# The Impact of Brexit Uncertainty on FDI-related New Jobs in Northern Ireland

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# The Impact of Brexit Uncertainty on FDI-related New Jobs in Northern Ireland[1]

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## Key Findings

- Recent research has found that Brexit-related uncertainty following from the outcome of the referendum in June 2016 on the UK's EU exit has negatively affected investment activity by firms including inward foreign direct investment (FDI) in the UK.

- Using data on new 'greenfield' FDI activity[2] in Northern Ireland, we examine the effect of Brexit uncertainty on the FDI-related job creation in Northern Ireland.

- Our results indicate that uncertainty following from the outcome of the Brexit vote has led to a lower number of FDI-related new jobs in Northern Ireland compared to a situation in which the Brexit vote had not taken place. We estimate that in the absence of this uncertainty, an additional 1,036 FDI-related new jobs could have been created over two years after the referendum on the UK's EU exit in June 2016. The number of actual FDI-related new jobs over two years after the referendum is estimated to be lower by 31% than a situation without the Brexit uncertainty.

- Additional analysis shows that the reduced number of FDI-related new jobs caused by Brexit uncertainty is mainly due to reduced FDI activity in services and by EU investors.

- These results are consistent with existing evidence of a reduced FDI activity in the UK due to uncertainty related to the future UK's trade relationship with the EU. To the extent that this uncertainty will persist over the next years, it is likely that it will continue to affect negatively the attractiveness of the UK and Northern Ireland to FDI. On the other hand, if the nature of the UK's trade relationship that is negotiated with the EU will allow the implementation of the postponed investments, the anticipated negative effects could either wholly or partly be reversed.

[1] This research has been undertaken for the Department for the Economy Northern Ireland within the Framework Contract on Economic Research Projects. We gratefully acknowledge the work of Elizabeth Gowdy who extracted and prepared the data on FDI for this analysis. We thank Wendy Lecky, Shane Murphy and participants at a research meeting at the Department for the Economy Northern Ireland for useful discussions. The views expressed here are those of the authors and they may not necessarily coincide with the views of the Department for the Economy Northern Ireland or the Economic and Social Research Institute.

[2] New greenfield FDI activity is associated with new operations established by foreign companies at a new site. The foreign company may or may not already be present in the country, but the FDI activity is in a new location within the country. It can also include relocation from one country to another. This analysis excludes any expansionary FDI or jobs created from Great Britain investment in Northern Ireland. The use of data on new greenfield FDI is appropriate in a study around Brexit uncertainty as it is consistent with identifying changes in FDI behaviour.

## 1 Introduction

It is widely acknowledged that the certainty of the business environment plays an important role on investment decisions including inward investment by foreign investors. Following the vote on the UK's EU exit in June 2016, concerns have been raised by the business community in relation to the negative impact uncertainty would have on investment and foreign direct investment (FDI) in the UK. Recent research published by the Bank of England reports that business uncertainty has increased significantly[3] following the outcome of the referendum on the UK's EU exit and that this uncertainty has caused a decline of investment by UK firms by 11% relative to what investment would have been otherwise over the three years after the June 2016 vote (Bloom et al. 2019). Furthermore, this research finds that the most exposed to this uncertainty are firms in industries which trade more with the EU.

Recent research has also found that the outcome of the vote in the UK's EU exit referendum has negatively affected the FDI inflows to the UK and has led to increased outward investment by UK firms in the EU. Serwicka and Tamberi (2018) find that by November 2017 the number of new greenfield FDI projects to the UK has been lower by 16-20% compared to a situation in which the Brexit vote had not taken place. Breinlich et al. (2019) provide evidence showing that by the third quarter in 2018 uncertainty following the Brexit referendum has resulted in an increase by 12% of the number of outward investment projects (greenfield and mergers and acquisitions) by UK firms in the EU (amounting to an estimated £8.3 billion) while the new EU investments in the UK have been lower by 11% (an estimated £3.5 billion of lost investment) over the same period after the referendum.

