

Pro-EU observers note more quietly that negligible and ailing are unfair adjectives. The EU remains the world's largest Free Trade Area. Germany, the world's largest exporting nation for much of the Noughties, may have been overtaken by China in 2009, and the EU's share of global exports may have slipped from 42% to 33% over the past 20 years, but the EU remains the world's largest exporter, exporting two and a half times more than NAFTA, second place. It also has the largest intra-group trade at 70% - again twice that of its nearest competitor.

It could be added that the combined exports of the British Commonwealth (including the UK), at USD 3.5 tn is dwarfed by the EU at USD 6.2 tn.

While the UK's trade balance has deteriorated over time, this has been because imports have grown, not that exports have reduced. Goods imports and exports, in balance at around USD 100 bn in 1985, are now at around USD 500 bn, but with a 20% deficit. Services' 20% surplus at a lower volume of c. USD 200 bn can not bridge this gap. Similarly, within the EU the UK's GBP 77 bn goods deficit is not offset by its GBP 15 bn services surplus.

The engineering and manufacturing focus of exports also leads to regional disparities: Scotland, Northern Ireland, Wales and the North of England are the nation's only net exporters of goods. As stated, politics is not our concern here, but we note that Exporters will be disproportionately hit, and this is a condition which could logically catalyse the break up of the United Kingdom.

The UK is presently governed by the external trade barriers of the EU, but there has been little prominence in debate regarding these being disadvantageous to e.g. the UK or its Commonwealth. Australian wine or Indian textiles are not seemingly priced off our shelves by Euro-protectionism, and perhaps surprisingly the UK manages a modest trade surplus with its non-EU partners.

In all cases, it has been the UK's relative productivity which has governed performance in times of greatly increasing global trade. It has not been EU red tape; the UK is the third least regulated market in the OECD. Nor has it been any failures in the EU's external trade conditions; the EU is after all the world's biggest exporter.

A central argument of the pro-trade faction of the pro-Brexit camp is that exports to the EU will in any case not be jeopardised by an EU exit; the EU's imports to the UK outweighing UK exports to the EU at GBP 220 bn and GBP 134 bn respectively.

This is held up to support the symmetry of a swift and equitable future trade agreement, and strikes us as a dangerous misuse of statistics.

Regardless of any game theory about the EU needing to send a message to deter future exits, it is relative, and not absolute trade flows which would affect any negotiating stances between the UK and EU following exit. 45% of UK exports are to the EU, while less than 10% of EU exports are to the UK, odds which do not indicate a strong negotiating position to us as business people. Poking the EU in the eye and watching it disintegrate may bring Schadenfreude, but we will not escape the wreckage of our largest trading partners scot-free.

And as for speed of negotiation, empirical evidence is not good, this being one of the EU's many failings. On-going free trade discussions with Canada have taken seven years thus far, and a UK negotiating team encompassing the pro-Brexit interests of UKIP, the BNP and Socialist Worker parties might be expected to have challenges of its own.

In summary, the UK is one of the world's most open economies. UK exports account for GBP 390 bn vs. its GBP 1.7 GDP, and the Engineering sectors on which his work focuses account for 44% of these exports, the majority of which is to the EU. Relative to its GDP the UK has the highest inward FDI stock of any major economy, and again Engineering sectors are disproportionately represented.

Leaving the EU would on balance be expected to have a damaging effect on both international trade terms and FDI attractiveness, particularly in the near term. Politicians, academics and economists can merily debate the long term, and the consensus is that the long term will be damaged also, sadly the near term is the one we are living in. The Engineering sector requires continuous investment decisions if it is to retain its international position, and so will shrink throughout this near term; indeed we are already seeing these effects.

We must not forget that counter-intuitively, but pragmatically, there is logic for low skilled British workers in the Engineering and Construction sectors to vote for Brexit. The harsh realities of Stolper Samuelson theorem

## 12 THINK ACT

### Engineering Brexit

in a free trade area point to the relative disadvantage of low skilled workers in a skilled economy like the UK. Redistributive policies, even with recent initiatives like the Living Wage, are felt to have done little to alleviate this in the face of wage depression from often better trained and motivated labour from Eastern Europe. Low skilled employees, with fewer opportunities, might be expected to overlook the relative health of their firm or even the theoretical risk of unemployment in the starker light of

more immediate self-interest. Persuading these UK vote-wielding employees of the errors of this narrow view will be a challenge for pro-EU employers in the day before the referendum.

