

The Effects of BREXIT on UK Trade: An Empirical Study of Exports

Les effets du BREXIT sur les échanges du Royaume Uni : une étude empirique sur les exportations

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Abstract:

BREXIT is a significant event in the history of the United Kingdom, whether economically or geopolitically since it has had major repercussions that have disrupted not only economic growth but also the country's trade with its partners. The objective of this paper is to analyze these repercussions on the United Kingdom's exports. To do this, we took a sample of data from 19 countries that have trade links with the United Kingdom. The study period spans from 2013 to 2023. The method we chose to estimate our model is that of generalized moments (MMG), because it allows us to identify the reverse causal relationships between the variables. The results showed that among the variables chosen for our model, the GBP exchange rate variable, the BREXIT variable and the partner's GDP variable had a significant effect on the United Kingdom's exports.

Keywords: BREXIT, Generalized Method of Moments, UK Exports, Free Trade.

JEL Classification: C23; F14; F1; H5; N7

Paper type: Empirical research

Résumé :

Le BREXIT constitue un événement marquant dans l'histoire du Royaume Uni que ça soit sur le plan économique ou géopolitique, puisqu'il a eu des répercussions majeures qui ont bouleversé non seulement sur la croissance économique mais aussi sur les échanges commerciaux de ce pays avec ses partenaires. L'objectif de ce papier est d'analyser ces répercussions sur les exportations du Royaume Uni. Pour ce faire nous avons pris un échantillon de données de 19 pays ayant des liens commerciaux avec le Royaume uni. La période de l'étude s'étale sur une période allant de 2013 à 2023. La méthode que nous avons choisie pour estimer notre modèle est celle des moments généralisés (MMG), car il permet de dégager les relations de causalité inverses entre les variables. Les résultats ont abouti à ce que parmi les variables choisis pour notre modèle, la variable taux de change du GBP, la variable BREXIT et la variable PIB du partenaire ayant eu un effet significatif sur les exportations du Royaume Uni.

Mots clés : BREXIT, Méthode de Moments Généralisés, Exportations de la GB, Libre-échange.

Classification JEL : C23 ; F14 ; F1 ; H5 ; N7

Type de l'article : Recherche appliquée

1. Introduction:

"Unity is strength", an expression commonly used to describe a situation where remaining alone in the world no longer counts, however, whether it is extrapolated to politics or even the economy, unity becomes a key to economic success on the international scene.

It is this success that makes the union an attractive idea that has always intrigued modern post-war states to the idea of associating. This reality can be explained by the desire of these countries to face a relentless globalization that has made it impossible for anyone to isolate themselves from the international context (rise of new economic powers and a new world order) as well as to improve their economic framework and, more precisely, their power to negotiate trade with other countries around the world. To this end, several forms of economic and geopolitical cooperation (union) have emerged in the second half of the 20th century, such as ASEAN or Mercosur or the European Union...

In this respect, and since its appearance on the world political and economic scene, the European Union has always been a vivid example of accumulation between European countries. The geopolitical and economic success of this union, whose history dates back to the 60s, has always inspired several countries around the world to follow the example of this massive economic bloc. What really happened with the United Kingdom when it decided to join this political and economic alliance previously called the European Economic Community in 1973, after years of isolation within the European space. This decision at the time was motivated by purely commercial reasons because in 1960, the European Free Trade Association was created, which allowed this country to boost its trade and more particularly its exports to European countries to the detriment of these former colonies long considered to be the source of economic domination, , as well as strengthening its geopolitical presence on the international scene and taking advantage of the European Union's negotiating power to forge strong trade relations with the rest of the world.

These same commercial motives and others such as the rise of British nationalism following the rise to power of the Conservatives led by David Cameron (he made BREXIT an election promise since 2012) and the economic crisis of 2008 made the United Kingdom decide to leave the European Union by organizing a referendum in 2016 to vote for what was called at the time BREXIT: A word that sums up a series of changes that could have harmful economic repercussions for all the countries of the Union and the United Kingdom itself (such as the imposition of barriers to entry to the European market in the event of a no trade agreement) and have consequences on the lives of many European and British citizens (reduce the mobility of British citizens), but also an irreversible sovereign decision that was carried out with firmness by a united kingdom encouraged by its historical ally: the United States (under the administration Trump called conservative) and despite the opposition of some of its territories such as Scotland (who threatened to reorganize a referendum on independence from the United Kingdom) or Northern Ireland (borders with Ireland and peace agreements after long years of civil war).