Recent data from the *Financial Times* fDi Markets database shows a significant decline of greenfield FDI activity and related new jobs in Northern Ireland in the two years after the UK's EU exit referendum in June 2016. Against this background, this research examines and quantifies the impact of the Brexit uncertainty on FDI-related new jobs in Northern Ireland. The analysis is based on new greenfield FDI only, in other words, jobs associated with new operations established by foreign companies at a new site. The foreign company may or may not already be present in the country, but the FDI project is in a new location within the country. Use of new greenfield FDI data is appropriate in a study around Brexit uncertainty as it is consistent with identifying changes in FDI behaviour and is an approach utilised in other research studies on UK FDI.[4] Therefore, the analysis does not include expansionary projects related to foreign companies who already have a base in Northern Ireland at their existing site. It also excludes any investment in projects from other parts of the UK.[5]

As discussed by Bloom et al. (2019), Brexit uncertainty is understood as being around the UK's future relationship with the EU and how this will impact access to the EU Single Market, regulations, migration, as well as the transition period and its various stages. This analysis builds on and extends previous research on the impact of the UK's EU exit on the attractiveness of Northern Ireland to FDI

[3] This research uses data from a major new survey of UK firms, the Decision Maker Panel (DMP) undertaken by the Bank of England, University of Nottingham and Stanford University with financial support from the Economic and Social Research Council. The survey has been carried out each month since August 2016.
[4] This analytical approach has been used by Serwicka and Tamberi (2018) and Breinlich et al. (2019).
[5] This analysis is based on data on FDI activity from the fDi Markets database. It does not include any secondary research or discussion with investment agencies or potential/actual investors.

(Siedschlag and Tong Koecklin, 2019).[6] To the best of our knowledge, this is the first analysis of Brexit uncertainty on FDI-related job creation in Northern Ireland after the UK's vote in June 2016 to leave the EU.

To isolate the impact of Brexit uncertainty on FDI - related new jobs in Northern Ireland, we use the Synthetic Control Method (SCM).[7] This empirical methodology has been first introduced in political science by Abadie and Gardeazabal (2003). Having been further developed by Abadie et al. (2010, 2015) and other authors, it has been used in the two previous studies mentioned above on the effect of the Brexit vote on FDI in the UK (Serwicka and Tamberi 2018; Breinlich et al. 2019).

For the purpose of this analysis, using the SCM empirical approach we compare the performance of Northern Ireland with the performance of a counterfactual "synthetic" Northern Ireland obtained as a weighted average of the performance of a group of countries and regions in the European Union[8] with similar relevant economic characteristics and FDI performance as Northern Ireland before the Brexit vote. The SCM is a data driven empirical approach which identifies a control group, a "synthetic" Northern Ireland and calculates the weights for each of the countries and regions included in this control group. The performance of the "synthetic" Northern Ireland replicates very closely Northern Ireland's performance in terms of FDI related new jobs in the period before the Brexit referendum. The key assumption in this analysis is that the uncertainty following the Brexit referendum has changed the behaviour of foreign investors considering Northern Ireland as a location for their new greenfield projects. The differential between the actual and counterfactual performance represents the Brexit uncertainty cost in terms of lost FDI-related new jobs.

For this analysis, we employ a rich dataset combining information on economic performance indicators relevant to FDI-related job creation and FDI-related new jobs in Northern Ireland and other EU comparable countries and regions from the first quarter in 2003 until the end of 2018.

Our results indicate that uncertainty following from the outcome of the Brexit vote has led to a lower number of FDI-related new jobs than a situation in which the Brexit vote had not taken place. The counterfactual outcome estimated on the basis of the model with the highest predictive power[9] indicates that 1,036 additional FDI-related new jobs could have been created over the period from 2016 Q3 until 2018 Q2. The actual number of FDI-related new jobs is estimated to be lower by 31% relative to what this number would have been in the absence of the uncertainty following from the

[6] www.economy-ni.gov.uk/publications/impact-eu-exit-attractiveness-fdi-uk-and-ni-and-associated-job-creation-effects

[7] The SCM empirical approach used for this analysis is discussed in detail in Appendix A.

[8] The list of EU countries and regions considered as possible candidates for the control group ("synthetic" Northern Ireland) is shown in Appendix B.

[9] The model with the highest predictive power is based on a combination of indicators of economic performance relevant to FDI related job creation (these are based on Siedschlag and Tong Koecklin 2019) and the values of the outcome variable (the number of FDI-related new jobs) in Q1 each year of the period before the Brexit vote. Estimates obtained with four alternative model specifications are close to those obtained with the first model described above. These results are available from the authors upon request. The details of all five model specification are described in Appendix A.

Brexit referendum. This result is obtained in the context of Northern Ireland performing worse than its estimated counterfactual in the absence of Brexit related uncertainty.

