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**Economic links between UK and other European Union countries: exports from experts**

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**Abstract**

Evidence in this paper shows that in recent decades, the UK economy has tended to vary in step with other European Union countries: UK tends to have economic growth when other EU countries are also growing. This paper suggests a possible explanation for this apparent connection: exports between economies within the EU. We might expect that one country’s success could lead to problems in other countries; but evidence in this paper suggests economic development in the EU is a ‘positive sum game’. If a German or French or Italian firm manages to export more, this could be a cause for celebration in UK also.

**Keywords:** European Union; UK; exports; economics growth.

**Introduction**

This paper focuses on the four largest EU countries, based on their Gross Domestic Product (GDP): Germany, UK, France, and Italy. It can be observed, from evidence reported in this paper, that several major economies tend to have similar periods of recession and recovery; this pattern has applied for decades. This may seem a surprising result, because we might expect these four countries to be rivals. For example, all four of these countries are car exporters; if one country is successful at exporting cars, we might expect the other countries’ exports to suffer. Similar international competition between these four countries applies in many other fields also, such as consumer goods and aerospace industries.

This paper offers an explanation for this apparently surprising result. The explanation outlined in this paper is based on exports: this paper claims that exports from one country (of cars, for example) often have a counter-intuitive effect, in that it helps (rather than harms) car industries in other countries.

It has been said that ‘if you build a better mousetrap, the world will beat a path to your door’. For any firm in a competitive industry, it is essential to produce goods which are at least as good as rival firms – in terms of low price, or high quality, or both. Hence, a firm which is successful in exporting needs to be ‘expert’ before it can export.

**Literature review**

Competition has advantages: it encourages every firm, and every country, to try to reduce the price- and raise the quality – of the products they make. Consumers benefit: as well as low prices, and plenty of choice, there is more likely to be technological and other improvements. For example, imagine a car manufacturing firm improves the quality of cars they make, by increasing the number of miles per gallon (or Kilometres per litre) the car can travel. Consumers can choose to buy this improved car; and rival firms, concerned about their own sales falling, have a strong incentive to improve their cars. We can see competition between countries in a similar way: economists use the term ‘comparative advantage’ to describe a country’s ability to successfully export a particular type of product (Timmer et al., 2014: 115). There are drawbacks from competition: for example, if one firm successfully manages to increase their share by spending more on advertising, then other firms may lose sales – this could lead to job losses in other firms. Similarly, if one country gets better at exporting a particular product, then factories in other countries may lose market share in the global market. Successful production of steel in countries such as China and India could help other countries, for example by reducing the world prices of steel products; but there is a risk of job-losses in EU-based steel firms.

This paper uses car manufacturing as a case study. In many EU countries, the car industry is an important source of jobs and export revenue (Needham, 2013: 2). Design & production of cars takes place in different EU countries, including engine design in UK; engineering design of the car as a whole in Germany; manufacture of engines in UK, Germany, Spain & Romania; and production of cars in Spain, Germany, Romania, Turkey, and Germany (KPMG, 2014). KPMG (2014) report that the car industry makes up 4% of GDP, and creates jobs for 700,000 people, in the UK. This sequence is known as a ‘value chain’ (Timmer et al., 2014). International value chains are an increasingly important part of manufacturing (Johnson, 2014: 139): for example, in aerospace (Jacob, 2012) and the food & drink industry (Food and Drink Federation & National Technology Platform for Food, 2012: 4). Exporting gives a company access to many consumers, and allows the firm to use a more specialised division of labour (Demeny & McNicoll, 2006: 270). Baldwin (2016: 111) suggests trade within EU is made easier by removal of trade barriers; in this respect, there has been little progress by the World Trade Organisation (WTO) in removing trade barriers worldwide.

The EU car industry is a complex structure: there are a few car manufacturers, but also a larger number of companies which supply car components. Needham (2013: 2-3) sees this as a ‘pyramid’ structure, in which a manufacturing firm designs and assembles the car; ‘first-tier’ firms manufacture car components, such as fuel pumps; ‘second-tier’ firms make simple individual components, such as a fuel pump housing; and ‘third-tier’ and ‘fourth-tier’ firms provide raw materials (Needham, 2013). Firms which manufacture components are often local firms (KPMG, 2014). Similar approaches are used in many industries (Timmer et al., 2014: 101).