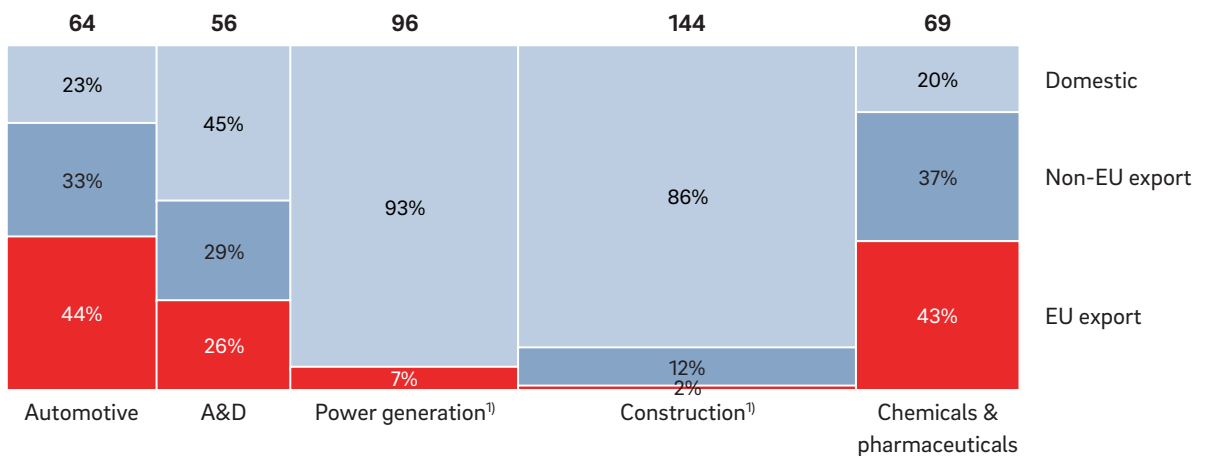
We conclude that predictable near term FDI and export considerations alone make it irrational for individuals involved in the UK Engineering sector to risk voting for Brexit. It is surely worthy of effort, however, to consider this at a more granular sector level. → **H**

# H

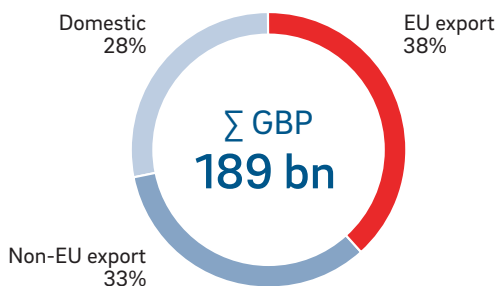
## TURNOVER OF MAJOR ENGINEERING-RELATED INDUSTRIES [GBP BN]

Engineering-related sectors are hugely more focused on EU exports than the rest of the UK economy is.

### SECTORAL MEKKO

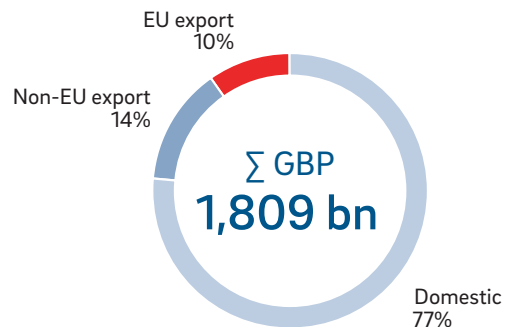


### ENGINEERING-RELATED SECTORS



VS.

### UK TOTAL



<sup>1)</sup> "Exports" indicate interconnector flows and overseas business respectively

# Some Engineering sectors have more at stake than others.

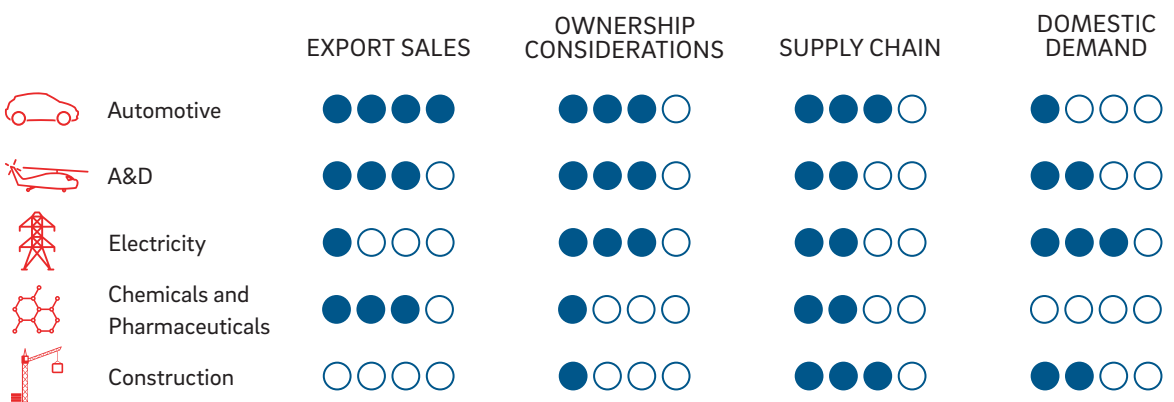
For example the Automotive sector, with its enormous propensity to export to the EU, could face an existential threat.