Additional analysis on FDI-related new jobs by sector and by the origin of the investors indicates that the largest Brexit uncertainty costs in terms of lost potential FDI-related new jobs two years after the June 2016 referendum have been in the cases of FDI in services and FDI by EU investors. The number of FDI-related new jobs in services two years after the Brexit referendum is estimated to be lower by 34% than what the number would have been in a situation without the Brexit uncertainty. The corresponding Brexit uncertainty cost amounts to an estimated 652 additional new jobs in services that could have been created. The number of FDI-related jobs from projects by EU investors is estimated to be lower by 39% equivalent to 644 FDI-related jobs which could have been created. See Appendix C for further information and results.

The remainder of this paper is organised as follows. Section 2 describes the data used for the analysis. Section 3 presents detailed empirical results and Section 4 concludes. Results of additional analysis on FDI-related new jobs by sector (manufacturing and services) and by the origin of investors (EU and non-EU investors) are reported in Appendix C.

## 2 Data

To analyse the effect of the Brexit uncertainty on FDI-related job creation, we combine three data sets. Quarterly data on FDI-related new jobs for Northern Ireland and other comparable EU countries and regions have been extracted from the *Financial Times* fDi Markets database.[10] The available data is from 2003Q1 until 2018Q4.

The second data set includes indicators of economic performance for Northern Ireland and the other EU countries and regions which are related to job creation:[11] wage, wage growth; regional GDP growth; tertiary education attainment (the share of population aged 25-64 with tertiary education), R&D expenditures as % of GDP.

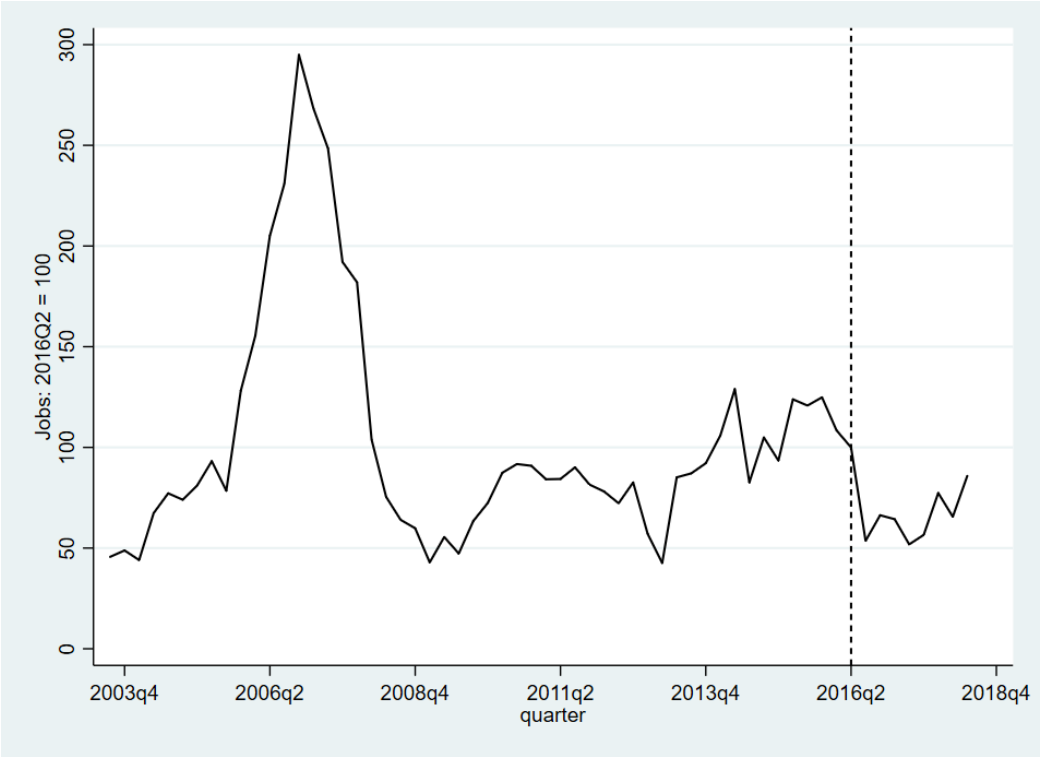
Finally, the analysis uses as an additional explanatory variable of FDI-related job creation, estimates of the probability of Northern Ireland and the other EU countries and regions to be chosen as location for new greenfield FDI projects over the period 2003-2015. These estimates are taken from Siedschlag and Tong Koecklin (2019).

