

How the short run effects of Brexit on trade, investment and GDP have been miscalculated in recent work

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There has been a lot of recent comment in the media to the effect that Brexit has damaged trade and the economy- for example, from LSE's Dr. Swati Dhingra in oral evidence to the Commons Treasury Committee¹, and also Chris Giles' recent report in the FT- <https://www.ft.com/content/e39d0315-fd5b-47c8-8560-04bb786f2c13>. Yet these claims are puzzling, given the numerous shocks that have hit both the world generally and the UK in particular, including Covid and the Ukraine war. How can it be possible to discern a Brexit effect in all this volatility? Of course, the economy today has many problems; to those who opposed Brexit, it must be tempting to blame them on Brexit. However, the issue when so many shocks are impacting on the economy, is to sort out the wheat from the chaff and identify the Brexit element in them all. This is the task that good statistical methods aim to address. In principle, the way they take is to set out a 'normal relationship' determining the economic variables of interest and then to identify the point of time at which the Brexit element intervened; this key date of Brexit arrival then allows us to identify the Brexit effect mathematically as a shift in the relationship definitely due to Brexit owing to its coinciding with that date. This type of analysis is known as an 'event study'. Because there are so many other shocks occurring before and after this event, the question arises whether the estimated effect is 'statistically significant'. By this is meant that it could not have occurred by chance, and not due to the event- here Brexit. This is judged by estimating a range of estimated effects that could occur simply by chance due to general shock volatility. The estimated effect is considered to be due not just to chance if it is bigger than this range: it is then considered to be 'statistically significant'. Usually we set this range at what could occur with up to 95% probability; if the estimated effect exceeds this, it would only have a 5% chance of occurring and so we consider that the event most probably had an effect. This is the yardstick we will use in judging whether there was an effect or not for sure.

Accordingly, we have looked carefully for such effects on the relevant UK data; they should show up as statistically significant effects of the date of Brexit in appropriate regression relationships of UK variables on their determinants or on their matched comparator group of countries, to which they should be closely related. Of course the data has notoriously been highly volatile due to major shocks just noted. This militates against finding significant Brexit effects, as common sense indicates. To anticipate our findings, we generally cannot find significant effects of Brexit in any of these regressions. The Brexit effects 'found' by media commentators are therefore of doubtful validity.

As noted in the FT by Giles, the work that claims to find damaging Brexit effects mainly uses 'doppelganger (D) methods' in which a group of other economies which in the past has behaved similarly to the UK is compared with the UK over the period since Brexit; if performance changes this is attributed to Brexit. There are two problems with this method. The first is that there is a potential for selection bias, in that the group can be selected precisely because it 'shows an effect'; those using this method have controlled for this by using an algorithm that chooses country weights based solely on maximising the group similarity to the UK prior to Brexit. The result (eg **in the Centre for European Reform paper**, 'What can we know about the cost of Brexit so far?'- https://www.cer.eu/sites/default/files/pbrief_costofbrexit_8.6.22_0.pdf.) is a weighted average of 22 countries- this in practice is close to the OECD average, to which one would expect the UK's economic behaviour to be close, both because we trade a lot with these countries and because they are all similar to our economy in many ways. The advantage of using the OECD average is that no selection is needed and so the comparison is guaranteed free of selection bias; nevertheless, the D group is so close to this that users of it will not in practice suffer from selection bias- implying also that the D selection process adds little to the analysis.

The second and far more important problem with the 'D method' is that it identifies the effect of Brexit as any changes in the UK's performance since Brexit relative to the D group. This is manifestly incorrect. There are many other shocks to both the UK and this other group occurring both before and after Brexit that can between them generate these changes. It is necessary to identify carefully the shock due to the Brexit 'event' and estimate its size. The standard way to do this in such 'event studies' is to introduce a 'dummy variable' into a regression of the UK relationship with the other group which takes the value of minus one from the date of the event- namely, here the date of EU exit at the start of 2020; the coefficient on this event

¹ <https://committees.parliament.uk/committee/158/treasury-committee/publications/oral-evidence/> -Nov16

term must be statistically significant to be evidence of a permanent Brexit effect, as opposed to being simply part of the statistical noise, i.e. all those other shocks, surrounding the relationship.