Engineering company leaders, whilst modestly represented in the ranks of e.g. formal letters to the Times supporting EU membership, have been anxious to remain statesman-like in their involvement with the Brexit debate. It seems to us that this gentlemanly approach, perhaps typical of Engineers, has been less vocal than it could have been. This approach has undoubtedly been sensitive to the political views of its stakeholders, and to views of politics being "outwith

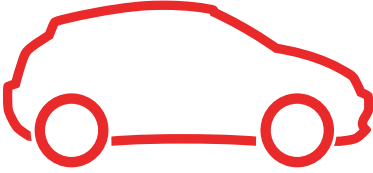
the role of a company". What is clearly true is that, when talking in a non-attributable way amongst friends, Engineering leaders of companies large and small are even more clearly against leaving the EU. Most trade associations at this point have surveyed their members, asking whether it is in the companies' best interests to leave the EU, and, dependent on sector, it seems that only in-between 15% and a staggering 0% of recipients have responded positively.

We believe that the reasons for this Europhilia differ greatly by sector, but are all explicable as a function of exports, demand, ownership and supply chain. →!

## IMPACT OF BREXIT ON DRIVERS (ORDER BY REDUCING IMPACT)



Source: Roland Berger



## AUTOMOTIVE

The UK Automotive industry is celebrating its resurrection from the dead. It is a great success story, having created many jobs and the perception, that the old and famous British car brands are back. If you take a closer look - a sore point for many British car enthusiasts - it is a story of foreign investment with the purpose to export to Europe (for instance Honda, Toyota or Nissan) and foreign knowledge transfer and investment with the purpose to revitalise valuable brands (for instance Rolls-Royce/BMW, Mini/BMW, Bentley/VW or Jaguar Land Rover/Tata).

It took many years to rebuild the UK's Automotive sector into what we see now, as part of the European and global Automotive industry, highly dependent on European parts suppliers, on the exchange of qualified people and hardwired to headquarters and design centres on the continent.

## EXPORT SALES



The two principal purposes of the UK Automotive sector are to design vehicles for use worldwide, and to manufacture vehicles for export to the EU. The UK sector has made great strides in becoming one of the most efficient in the world, and can compare favourably to most European counterparts. The year to February 2016 saw 1.6 million cars produced in the UK, a 60% recovery from its 1980 ebb and near to its 1972 peak. In 2015, 77% of cars produced in the UK were exported, 44% to the EU.

## OWNERSHIP CONSIDERATIONS



The UK Automotive OEM sector is owned by non-UK-domiciled businesses. Unlike other Engineering sectors, these businesses are predominantly from outside the EU, particularly the US, Japan and India, though also from Germany.

Automotive OEMs have been anxious to remain statesman-like in their involvement with the Brexit de-

bate, with carefully worded interventions seeking to reassure the 240,000 directly employed in the sector by stressing continued commitment to the UK.

In private, however, only 9% of automotive suppliers favour Brexit. The results of a recent independent survey, announced by the Society of Motor Manufacturers & Traders (SMMT), revealed that 88% of large motor industry businesses and 73% of smaller and medium-sized enterprises actively wanted to stay in the EU. 77% of the industry as a whole agreed Europe was best for business.

## SUPPLY CHAIN



Automotive is one of the most global supply chains in the world, with almost all players having international production footprints that allow simple alternatives to UK investment. The cost of closing UK operations is very low vs. more protectionist counterparts. Automotive product lines change particularly quickly, meaning that constant investment decisions to tool up for new models are needed to maintain a position in the industry, and without continued investment the UK industry could become negligible in six years.

In this environment (and barring a presumably-undesirable collapse in the value of Sterling) foreign-owned automotive businesses, be they OEMs or Tier 1 suppliers, will rightly defer investment in the UK, pending clarity on whether or not it intends to be part of the world's largest free trade area. The present debate is already damaging the industry in this regard, and even in the best case offered by the pro-Brexit lobby, an EU free trade agreement penned will still lead, necessarily, to the loss of a third of the industry and 80,000 direct jobs in the intervening two years of uncertainty. This dangerous game is presently being played out in the manufacturing economies of the Midlands and North of England, far from the focus of the journalistic chattering classes.