[10] We use data on new greenfield FDI-related job creation to identify the timing of any changes in FDI behaviour.
[11] The choice of these indicators is based on the model specification explaining FDI-related job creation estimated by Siedschlag and Tong Koecklin (2019).

## 3 Main Results

Figure 1 shows the evolution of the number of FDI-related new jobs created in Northern Ireland every quarter from 2003 until 2018. To smooth data volatility, we compute moving averages over the two preceding and the two subsequent quarters. In addition, data is normalised to 100 in 2016Q2 to facilitate the comparison of the trends and patterns before and after the Brexit referendum.[12]

**Figure 1: Northern Ireland – Number of FDI-related New Jobs 2003-2018**
**All FDI – Quarterly Data**




*Source*: Authors' elaboration based on data from fDi Markets.
Note: The numbers shown are moving averages over the two preceding and the two subsequent quarters, normalised to 100 in 2016Q2.

The cumulated number of FDI-related new jobs from 2016Q3 to 2018Q4 was lower compared with the corresponding number of jobs created over a similar time period (ten quarters) before the Brexit vote, 2014Q1-2016Q2.

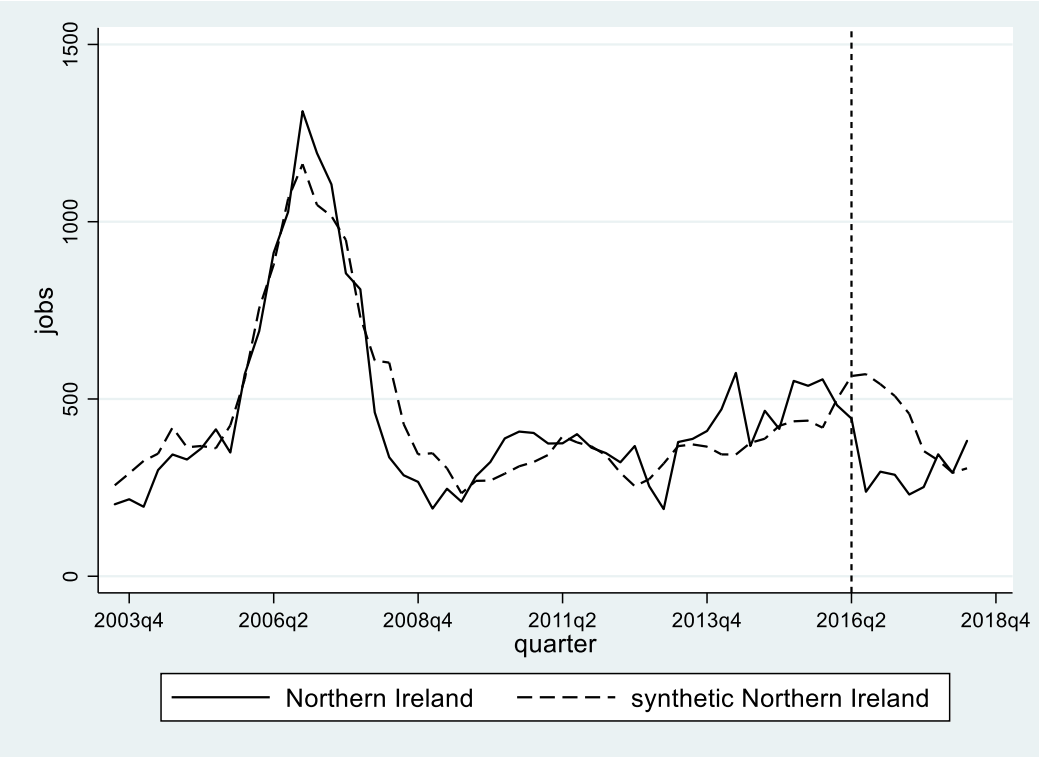
We further examine if this decline in the number of FDI-related new jobs could be linked to the uncertainty following from the result of the Brexit referendum. To this purpose, we compare the actual number of jobs created by new greenfield FDI in Northern Ireland with a counterfactual outcome of a "synthetic" Northern Ireland obtained as the weighted average of the performance of a control group of comparable EU countries and regions not affected by the Brexit referendum. This counterfactual outcome is the result of the Synthetic Control Method (SCM) we apply as explained in the Introduction.

Figure 2 shows the number of FDI-related new jobs in Northern Ireland compared with the counterfactual performance of a "synthetic" Northern Ireland. As shown in the figure, the "synthetic"

[12] This descriptive approach of FDI data has been also used by Breinlich et al. (2019).