When BREXIT came into force in 2020, the United Kingdom was faced with reconstituting its economic links by multiplying free trade agreements with countries outside the European zone such as India or Japan at a time when May's government was about to go for a "hard Brexit" without an agreement with the European Union (the UK paid a very expensive cost to carry out its exit from the European area: over 140 billion pounds according to a study by Cambridge Econometrics), which is her country's natural partner until the latter managed to conclude a free trade agreement with the United Kingdom on 1 January 2021.

In our study, we propose to study the impact of BREXIT on the UK's trade by focusing on its exports. We seek to answer the following question: What is the impact of BREXIT on UK exports?

This article is structured as follows: an introduction, a first section that deals with the empirical literature. A second section that presents the research methodology and describes the dataset, a third section that analyzes the empirical results and finally a conclusion to finish this paper.

2. A survey of the literature

Several empirical studies have attempted to examine the effects of BREXIT on UK foreign trade. In our overview of the empirical literature, we will present the studies that have been developed before and after Brexit. We begin our PRE-BREXIT literature with a study by **Mansfield (2014)** that used a general equilibrium model to understand the impact of BREXIT on UK trade with the EU and third countries. In his analysis, **Mansfield** believes that the UK's exit from the EU could be an opportunity to increase trade with fast-growing countries and lower tariff costs. However, he suggests that the success of BREXIT will lie in the UK's ability to debate its own trade agreements and strike a balance compatible with its exit from the EU, its largest trading partner. Another study by **A. Ottaviano et al. (2014)** attempted to examine the future impact of Brexit on the UK economy by focusing on four shocks: the rise in trade tariffs and protectionist measures, the future deterioration of these barriers, and the cancellation of the UK's contribution to the EU budget. He believes that although blocking budgetary contributions offers a tax advantage, this gain would be largely substituted by the economic damage caused by the decline in trade, making the effect of Brexit harmful to the British economy. In addition, **Dhingra et al. (2017)**, **Sampson (2017)**, **Bevington et al. (2019)** predicted that the post-Brexit trade agreement, known as the TCA (Trade and Cooperation Agreement), would lead to a deterioration of almost 30% in trade between the United Kingdom and the European Union within 10 years. They also anticipated that this agreement would have a moderate impact on the UK's trade with the rest of the world. Their study suggests that an exit from the single market and customs union would cause an increase in non-tariff barriers, thus reducing trade with the EU.

In the same vein, **Vandenbussche et al. (2017)** gives an econometric model to study the effect of Brexit on trade between the EU and the United Kingdom, introducing direct and indirect trade. The authors adopt a gravitational model to analyze the consequences on production reports. They find that in the case of a "soft Brexit", non-tariff barriers would rise slightly, while in the situation of a "hard Brexit", non-tariff barriers and tariffs applied by the WTO would lead to a significant increase in trade burdens. The same observation is confirmed by a study by **Mayer et al. (2018)** using a model by **Costinot and Rodríguez-Clare**, to claim that the Common Market has tripled trade between the Member States of the European Union, with an average increase in GDP of 4.4% for these countries. The benefits of integration are particularly marked for small and Eastern European countries, which have benefited from increased openness to European markets. Imports into the EU increased by 109% on average, while GDP gains varied across countries, ranging from 2.3% to 8.2%. The text also points out that the reintroduction of post-Brexit non-tariff barriers could lead to an increase in trade costs of up to 80%, which could reverse some of the gains achieved through European integration. Through a dynamic general equilibrium model. Another analysis by **Pisani and Vergara (2018)** put forward 2 relevant scenarios associated with the economic effects of Brexit on trade between the United Kingdom and the European Union: a WTO scenario suggesting that tariffs would increase which will consequently affect British exports and a second scenario of the **FTA (Free Trade Agreement)** or, Tariffs will be lower than with the WTO, but non-tariff costs will increase.

Several reports have also been started on the effects of BREXIT among them, a report by **HM Treasury (2016)** which used a gravitational model to study the potential economic effects of BREXIT, this report finds that, if the United Kingdom applies the WTO rules on bilateral agreements, the new tariff barriers could impact imports and exports with the EU. Making a