In industries which are based on international value chains, each manufacturer chooses what it thinks is the most appropriate supplier of components (Sarı, Baynal & Ergül, 2016): this decision combines various aspects, seeking low-priced but also high-quality components. If a car manufacturer suddenly found an improved component (such as a car engine, which is more fuel-efficient than previous engines), then this would tend to make their car more appealing to consumers (especially for the first manufacturer to start using this engine). Hence, it is not easy to identify cause and effect: if we find increased sales of car engines from UK to Germany (for example), the cause could be more consumer demand for German cars due to changing fashion; or more consumer demand for German cars because they are now more fuel-efficient than Italian cars. Hence to some extent, competition between car firms can be seen as competition between engineers; but many other staff are also involved, such as accountants and assembly-line workers. International trade has advantages for all firms which import or export: it makes a firm’s employees aware of new techniques and technologies (Ganotakis & Love, 2012).

This paper examines data on Gross Domestic Product (GDP), a conventional way to assess economic progress in economics (Dornbusch, Fischer & Startz: 2014). GDP attempts to assess the output of an economy in a year: hence, it gives an impression of whether the standard of living is rising or falling over time. It can be argued that GDP is an imperfect measure – for example, it does not take account of problems such as pollution. GDP has the advantage that data for many years are widely available, for most countries. For this paper, GDP data from EUROSTAT (2016a) are analysed.

Central to this paper is to test the hypothesis of Simister (2016), which claims that EU car firms often import components from other EU countries – for example, many UK firms manufacture car components, which are then installed in cars made in Germany, France, and Italy. These findings are consistent with the use of ‘Just-in-time’ manufacturing, in which components are delivered – when needed – to a factory which assembles finished products. Just-in-time production is associated with the Kanban system, originally developed in Japan (Kaizen Institute, 2016). A key aspect of this modern approach is that if a firm sells cars using just-in-time manufacturing, then car components are sold to the final firm at about the same time as cars are manufactured; hence, if car components are sourced from other countries, we can use data on exports to investigate the economic activities.

EU firms may benefit from standardisation of goods made and sold in Europe: for example, EU firms are familiar with the required specification for a catalytic converter in a car exhaust sold in EU because each EU country follows similar rules (Amin & Rathod, 2012; European Commission, 2016).

**Data and methods**

For this paper, data from the EUROSTAT database (EUROSTAT 2016a, 2016b, 2016c and 2016d) were downloaded by the author. The selected data are not seasonally adjusted by EUROSTAT, but are reported in real terms (i.e. converted by EUROSTAT to constant prices). UK data have been converted by EUROSTAT from UK £s to Euro currency: exchange-rate details are reported on the EUROSTAT website. One data series analysed in this paper is reported as an index, set to 100 in 2010: EUROSTAT (2016c). The author converted monthly data to quarterly data, for Chart 3.

The specific version of GDP analysed in this paper is at market prices; unadjusted (i.e. neither seasonally adjusted nor adjusted for the varying number of days per month, such as February); and using chain-linked volumes, with the reference year set to 2005, and at 2005 exchange rates. The conventional economic definition of Gross Domestic Product (GDP), also called ‘national income’, is shown in Equation [1].

GDP = C + I + G + (X – M) Equation [1]

In Equation [1], C represents total consumer spending, for all households; I represents total investment, by all firms; G represents ‘consumption’ by government (central and local) – such as the cost of maintaining hospitals, roads, and police forces. In equation [1], X represents exports, and M represents imports. A possibility explored in this paper is that variations in exports are a key driver of changes in GDP; to justify this hypothesis, other components of GDP (in equation [1]) may tend to be fairly constant over time – for example, households eat about the same quantity of food from year to year; and the cost of government activities such as police forces and prisons may be about the same as it was in the previous year. This paper examines year-to-year changes (explained below); long-term variations in an economy are not the focus of this paper.

For each of the four data series analysed in this paper, the author then calculated annual growth-rates for each quarter, as follows:

Growth-rate = 100 ( X***n*** – X***n - 4*** ) [equation 2]

X***n - 4***

In equation [2], ***n*** is the quarter number, and X is the variable being analysed (such as GDP). Equation [2] calculates percentage growth rates, which can be compared with other annual rates; but is available for quarterly data. Among other advantages, comparing one quarter with the same quarter a year earlier removes most seasonal effects (which tend to make charts look more complicated).

This paper reports evidence in the form of charts, with time on the horizontal axis. To improve comparability of Charts in this paper, each chart has the same time-period on the horizontal axis: from 1998 quarter 1 (1998q1), to 2016 quarter 1 (2016q1) – even for data series which have missing data in recent quarters. The latest available EUROSTAT data (at the time of writing) are used in this paper; the earliest date, 1998q1, is chosen by the author – and is arbitrary (future researchers could choose a different time-period).