In 2015, only 33% of automotive components were sourced domestically, compared to c. 60% in Germany (and 90% in 1970s Britain). Of the approximately GBP 11 bn imported automotive parts, 94% came from the European Union, with 27%, the biggest portion, from high-tech suppliers in Germany.

It is not only the UK's OEMs which are dependent upon the EU for markets and ownership. The scale

economies associated with Tier 1 manufacturers like Valeo (France), Bosch (Germany), and Visteon (US) make them even more focused on optimising their global production footprints. UK-domiciled players like GKN and Johnson Matthey follow this global theme. Even as traditional a British company as GKN has the design centre for its automotive business in Germany in order to locate its engineering teams close to its automotive customers on the continent. Further up the supply chain this global theme also holds: the machine tools needed for capital investment are very largely imported to the UK, as are many of the designs, though in this last regard the UK more than holds its own.

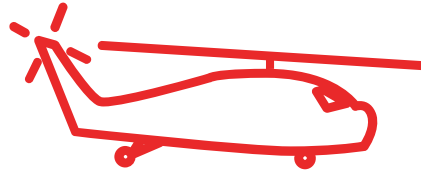
#### DOMESTIC DEMAND



The only area where there is little anticipated impact of Brexit on the UK's Automotive sector is on domestic demand, which, whilst only a small part of the sector's sales and job creation, has fared well in recent years. It seems likely that a UK Automotive sector outside the EU will voluntarily align itself with EU regulations e.g. in air quality and health & safety, as others do. The buying habits of British consumers have long been amongst the least nationalistic in the world, and this also may be expected to continue, so domestic demand is deemed unlikely to be affected by anything beyond macro-economic trends.

#### OTHER VEHICLES

It should not be forgotten that, in addition to Aerospace and Automotive, other transport and vehicle companies are active in the UK. In most cases these other transport companies have much in common with the Automotive sector. For example the Rail equipment market, where recent FDI investment decisions by Schneider (France) and Hitachi (Japan) are noteworthy, and explicitly driven by access to EU markets.



#### AEROSPACE & DEFENCE

The UK has the world's second largest A&D industry; a position greatly jeopardised by Brexit.

#### EXPORT SALES



#### OWNERSHIP CONSIDERATIONS



#### SUPPLY CHAIN



#### DOMESTIC DEMAND



The days when the UK could afford to fund the development of all new aircraft, whether civil or military, are long gone. The UK's civil aerospace activities now reside within Airbus, the European aircraft manufacturer founded in 1970 for which the UK designs, develops and supplies the wings for every Airbus large commercial aircraft programme. The attitude of Airbus to a possible Brexit was made very clear in the letter sent to employees which stated that:

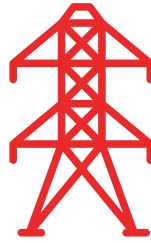
**"Airbus Group's success in the UK is predicated on a highly competitive, integrated European business model."**

TOM ENDERS, CEO AIRBUS GROUP

In military aircraft, all of the UK's recent combat aircraft have been European collaborations, including the Jaguar (UK/France), the Tornado (UK/Germany/Italy), and the Typhoon (UK/Germany/Italy/Spain). Whilst the UK has also entered the US-led F-35 Joint Strike Fighter as a Level 1 international partner, it is very clear that the level of technology access and systems integration responsibility given to the UK as a junior partner to the US is very much lower than the UK secures in European collaborative developments (regardless of the inefficiency of these multi-faceted arrangements). For this reason, the UK and France have recently agreed to invest up to EUR 2 bn in a demonstrator programme for air combat UAVs; neither country can afford to go it alone, and this joint programme allows each to continue to develop and own the critical technologies at the heart of this next generation of aircraft.

In engines, Rolls-Royce has managed to remain one of the three global leaders in the large engine game. However, to portray Rolls-Royce as a "British" company these days would be misleading, with over 85% of revenues generated overseas and 55% of staff located outside the UK. In fact, Rolls-Royce's second largest country by number of employees is now Germany, and the ability of Rolls-Royce to move people freely between different countries in the EU greatly aids its operational effectiveness; like Airbus, any barrier to this free movement would clearly be disadvantageous.

Finally in the Space sector, arguably the most EU-intertwined of all in A&D, the UK has built a spectacularly successful GBP 5 bn supply chain growing at over 20% per annum, but causally dependent upon its involvement in Europe-wide investment programmes, and often under EU corporate ownership.