comparison, being part of the European Economic Area (EEA) would have a moderate effect, but pulling out of the customs union would cause further trade restrictions. The report suggests that these changes would lower the UK's economic openness and its international trade position. In addition, it is confirmed that 3.3 million jobs in the UK result from exports to the EU, and that 12.6% of the country's GDP is associated with trade with the EU. The report also claims that the UK's membership of the EU has promoted trade with member states without disrupting global trade, which amounts to free trade agreements concluded by the EU. Another report by **Economists for Brexit (2016) and Minford (2015)**, based on an equilibrium model developed at Cardiff University, examines the future effect of Brexit on UK foreign trade. The authors of this report, Minford noted, advocate a "hard Brexit", where the UK would fully exit the EU to trade with it under WTO rules, similar to the US and China's trade with the EU. This decision, nicknamed "Britain Alone", aims to liberalize trade and boost the UK's GDP growth. According to Minford's estimates, this version of Brexit could lead to a 4% increase in GDP, an 8% decrease in consumer goods prices, and an improvement in the service sector. However, this model also estimates the almost complete deterioration of the UK industrial sector due to global competition. Finally, a report by **PwC (PricewaterhouseCoopers)** published in 2016, predicts that Brexit could significantly impact long-term trade and investment in the United Kingdom. If membership of the European Common Market is limited, the new trade restrictions would reduce trade with the EU, the UK's largest trading partner. This would have repercussions on investment, including foreign direct investment (FDI), which had a stock of £1 trillion in 2014. After Brexit several studies were conducted to measure the effects of BREXIT on UK trade including a study of **Gasiorek and Tamberi (2023)** where they compared UK trade in goods with the EU and the rest of the world vis-à-vis other countries. Their analysis showed that the Brexit of 2016 did not have an instant effect on trade between the UK and the EU. However, after the ATT came into force in 2021, they saw a short-term decline in UK exports to the EU, which did not last over time. In contrast, the ATT caused a net and continuing decline in imports from the EU, indicating that the new trade barriers had a more significant effect on imports than exports. A second post-BREXIT study by **Bhalotia et al (2023)** examined how ATT barriers to external trade in services have impacted trade in services between the UK and the EU. They concluded that the ATT had a negative effect, lowering the chance of exporting services to the EU by 5.5% in 2022 and 2023 compared to the pre-BREXIT period. However, they observed that the overall effect on trade in services was proportionately moderate relative to goods, showing that some service sectors were less affected by the new trade restrictions. In addition, **Freeman et al (2024)** used the detailed customs to study the effect of Brexit on trade in goods of individual firms. Their study showed that before 2021, exports or imports from the United Kingdom largely moved towards the EU. However, after the implementation of the ATT, they observed a sharp drop in trade with the EU compared to the rest of the world. For medium-sized companies, exports to the EU decreased by 14% and imports by 21%. They also found that smaller firms were the most affected, with a 29% drop in exports to the EU for smaller firms, while larger firms adapted better to the new business situation. Finally, **Fernandes and Winters (2021), De Lucio et al. (2024)**, analyzed the impact of Brexit on trade with the UK for EU countries and the rest of the world. They have generally found adverse effects on trade with the UK. However, these analyses overlooked market law shocks in the UK, suggesting that some of the observed effects could be associated with other economic factors outside of Brexit. After reviewing the empirical literature, we will build our model taking into consideration the following assumptions:

H1: BREXIT is an opportunity for the United Kingdom to improve its trade.

H2: BREXIT will have a detrimental impact on UK foreign trade.

3. Methodology:

To conduct our study, we chose a sample of panel data from 19 countries that are the UK's main trading partners. Our sample spans the period from 2013 to 2023. Five variables are retained for our study and two binary variables created to build our explanatory model:

- **GB exports:** they include all exports in value terms from the United Kingdom to its trading partners.
- **The GBP exchange rate:** this is the exchange rate of the UK pound Sterling in foreign currencies.
- **GDP of the United Kingdom:** this is the gross domestic product (current price) of the United Kingdom during the period studied.
- **Partner GDP:** This is the gross domestic product (current price) of the UK's partner countries during the period under review.
- **Inflation in the United Kingdom:** this is the rate of inflation recorded in the United Kingdom over the period studied.
- **BREXIT binary variable:** This is a dummy variable that captures the effect of BREXIT on UK foreign trade. It takes the values of 0 and 1.
- **Free Trade Agreement Binary Variable:** This is a dummy variable that captures the effect of POST-BREXIT free trade agreements on UK foreign trade. It takes the values of 0 and 1.

Table 1: Sources of variables

Variables	Unit of mesure	notation	Sources
Logarithm of UK Exports	billions of dollars	lnX	World Bank
Logarithm of GBP exchange rate	Trade partners currency	lnGBP	Central Bank of UK
Logarithm of UK GDP	billions of dollars	lnGDPGB	World Bank
Logarithm of partners GDP	Billions of dollars	lnGDPP	World Bank
Logarithm the UK inflation rate	Inflation rate index	lnIGB	World Bank
BREXIT	Binary values	B	Created by the authors
Free Trade Agreements	Binary values	FTA	Created by the authors

Source: created by authors

To meet our objective, we have chosen the following econometric model:

$$\ln X_{it} = \beta_0 + \beta_1 \ln \text{GBP}_{it} + \beta_2 \ln \text{GDPGB}_{it} + \beta_3 \ln \text{GDPP}_{it} + \beta_4 \ln \text{IGB}_{it} + \beta_5 B_{it} + \beta_6 \text{FTA}_{it} + e_{it}$$

Where e_{it} is the idiosyncratic error term. $i = 1, 2, \dots, N$ indicates the countries, $t = 1, 2, \dots, T$ indicates the time period, β_n are the coefficients to be estimated. It is assumed that an increase/decrease of β_n leads to an increase/decrease of the variable X_{it} .