**Results**

The first new evidence in this paper is Chart 1, which shows GDP over time for the four selected countries: these are the countries with the largest GDP, according to EUROSTAT (2016a). Chart 1 can be used to assess the hypothesis that EU countries are economically integrated, so that a period of growth (or recession) in one country tends to occur when other EU countries have similar growth (or recession) experiences.

**Chart 1: GDP growth in the previous 12 months, from 1998 to 2014: four countries**



*Source: author’s analysis of EUROSTAT (2016a)*

Chart 1 is complicated, and reflects many different influences. Influences on GDP include variables in equation [1] above: for example, the UK£ varies independently of the Euro currency, and changes in exchange-rates are likely to influence UK exports. Each country’s foreign & domestic investments are influenced by that country’s commercial interest rates; and government spending is affected by policies of the governing political party. Other factors (not included in equation [1]) are also likely to have influenced GDP growth-rates in Chart 1: for example, consumers may spend more when they feel optimistic about future earnings. There is not sufficient space in this paper to discuss all possible influences on GDP in these four countries.

This paper attempts to assess whether or not UK economic growth is connected, in some way, with economic growth in other EU countries – focusing on Germany, France, and Italy. Chart 1 offers some evidence: there are similarities between periods of growth in these four countries. The most obvious similarity is negative growth period around 2009, for all four countries: this is likely to be associated with the global financial crisis (Reinhart & Rogoff, 2013), so this is not persuasive evidence: many countries inside and outside EU faced negative growth just after 2008. But other evidence suggests the four countries in Chart 1 had similar patterns of economic growth & decline: perhaps the clearest case is the growth in 2000 for all four countries. Another common pattern in Chart 1 is economic recovery in 2010, followed by decline to 2012, and then recovery (EUROSTAT do not report GDP data since 2014). There are periods where UK seems different to the other three countries in Chart 1: from 2001 to 2003, UK had much more positive growth than Germany or France or Italy. Simister (2016: 54) comments that the value of UK exports of car parts (in Euros) is higher in 2001 than might be expected, stating “this pattern may be clarified by further research”. Increases in UK exports might explain the anomaly in Chart 1 above – a topic discussed further below.

The previous evidence, in Chart 1, suggests a tendency for these four EU economies to move together; if this does occur, it would be helpful to understand why. Chart 2 investigates a possible explanation: exports from these four EU countries. Chart 2 includes all exports from these four countries: for example, German exports include products sold to France and Italy and UK; other EU countries; and countries outside the EU. Some, but not all, of the exports in Chart 2 are associated with cars.

**Chart 2: export growth in the previous 12 months, from 1998 to 2014: four countries**



*Source: author’s analysis of EUROSTAT (2016b)*

Chart 2 shows how exports in four EU countries varied, since 1998. The time-period in Chart 2 is similar to Chart 1; but the vertical axis in Chart 2 extends from minus 25% to plus 25%, whereas the vertical axis of Chart 1 only varies from minus 10% to plus 10% (exports in Chart 2 had more year-to-variation, than GDP variation in Chart 1).

Chart 2 shows remarkable similarities between the four countries: exports grew rapidly in 1998; 2000; 2002; 2004; 2006; and 2010. The periods of growing exports in Chart 2 may explain at least some of the GDP variation in Chart 1: for example, GDP growth in 2000 (in Chart 1) may be an effect of export growth in 2000 (in Chart 2). Similarities between countries are more persuasive in Chart 2 than in Chart 1; this seems consistent with a hypothesis that exports between these four countries tend to vary in tandem. But if Chart 2 does reveal an important pattern, it does not explain why these four countries’ economies seem inter-related. The definition of GDP (in equation [1]) confirms that exports are a component of GDP; if there are increased exports, we would expect this to lead to GDP growth (and more jobs in the exporting country). However, there are reasons to question this interpretation of cause-and-effect: for example, the GDP increase in 2000 (shown in Chart 1) may have allowed Europeans in these four countries to afford imported cars – hence, increased exports could be an effect, rather than a cause, of GDP growth.

Another issue relevant to the previous paragraph is related to the above discussion of competition: if one country exports more, it might be expected that other countries will be worse off (other countries’ exports would tend to be reduced, assuming global demand is limited). Chart 3 sheds some light on this issue.

Chart 2 analyses data on exports in general; Chart 3 focuses on (growth in) car production – this includes car exports, and cars sold in a country’s domestic market. Chart 3 only shows data for three countries: UK is excluded from Chart 3, because UK data are missing for all years in EUROSTAT (2016c).