## ELECTRICITY EXPORT SALES



Whilst intuitively an historical nonsense to talk about export of power, a world with interconnectors makes export (and more particularly import) a real consideration. Several interconnectors have been built and are being built, presently all of them to EU countries, with projects like Nemo (to Belgium) presently providing welcome respite for the beleaguered offshore installation industry. There is little or no discussion of Brexit affecting interconnector contracts, but it should be noted that, with UK capacity margins approaching all time lows and the EU forecast to be overcapacity by perhaps 150 GW, any disruption to interconnectors is unhelpful. Indeed November 2015's spike in power spot prices was primarily a result of low interconnector inflows.

## OWNERSHIP CONSIDERATIONS



A major consideration for Brexit in the Power sector is clearly the industry's ownership structure. This is an issue in T&D networks, but is nowhere clearer than in the major vertically integrated power generation and retail companies. With E.ON, EDF, Iberdrola (ScottishPower) and RWE representing well over half of energy retail in the UK, relationships with French, German and Spanish utilities and their government stakeholders will be strained. The UK Power sector is already facing a huge investment demand, some 39% of the National Infrastructure plan being electricity-related, and is already relying on French government Final Investment Decisions in Nuclear (plus Dong (Denmark) in Renewables, RWE (Germany) in thermal etc.). European Utilities meanwhile face structural crisis, with unprecedented balance sheet and profitability challenges giving rise to calls for a bail out comparable to that of the Banking sector. It is unlikely that a Brexit decision in the absence of deterioration in trade positions is likely to affect FIDs,



but it is also fanciful to assume the EU government relations are irrelevant in a sector dominated by state aid considerations and EU Utility capex decisions.

## SUPPLY CHAIN



As with other Engineering sectors, the Power sector employs a great number of EU workers, particularly in O&M of generation and T&D facilities. Additionally the virtual absence of UK-manufactured equipment in the sector means that almost all hardware is imported. Japanese, Chinese and American manufacturers do feature, but most OEMs are European, with Siemens, ABB and Alstom particularly prominent. The sheer scale of the National Infrastructure Plan will make these investments a prominent drain on UK balance of trade, and any worsening of trade terms a further expense, particularly in growth areas where hardware makes a high proportion of costs, e.g. offshore wind. We calculate that a 2% tariff on European power generation hardware (comparable to that levied by NAFTA) would increase the on-paper cost of intended hardware by GBP 1 bn. It should finally be noted that what little power equipment is manufactured in the UK, e.g. Siemens' plants, plus their recent investments in wind and Rolls-Royce's Energy division, are largely a result of European FDI.

## DOMESTIC DEMAND



The position on whether Brexit will affect domestic power markets is entirely dependent upon whether one considers a future post-EU government will meet present environmental responsibilities, but we assert here it will not.

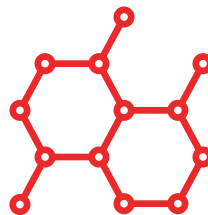
The EU has usually (though not always) led the UK in terms of Environmental obligations, requiring the UK to act on decarbonising its energy mix. International legal obligations are less stringent in the near term than EU regulation. In particular the UK government's conspicuous commitment to phase out coal power by 2025 could be seen as an extension of EU regulation like the LCP directive which has gradually replaced carbon-intensive coal with other sources. A UK outside the EU but with today's environmental targets would have almost no impact on the Power

sector, but it is naïve to assume that this would be the case. Many of the pro-Brexit voices, including the right of the Conservative party itself, would be expected to target cheaper and less eco-friendly policies, perhaps providing a stay of execution for polluting stations. This could greatly reduce the investment needs of the Power sector, leading to cheaper power. A curious outcome of Brexit could thus be French, German and Spanish utilities, buffeted by eco-regulation at home, being able to continue economically rational but environmentally disadvantageous fossil fuel generation here in the UK.

## OTHER ENERGY

The present cyclical recession in the UK's Oil & Gas sector constitutes an existential threat to the North Sea's upstream sector. The nature of hydrocarbon markets means that they transcend European considerations for the large part, but "European interference" has done little to tie the UK's hands in its policies towards the North Sea, and the vocal support of oil majors for EU membership belies the concern that many such valuable companies have for the present debate. In particular:

- > The relative strength of the UK in the engineering supply chain has attracted many of Europe's best minds to work in the UK as one of the world's preeminent centres for offshore design
- > The increasing importance of UK fuel imports raises new ties with European trade agreements



## CHEMICALS AND PHARMACEUTICALS

Chemicals and Pharmaceuticals are often bracketed together in UK industrial surveys, the borders between their products being blurred, and their largely consolidated players being represented through the same trade association, the CIA. In an April 2016 survey of 93 members on attitudes to EU membership, the CIA stands alone in having had absolutely no members whom said that leaving the EU would be in the best interests of their business.