For the estimation of the coefficients, we used **the Generalized Moments Method (GMM) of Arellano-Bond (1991)**. This estimator minimizes an objective function based on the model's conditional moments. It is widely used to address statistical endogeneity issues in panel data models, such as unobserved heterogeneity and correlated effects. This method also makes it possible to deal with problems related to reverse causation and gives robust and effective coefficients. Data processing and model estimation is done using the package (plm) on the R software which presents a fast and efficient tool for data analysis.

4. Results and discussion

After specifying the appropriate method and model for the case analysis of our study, it is time to move on to a presentation of the results obtained. As a first step, it is a question of tracing the statistics of the data that we used in our analysis. The following table summarizes the data statistics:

Table 2: Variables statistics

Variables	Logarithm of Exports from GB	exchange rate of GBP logarithm	GB GDP logarithm	Partner GDP Logarithm	GB inflation logarithm
Average	18.73	101.97	2499	3065	2,774
Max.	73.52	1882	3340	27360.9	2 830
Min	3.17	1.03	2413	221.9	0.400
Median	12.04	1.69	965	1,396	2.400
1st quantile	6.41	1.17	055	694	1.650
3rd quantile	18 71	9.32	2962	2782	2 830

Source: Developed by the authors using R software

According to Table 2, the average annual logarithm of GB exports over the study period is \$18.73 billion, while the logarithm of the GBP exchange rate had a minimum exchange rate parity of 1.03 against the euro. The logarithm of the GDP of the GB has a median of 2745.965 USD current price while the logarithm of the GDP of trading partners has a maximum of 27360.9 USD current price, which corresponds to the GDP of the United States in 2023. The inflation logarithm had a 1st quantile of 1.650% and 3rd quantile of 2.830%.

The correlation between the variables used for the estimation of our model is presented in the following table:

Table 3: the correlation between the logarithm of GB exports and the other variables

	GB Exports Logarithm
GBP Exchange Rate Logarithm	0.210
GB GDP logarithm	0. 049
partners GDP logarithm	0.595
GB inflation logarithm	0.043
Free trade agreements	0,297
BREXIT	-0.010

Source: Developed by the authors using R software

The results of the correlation tests show that the GBP exchange rate logarithm is negatively correlated with the GB export logarithm with a correlation coefficient of -0.210 suggesting that an increase in the Sterling exchange rate parity leads to a deterioration in UK exports. The results also prove that the logarithm of GB GDP is slightly positively correlated with the logarithm of GB exports with a correlation coefficient of 0.049, meaning that a growth of GB GDP has only a moderate effect on exports. The logarithm of the GDP of the trading partners of the GB and that of the exports of the GB are strongly correlated in the positive sense with a correlation coefficient of 0.595 which suggests that an increase in the GDP per capita of the UK partner countries leads to an improvement in demand on GB exports. The tests also confirmed that the logarithm of inflation is slightly correlated with the logarithm of GB exports in the positive sense (0.043), the same finding also for the correlation between the binary variable: free trade agreements with a coefficient of 0.0297, which means that these two variables do not have a very strong effect on GB exports. Finally, the binary variable BREXIT is slightly negatively correlated with the logarithm of GB exports, suggesting that BREXIT had a negative impact on UK exports.

The results of the validation tests of our model are reported in the following table.

According to table 4, the high p-value (0.84721) of the Hansen/Sargan test suggests that the instruments and innovations of the model are not correlated, indicating that our model has been well specified. This confirms that the explanatory variables are correctly instrumented, thus ensuring that the coefficient estimates are not biased. The Wald's test also suggests that the coefficients of our model are quite significant (very low p-value of 1.1992e-06) confirming that the endogenous variables chosen have a primordial role in the progression of exports, thus

suggesting that the instruments chosen for our model understand very well the economic factors that influence the exports of the United Kingdom in the post-Brexit period. Finally, the lack of autocorrelation of first-order and second-order residues as shown by the Arellano test suggests that past errors and values are not associated systematically, thus ensuring a better estimation of the coefficients of the model and that the variables used are adequate and that the model is unbiased by an autocorrelation of innovations, ensuring the validity of the estimate.