We can now use economic theory to suggest how the Brexit event might impact on the UK economy. As we have said in previous publications (e.g. Minford and Meenagh, 2020, *After Brexit- what next?* Edward Elgar) the effects of Brexit will come in over the long term as free trade agreements are completed and a new regulative environment established. In the short run we expect some temporary and minor disruption as existing relationships with the EU are remade under UK independence; ‘temporary and minor’ because the Trade and Cooperation Agreement is intended by both the UK and the EU to maintain cooperation and avoid new trade barriers, whereas short run effects as people and firms adapt may well be found. But we would not expect to find any permanent effects.

Any effects of Brexit must come through via trade, so we explore here the effects on trade as well as those on GDP and investment. Our method avoids any selection bias by simply using the OECD average as the group of countries to compare with the UK when we are gauging whether the comparison shifted post-Brexit: we use the OECD as the comparator to see if UKGDP and investment/GDP ratio has shifted relative to the OECD post-Brexit. We look at data behaviour for the last two decades and check whether there is any permanent effect of Brexit via the significance of the Brexit dummy. As already noted the D group chosen by the CER algorithm is close to this OECD average and so will give similar results- we check in the Appendix for robustness to changes in setting up the comparison group.

In examining trade, in our first set of regressions we specify normal trade demand relationships+ and check whether they shifted due to the Brexit dummy. We examine imports and exports, to the EU and to the non-EU; in volume terms and in current price terms. What we see is that in none of these regressions is there a significant Brexit effect. Coefficients in the regression that are significant at the 5% level are asterisked.

+ the data are heavily trended so we do not interpret the regression coefficients as structural relationships but as ‘reduced form’ ones reflecting the correlation of the underlying trends. The focus here is only on whether they are shifted by Brexit.

Table 1 CP/deflator measure, OLS estimate results, 2005Q1 to 2022Q2,

	Export EU	Export non-EU	Import EU	Import non-EU
EU GDP	1.158* (0.197)			
World imports		0.612* (0.048)		
UK GDP			1.987* (0.113)	1.692* (0.119)
RXR	-0.105 (0.099)	-0.438* (0.102)	-0.835* (0.077)	-0.832* (0.082)
Brexit departure	0.028 (0.065)	0.097 (0.063)	-0.069 (0.055)	-0.001 (0.058)
COVID	-0.134 (0.075)	-0.076 (0.071)	0.055 (0.064)	0.039 (0.068)
COVID recovery	-0.09 (0.074)	-0.129* (0.067)	-0.049 (0.058)	-0.033 (0.062)

Note: *significant at the 5% level; Constant is not reported but included in the regression

Table 2 Current price measure, OLS estimate results, 2005Q1 to 2022Q2,

	Export EU	Export non-EU	Import EU	Import non-EU
EU GDP	1.104* (0.065)			
World imports		0.983* (0.037)		
UK GDP			1.201*	1.027*

			(0.037)	(0.051)
RXR	-0.243*	-0.642*	-0.349*	-0.414*
	(0.108)	(0.077)	(0.054)	(0.072)
Brexit departure	0.026	-0.032	-0.008	0.052
	(0.065)	(0.047)	(0.033)	(0.044)
COVID	-0.075	-0.017	-0.092*	-0.088
	(0.073)	(0.054)	(0.037)	(0.049)
COVID recovery	-0.112	-0.157*	-0.126*	-0.098*
	(0.073)	(0.051)	(0.035)	(0.046)