## EXPORT SALES



When combined, Chemicals and Pharmaceuticals are the UK's largest Export sector, exporting GBP 55 bn. 54% of these exports are to the EU.

The UK's Pharmaceuticals sector delivers around 7% of all global pharmaceutical exports, the second only to the Whisky business in terms of the UK's global relevance.

The Chemicals sector is also a giant of the UK economy, with almost GBP 25 bn of exports and over 100,000 employees, plus as many again in Plastics.

Both Chemicals and Pharmaceuticals rely largely on access to the markets of the world's largest free trade area in order to deliver the scale economies they need, both in production and R&D, in order to survive in the face of competitors with lower input costs in the US and China.

## OWNERSHIP CONSIDERATIONS



Relatively few Chemicals and Pharmaceuticals players in the UK are owned by Continental European players. Inevitably in such a large sector there are notable exceptions, such as AkzoNobel and BASF, but this is a sector where UK ownership has remained commonplace, both in public corporates like GlaxoSmithKline, and in private companies like Ineos.

FDI outflow to Europe has been material in this sector, given the strength of science education in the EU, and must be safeguarded. Global megamergers are similarly important, but could outlive EU membership.

## SUPPLY CHAIN



More than most sectors, it is essential for chemical supply chains to integrate across products. Shipping costs are material for low grade products, so complex eco-structures grow up in clusters, for example around refineries in Grangemouth or chlorine cells in the North West. Supplies to these complexes are usually of basic materials, energy, labour, and project management. The terms under which these supplies can be procured are not heavily dependent upon the EU.

The pharmaceutical supply chain is less intertwined than that of chemicals, but more Euro-depend

ent, with the supply of European capital equipment a notable feature.

The main concerns we hear from our pharmaceutical clientele surrounding Brexit are actually both related to supply chain, and concern international staff mobility and R&D funding.

The sector is particularly R&D intensive, spending around GBP 5 bn per annum or one in three of all Dollars spent on R&D. European structure relating to intellectual property protection is also important. This is a high-value industry; UK Chemical Engineering graduates have had the highest starting salary of any graduates in recent years, and the best candidates are drawn from across Europe.

## DOMESTIC DEMAND



Is of little consideration, given the sector's export focus.

## OTHER PROCESS INDUSTRIES

In addition to Chemicals and Pharmaceuticals, other process industries are responsible for the direct employment of over half a million people in the UK.

Food and Beverages in particular is a major employer and a great strength of the UK, the largest Manufacturing sector at 16% of turnover. Whilst largely domestically focused in nature, exports are an important opportunity for many sectors, and proximity and tastes mean that over half of food and drink exports are to the EU. This is a sector where Ireland is also very important.



## CONSTRUCTION EXPORT SALES



The UK's Civil Engineering and Construction firms are amongst the least dependent upon the EU for their sales. Civil structures by their nature do not export. Only 8% of Contracting firms have any involvement in non-UK work, and of this small proportion very little is in Europe. Engineering firms, and particularly Engi-

neering Design companies have a much longer history of export (accounted for in the UK's service surplus), with businesses like AMEC, Arup and Mott MacDonald dominated by non-UK sales over many years, but even here sales to Europe are minimal, around 10% of trade. This is a result of the local nature of Civil Engineering markets world-wide, and particularly in Europe where language and cultural barriers have led to national champions.

## OWNERSHIP CONSIDERATIONS



Unlike exports, European ownership of UK businesses is a slightly larger issue. Of the top ten contractors four are domiciled in foreign EU countries. The historical openness of the UK market, coupled with healthy demand in buildings and infrastructure, has been the attraction here. EU owners are already exposed to e.g. currency fluctuations between Sterling and the Euro, and differences in local regulation, so it is not clear that Brexit would materially affect the relationship between European owners and their UK subsidiaries. Only if Brexit led to material challenges e.g. in repatriating profits would this become a real problem, and given the UK's historical openness to FDI and trading this possibility seems remote indeed.

## SUPPLY CHAIN



The area where Brexit would affect the Civil Engineering community most greatly would be in its supply chain.

Building materials are largely sourced locally, though the recent well publicised example of tariffs on Chinese steel illustrates that free trade issues do impact here, albeit in a complex way not clearly correlated with EU membership.

Much more pressing is the relationship between the civil engineering community and its employees.

The Construction sector has become well-used to employing high-value-for-money employees from the EU. Enquiries of our client base indicate that around 15% of Construction sector manual workers are from the EU (much higher in e.g. London). Interestingly the situation is not much different in the "white collar" end of the market, design

consultants employing c. 8% of their staff from other EU countries.