Table 4: Model's validation test results

Tests	Statistics	Degree of freedom	P-value
Hansen/Sargan test	18.74006	26	0.84721
AR autocorrelation (1)	-0.9759269	-	0.3291
AR autocorrelation (2)	0.3662258	-	0.7142
Wald's test (coefficients)	40.11004	7	1.1992e-06

Source: Developed by the authors using R software

The results of our econometric model are reported in the table below:

Table 5: Model coefficient estimation results

The Dependent Variable	
lnX	
Lag(X,1)	-0,2527 (0,0620)
lnGBP	-0.0089 (0,2422)
lnGDPGB	0.0017 (0,0050**)
lnGDPP	0.0010 (0.0289 *)
lnIGB	0,2110 (0,3832)
B	- 4,2991 (0,0175*)
FTA	-1,9601 (0,7586)

Note: * ($p < 0.05$); ** ($p < 0.01$)

Source: Developed by the authors using the R software

The results of the estimation of our model show that the domestic product of the United Kingdom and its trading partners, as well as BREXIT have a direct impact on British exports. From our model for the sample studied, we found that a 1% increase in the sterling exchange rate leads to a 0.0089% depreciation in exports. As this coefficient (Sterling exchange rate) is negative and insignificant (p -value = 0.2422), its variation does not influence exports. We also found that a 1% increase in UK GDP is linked to a 0.0017% increase in exports (This is explained by the fact that the UK's economic growth is due to an increase in production and a change in the competitiveness of British products, which has had a positive impact on exports) which goes in line with the results of **the report of Economists for Brexit (2016) et Minford (2015)** in which **Minford called for aim to liberalize trade and boost the UK's GDP growth. According to Minford's estimates, this version of Brexit could lead to a 4% increase in GDP, an 8% decrease in consumer goods prices, and an improvement in the service sector.** Another significant result (p -value= 0.0289) of our model, that of the impact of the GDP of the economic partners of the United Kingdom on exports, since an increase of 1% of the GDP of the trading partners is translated into an improvement of 0.0010% of exports (this impact is mainly due to a large demand on British exports, associated with an improvement in the purchasing power of its economic partners) **which is in accordance with Mansfield (2014) who believes that the UK's exit from the EU could be an opportunity to increase trade**

with fast-growing countries and lower tariff costs. Inflation has no direct impact on British exports, since its coefficient is insignificant (p -value= 0.3832), which may indicate that the variability of inflation is not sufficient. As for free trade agreements, they do not influence exports and their coefficient is non-significant (p -value= 0.7586). This data is explained by the nature of the agreements concluded and their modalities of implementation, as well as the timing of their entry into force. Regarding the effect of BREXIT, which is the subject of our analysis, this effect is negative and significant (p -value= 0.0175) since it led to a deterioration in exports of 4.2991% (This can be explained by the difficulties created by BREXIT for trade, including customs barriers, administrative formalities and political instability, which affected the competitiveness of British exports abroad, thus causing their deterioration) which confirms the results of **Gasiorek and Tamberi (2023)** who suggest that the Brexit of 2016 did not have an instant effect on trade between the UK and the EU. However, after the ATT came into force in 2021, they saw a short-term decline in UK exports to the EU, which did not last over time.

5. Conclusion:

The main objective of this paper was to practically examine the impact of BREXIT (the UK's exit from the European Union) on UK exports over a period of 2013-2023, a period that covers BREXIT from the referendum until the implementation of the decision to leave the European Union and the negotiations of free trade agreements with the European Union. All this based on a sample of trade data from the UK to 19 of its trading partners. The period studied made it possible to analyze the evolution of trade (exports) of the United Kingdom since its exit from the single European market and also shows the willingness of the United Kingdom after BREXIT to diversify its international trading partners such as the United States, China and India, while maintaining its relationship with the European Union as its main trading partner. In this study, we used a GMM model from **Arellano and Bond (1991)** to detect the inverse causality that surrounds our study subject. Empirical results have shown that an increase in the sterling exchange rate leads to a deterioration in exports. Another negative result is that of BREXIT since it had, and according to the results of our study, a significant impact on the United Kingdom's exports with its main trading partners. The results also showed that BREXIT to have a moderate positive effect on exports only if the UK exports to high purchasing power countries. As a recommendation, the United Kingdom should seek to diversify its trading partners by negotiating free trade agreements with other countries whose economic weight is relatively strong on the international scene such as the United States, its political ally, or China and India, both of which are the largest markets in terms of consumers in the world.

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