**Chart 3: car production from 1998 to 2016, in Germany and France and Italy**

*Source: author’s analysis of EUROSTAT (2016c)*

Chart 3 does not show particularly strong similarities between the three countries, but there are some commonalities: in all three countries, sales fell about 2009; and rose in 2000, and in 2010-11. These increases in car production seem consistent with the increased exports in 2000 and 2010-11 in Chart 2. This paper does not attempt a full analysis of car sales – which is a very complicated topic. For example, some changes in car production (in Chart 3) may be due to sales within a country, rather than exports. Some key lessons from Chart 3 become clearer when we compare it with Chart 4, as explained below.

**Chart 4: UK exports of car parts from 1998 to 2016, to Germany and France and Italy**



*Source: author’s analysis of EUROSTAT (2016d)*

Chart 4 shows changes in exports of car parts, from UK to three other EU countries. There are some aspects of Chart 4 which show similarities between Germany and France and Italy: UK exports of car parts to all three countries rose in 2000, and fell in 2009. We can learn more by comparing Charts 3 and 4. Consider 2006, for example: Chart 4 shows UK exported more car parts to Italy – whereas sales to Germany remained around the same, and sales to France fell. This pattern is consistent with Chart 3, in that Italy increased car production in 2006. There was a drop in Italian car production around 2013q1 in Chart 3; at that time, Chart 4 shows a corresponding fall in exports of car parts from UK to Italy. The relationship between Charts 3 and 4 is complicated, and does not show a perfect match: there are many influences on sales of cars and car parts – for example, car manufacturers may have long-term or short–term contracts with their suppliers.

A useful lesson from comparing Charts 3 and 4 is that the UK firms which export car components seem flexible: they vary which country they sell to, apparently in response to each country’s car production. This brings us back to the above discussion on competition: it can be argued that competition between firms (and between countries) is desirable, because a car firm’s production implies potential for increased sales from firms which supply car components. From the viewpoint of a UK engine manufacturer, for example, it seems desirable for German and French and Italian firms to compete with each other for sales in USA; whichever country ‘wins’ the exports race to sell cars, UK firms can sell more car engines. It makes sense for UK car component manufacturers to co-operate with car manufacturers in other EU countries, regarding research and design: if a UK engine manufacturer can help to make (for example) French firms sell more cars, then UK and French firms both benefit from jobs and export revenue. Needham (2013) claims a large fraction of Research & Development in the EU is associated with the car industry.

The study of car manufacture in this paper may seem controversial: for some people, producing cars is a problem, because cars often cause harm – such as air pollution and global warming; congested roads; and risk of injuries to pedestrians. Other readers may consider car production as beneficial – perhaps seeing car manufacture as raising standards of living, and replacing old highly-polluting cars with modern fuel-efficient cars (if someone is going to use a car to get to work, it may be better if they drive a modern car with a catalytic converter – rather than an old car, which could be more polluting). Other industries are also controversial: for example, foreign holidays tend to increase the number of aircraft flights, and hence may add to fossil fuel use and global warming. Much of the evidence in this paper may apply to manufacturing in general, rather than just to cars. For example, building houses in one EU country could increase demand for bricks, furniture, and paint in other EU countries; UK manufacture of wings for Airbus aircraft could help maintain jobs in France. Hence, successful production in one EU country may benefit other countries.

The EU is a geographical region where experts can interact: for example, the best engine designers can liaise with the best car designers, to produce more fuel-efficient cars. To some extent, such activities happen globally, and do not require the European Union. But EU does influence economic activity: sometimes discouraging imports, and at other times making more positive contributions such as improving safety. European Commission (2016) report that technical harmonisation of cars in EU countries is based on the ‘Whole Vehicle Type-Approval System’ (WVTA): in this system, a car manufacturer which obtains certification for a vehicle type in one EU country can market this vehicle in all EU countries, without needing more testing. This could be seen as helpful, in ensuring EU consumers buy safe cars.

**Conclusions**

Many writers (some of whom are reported in this paper) report that modern manufacturing often uses ‘Just in time’ techniques: components such as engines, headlights, & gearboxes are purchased from various firms, and assembled into finished cars for sale to consumers. A car manufacturer has choices to make: which suppliers can provide the best components? If we imagine a car manufacturing firm facing competition from inside & outside EU, it is vital for the firm to buy components which are appropriate – this often means a trade-off between seeking lower cost, or higher quality. The choice seems even more important for high-status car brands (including some car firms in Germany, France, & Italy). In short, a car manufacturer needs to buy components from expert manufacturers. EUROSTAT and other data sources show that UK firms often export car products to Germany, France, and Italy: this indicates that many UK exporters are experts in their field.

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