Note: *significant at the 5% level; Constant is included in the regression

We go on to consider the investment/GDP ratio and regress the UK data on the OECD data, as follows. The regression relates the UK investment/GDP ratio to that in its OECD peers. As the chart of the two series shows, shows, the UK ratio is lower than the OECD average, probably because as a predominantly service economy UK capital is much more intangible so not included in the fixed investment figures. The UK ratio is also more stable than the OECD's, fluctuating about half as much, probably for the same reason. It can be seen there is no significant effect of Brexit. **Nor is there any Brexit referendum effect, via expectations.CHECK**

$$\ln(\text{UK Investment GDP ratio}) = C + \beta_1 \ln(\text{OECD investment GDP ratio}) + \beta_2 \text{Brexit departure dummy} + \beta_3 \text{Covid dummy} + \beta_4 \text{Covid recovery dummy}$$

Table 3 Investment GDP ratio, 2005Q1 to 2022Q

	UK Investment/GDP
OECD Investment/GDP	0.534* (0.154)
Brexit departure	0.007 (0.008)
COVID	-0.002 (0.009)
COVID recovery	-0.002 (0.008)

HERE ADD Brexit referendum dummy taking value -1 from Q2 2016.

Next, we do the same for GDP, regressing the UK on the OECD and the same dummy variables. This regression tests whether the UK's GDP behaviour relative to its OECD peers' average was affected by Brexit; notice the strong connection between UK and OECD GDP, stemming from the fact that both are responding to the same world shocks and are also closely linked by trade. This suggests that the OECD fulfils the role of doppelganger effectively, but with no selection of a country subset involved; cet par UK GDP will vary closely with OECD GDP. If Brexit reduced UK GDP it should show up as a significant negative factor. As can be seen, the effect is insignificant.

Table 4 GDP regression, CVM, 2005Q1 to 2022Q2

	UK GDP
OECD GDP	0.879* (0.049)
Brexit departure	0.032 (0.027)
COVID	-0.034 (0.032)
COVID recovery	0.003 (0.030)

Again add referendum dummy to check for expectations effects.