Thus, an exit from the EU would call into question the employment rights of c. 10% of the sector's employees and commensurately GBP 14.4 bn of revenue. A post-Brexit Britain would be able to replace this immigrant workforce with workers from other parts of the world, but few pro-Brexit commentators appear to have identified civil engineers or construction workers at the front of the "scarce professions" queue for an Aussie-style fast track visa application. It is therefore very likely that EU exit would lead to a period of material loss of personnel for civil engineering companies, and with it a loss of revenue, or at the very least an organisational & training hiatus.

## DOMESTIC DEMAND



Construction is perhaps unusual amongst Engineering sectors in that, beyond national economic growth considerations, Brexit might be anticipated to directly reduce domestic demand. It will do this through a reduction in both funding and need.

Funding in the Building sector is unlikely to be a big issue; parking challenges in the UK Financial Services sector, it is unlikely that building developers will be affected, and debt and sovereign wealth-funded projects will likely continue unabated.

The one area of funding where great care will be needed however is in infrastructure funding. The UK National Infrastructure Plan foresees the need for GBP 300 bn of funding over five years to renew and maintain the nation's key infrastructure. The unprecedented indebtedness of the UK Public sector means that government is constrained in its ability to borrow this money, and for the past five years it has made great efforts to seek alternative funding sources, for example from the UK Pensions sector and overseas infrastructure funds. To date, however, one of the largest sources of new funds has been the European Investment Bank. → J

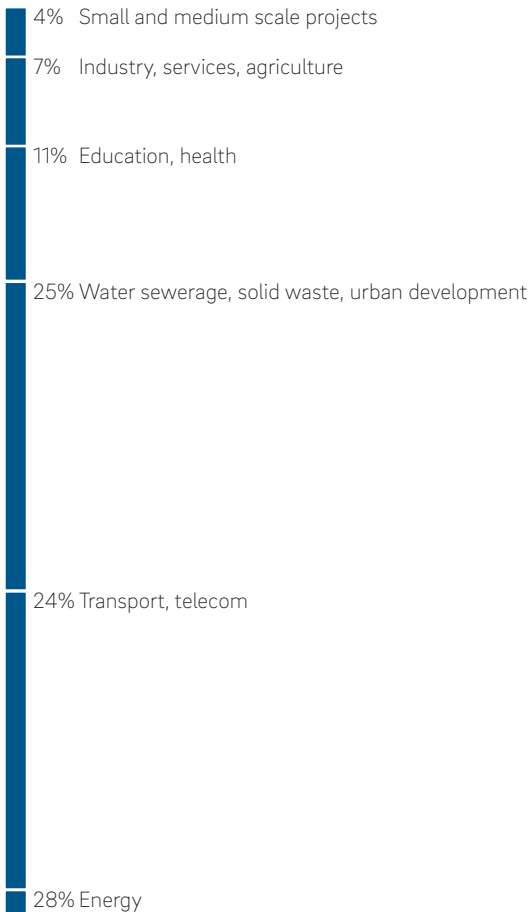
The EIB, an EU institution part-owned by the UK government, has provided EUR 29 bn of debt for UK infrastructure in the 2011-2015 period, more than the entire previous period since its inception, and much more than the well publicised initiative with the UK Pensions sector has yet achieved even in concept. EIB

J

## EUROPEAN DEBT FUNDING FOR INFRASTRUCTURE PROJECTS [%]

EIB lending by sector.

EUR 29.1 bn



has effectively funded 25% of UK infrastructure over the past five years, and the future of this debt provision must be a priority.

The other driver on domestic demand will be demographics itself. 60% of recent UK population growth, and with it its demand for schools and transport systems, has come from European migration. In central London alone, the source of an unprecedented 32% of UK construction in 2015, and three quarters of its growth since 2010, there are now 452,000 non-UK EU residents, 15% of the total. A reduction in the UK's EU population, whilst potentially popular with some voters, is unlikely to boost the Civil Engineering sector.

### OTHER MANUFACTURING

The Steel sector, so much in the news in recent weeks, provides a cautionary tale for the potential failings of free trade. As recently as 2013 the sector was still exporting almost GBP 5 bn of products under largely Asian ownership, but today's industry stands on the brink of extinction, increased tariff barriers to protect from Chinese dumping a belated and perhaps futile measure, resisted by the UK.

In contrast, the UK's Electronics sector, though not prominent in public discourse, is a success story for the UK. The key dynamic for this sector is again Foreign Direct Investment, with 14 of the top 20 global players materially represented in the UK through design or manufacture, and 80% of activity in semiconductors dependent upon inbound trade investors. Of the members of TechUK (which includes many software players, and some 80,000 SMEs more usually associated with pro-Brexit opinion), only 15% advocate Brexit.