Figure 1 UK Export, EU and Non.EU

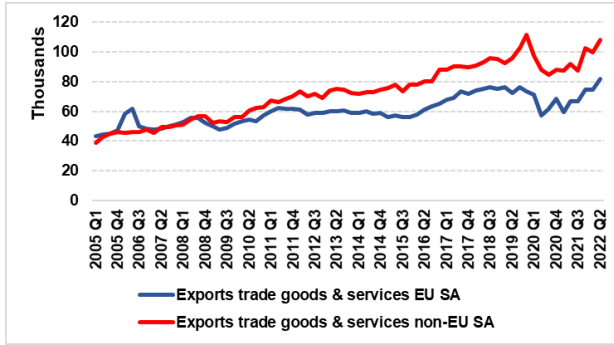


Figure 2 UK Import, EU and Non.EU

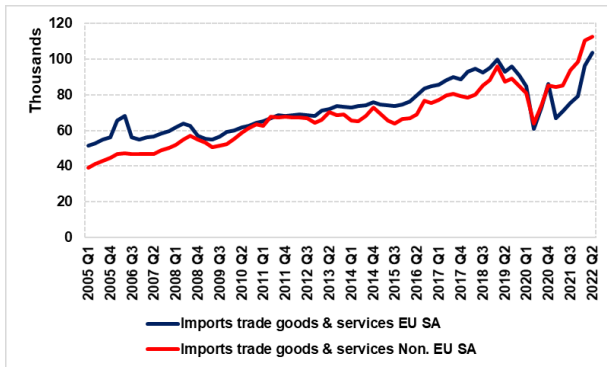


Figure 3 Investment-output ratio, UK and OECD

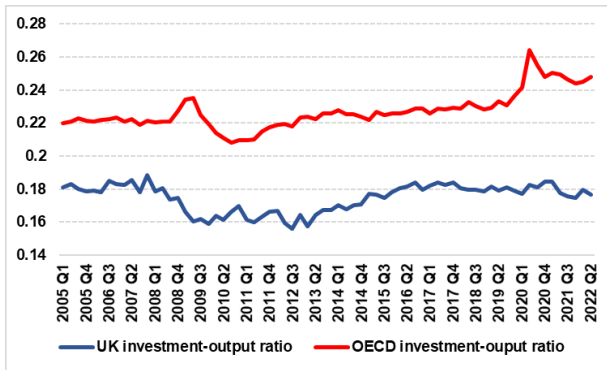
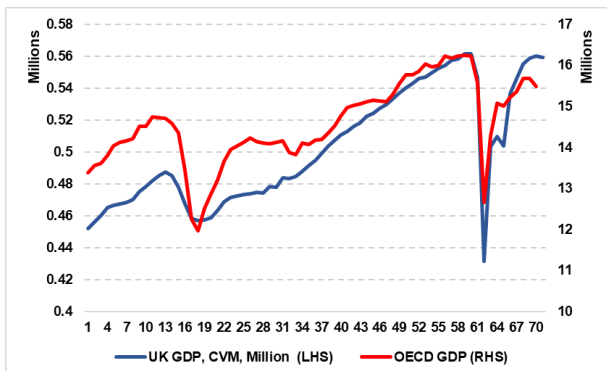


Figure 4 Output, CVM measure UK and OECD



Here put dates along bottom in place of numbers

Variable definitions:

<i>Dependent Variable</i>	Definition	Source
Export EU	Exports trade goods & services EU, current price, SA	ONS
Export non-EU	Exports trade goods & services Non. EU, current price, SA	ONS
Import EU	Imports trade goods & services EU, CP, SA	ONS
Import non-EU	Imports trade goods & services Non. EU, CP, SA	ONS
Independent Variable		
RXR	Effective Exchange rate index	BoE
UK GDP	GDP, Chained Volume measure (CVM), SA	ONS
EU GDP	Millions of Chained 2010 Euros, Seasonally Adjusted	Eurostat
World import	Import trade in goods & services, constant price & PPPs	OECD
Brexit departure dummy	-1 from Q1 2020, 0 otherwise	-
COVID dummy	1 from Q2 2020 to Q4 2020, 0 otherwise	-
COVID recovery dummy	1 from Q1 2021, 0 otherwise	-

Dependent Variable	Definition	Source
UK investment	Total gross fixed capital formation, CVM, SA	ONS
UK GDP	Gross domestic product, CVM, SA	ONS
Independent Variable		
OECD Investment	Total gross fixed capital formation, CVM, fixed PPP, SA	OECD
OECD GDP	Gross domestic product, CVM, fixed PPP, SA	OECD
Brexit departure dummy	-1 from Q1 2020, 0 otherwise	-
COVID dummy	1 from Q2 2020 to Q4 2020, 0 otherwise	-
COVID recovery dummy	1 from Q1 2021, 0 otherwise	-

Conclusions

Thus whatever relationships we examine, whether trade, investment or GDP, we find no statistically significant ongoing effect of leaving the EU. In the Appendix we check our results' robustness to two things: changing the group make-up for the comparator and adding a separate dummy for the Brexit referendum in Q2 2016- which implicitly tests for expectations effects created by the referendum result. Changing the comparator in our above regressions makes no difference to the non-significance of the Brexit departure dummy. A Brexit referendum dummy is insignificant in all the regressions above. Our results should not come as a surprise. There has been enormous turbulence in the past few years in all economies due to Covid and the Ukraine war, besides accompanying large fiscal and monetary policy fluctuations. This can be seen in the charts of these data series, shown above. Brexit is one policy shift among many shocks, and estimating its effect is fraught with uncertainty. Economic theory suggests it will have had a disruptive effect on EU trade in the short run as businesses adapt to a new border and the resulting new paperwork and related processes. But the TCA is designed to create a barrier-free and seamless border; so we should expect this effect to be dissipated steadily- including in the future as the TCA is streamlined by new talks- and not to be permanent. This is consistent with these regressions on the data.

Appendix: Robustness checks

Try alternative comparator group- eg D Group of CER. Weights used and data are in CER paper.

Also add Brexit referendum dummy- from Q2 2016. Did the referendum cause damage before Brexit occurred?