Many other Manufacturing sectors exist, too numerous for discussion here. After years of non-interventionist trade policy and strength in Sterling the UK's niche manufacturers of shoes, furniture, audio goods, excavators, machine tools etc. tend to be high-end, design-led and mercantilist in outlook. Sophisticated consumer markets in the EU would be jeopardised at their peril.

# So what will happen next? In June 2016 we will know what the British public has decided.

A "leave" vote will absolutely vitally need to be followed by pro-trade agreements as swiftly as possible with as many countries and trading areas as possible. This may also be with soon-to-secede exporters like Scotland. Given the loss in momentum to exports and probably terminally to FDI we might expect to see a futile "buy British" campaign such as that presently envisaged for steel in order to prevent a collapse in export-dependent sectors and the Pound. Conversely a unilateral reduction of trade barriers to imports from future partners outside the EU might be a sensible way to facilitate trade agreements. The contradictory nature of these two positions illustrates what will be a period of great uncertainty.

Regardless of the political complexion of a future pro-Brexit UK government, immediate sector level focus would be needed to safeguard the loss of most critically endangered sectors like Automotive and Aerospace, and the Engineering industry will have to exercise its initiative quickly.

Article 50 dictates that a comprehensive trade deal will need to be penned within two years. Given the requirement for EU27 unanimity, and the example of Canada which has already taken seven years, waiting for a comprehensive deal is not an acceptable bet for business

people. The pro-trade proportion of Brexiteers have themselves recognised this in tabling the WTO default option, but the WTO terms still expose the Engineering sector to some punitive tariffs, for example in car parts. So the only outcome acceptable to industry is a "Swiss" à la carte deal, allowing sector specific trade deals to be struck with pro-trade EU partners on a "weighted majority" basis, and to accept that à la carte deals may prove difficult in the long term, as the Swiss themselves are presently discovering.

The UK Civil Service will be crippled in this period (headcount reduction of 70,000 or 15% since the 2010 spending review, 12,000 legal directives to unpick etc.) so ...

**... industry will need to second senior commercial staff to this effort.**

If á la carte sector deals can be secured within six months instead of two years, the damage caused by uncertainty will be quartered. With more resources, and if sector deals can be struck quickly with our main trading partner, then the next target may be to explore equivalents outside the EU also, and to address sector-specific issues beyond trade. For example, the potential loss of skilled labour would need to be obviated by the clear fast-tracking of visas for employees in science- and engineering-related roles, be they from the remaining EU or elsewhere. Industry cannot wait for the politicians who have so recklessly pulled us into this mess to haul us out of it.

A "remain" vote may be misinterpreted by Brussels as an endorsement of its every policy. This would be to miss an opportunity to press for the changes that Europe and the UK need to become more competitive. British Engineering industries require access to the markets and skilled labour that an enlarged EU provides, whilst safeguarding our rights to support those disadvantaged by free trade.

The Brexit debate, though it has created damaging uncertainty, can be thanked for identifying clear pro-trade voices for change in the EU and elsewhere. The UK, post "remain" has an opportunity to end a period of self ostracisation in Brussels and to lead pro-trade change in the Union; this is, after all, the UK democratic mainstream. With similar proactive support from other industries, this change could include extending the single market to the Service sector.

UK industry has long taken a worldly and disinterested attitude to HMG ministries, but perhaps the undoubted shock of this referendum could be harnessed to herald a new and more proactive era of public-private co-operation.

It is our hope that the UK will vote to "remain", and that following this vote industry and government will speak with renewed clarity to steer the EU towards clearer pro-trade policies. With this, and with the sector's ingenuity and capital, our companies can continue their necessary improvements in productivity, and contribute even more decisively to the country's success. ♦

# ABOUT US

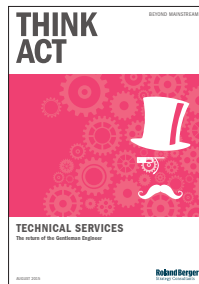
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Over the last 300 years, new technologies and processes have paved the way for disruptive products and breakthrough innovations. In the 18th and 19th centuries, there were relatively few truly disruptive technologies introduced, and the intervals between them were relatively long. In the 20th century these breakthrough innovations have become more frequent. It was, and obviously is difficult to predict the importance & impact of new products. So have company leaders learned lessons from the past, and are they prepared for this pace of technological change, & the competitive threat it entails?



### TECHNICAL SERVICES: THE RETURN OF THE GENTLEMAN ENGINEER

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