Northern Ireland matches closely the evolution of Northern Ireland' performance up to the time of the Brexit vote.

**Figure 2: Brexit Uncertainty Effect on FDI-related New Jobs in Northern Ireland**
**All FDI**




*Source*: Authors' estimates based on data from fDi Markets, Eurostat and OECD data.
Notes: The performance of the "synthetic" Northern Ireland is obtained as a weighted average of the performance of the following EU regions: Bremen (45.2%), Vlaams Gewest (23.4%), Bassin Parisien (14.6%), Mainland Finland (11.7%), South Western and Central Bulgaria (3.7%), and North-East and South-East Romania (1.4%). The goodness of fit of the model which reflects how close the estimated counterfactual performance matches the Northern Ireland's actual performance in the period before the Brexit referendum is 87%.

Our estimates indicate that from 2016Q3 to 2018Q2, 1,036 new jobs could have been created had the Brexit vote not taken place. The number of FDI-related new jobs in Northern Ireland are estimated to be lower by 31% compared to a situation in which the Brexit related uncertainty did not happen. The figure shows a large gap between the actual and potential performance outcomes after the Brexit vote. The gap becomes smaller closer to the end of the analysed period when the number of actual new jobs in Northern Ireland seems to pick up. This result could be consistent with companies adjusting over time to the uncertainty related to Brexit. The smaller gap at the end of the period is also due to a declining performance of the control group.[13]

Additional analysis by sector (manufacturing and services) and by the origin of investors (EU and non-EU based) indicates that the largest losses in terms of potential FDI-related new jobs have been in services and related to FDI by EU investors. The estimated effects in the case of new jobs related to FDI in manufacturing and FDI by non-EU investors are marginal and less clear-cut. These results are reported in Appendix C.

[13] The list of EU countries and regions considered as possible candidates for the control group ("synthetic" Northern Ireland) is shown in Appendix B. The control group is a synthetic NI and calculates the weighted average performance for these countries and regions, selected on the basis of similar relevant economic characteristics and FDI performance as Northern Ireland before the Brexit vote.

## 4 Conclusions

This research examines the effect of Brexit uncertainty on the number of new jobs created by FDI in Northern Ireland in the two years after the referendum on the UK's EU exit.

To identify and quantify this effect, we compare the performance of Northern Ireland with an estimated counterfactual "synthetic" Northern Ireland obtained with a synthetic control methodology. We use data on new greenfield FDI activity combined with information on economic performance indicators and estimates on the attractiveness of Northern Ireland and other comparable EU countries and regions.

Our results indicate that the uncertainty following the UK's decision to leave the EU has affected negatively the FDI activity in Northern Ireland in terms of the related job creation. Specifically, over two years after the Brexit vote, it is estimated that an additional number of 1,036 new jobs could have been created. The largest negative effect in terms of lost potential jobs has been related to FDI in services and FDI by EU investors. The estimated effects of Brexit uncertainty in the case of FDI in manufacturing and FDI by non-EU investors appear to be marginal and less clear-cut.

These results are consistent with existent evidence on reduced investment including inward FDI activity in the UK after the Brexit referendum (Serwicka and Tamberi 2018; Breinlich et al. 2019: Bloom et al. 2019). To the extent that uncertainty related to the UK's future trade relationship with the EU will persist, the UK and Northern Ireland are likely to continue to become less attractive to FDI.

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## Appendix A

### Empirical Approach: Synthetic Control Method (SCM)

The Synthetic Control Method (SCM) is an empirical technique firstly implemented by Abadie and Gardeazabal (2003) and further developed by Abadie et al. (2010, 2015). It identifies and quantifies the effects of a policy intervention on a given country or region ("treated" unit) by constructing a counterfactual or "synthetic" unit from a combination of non-treated units, which have similar characteristics to those of the unit of interest prior to the period the policy intervention took place. Thus, the SCM constructs a counterfactual by obtaining a weighted average of the units in the control group, according to their pre-treatment characteristics, so that the most similar units to the treated one will get a larger weight.

For the purpose of this analysis, using the SCM approach we construct a "synthetic" control group of regions in the European Union (units) which closely resembles relevant characteristics of Northern Ireland before the Brexit vote.

Let $J + 1$ be the total number of regions in the sample, $j = 1$ being the treated region and the remaining $J$ the control regions. They are observed during the period $t$, ranging from 1 to $T$. The period from 1 to $T_0$ is the pre-treatment period, which the lapse between $T_0 + 1$ and $T$ is the post-treatment period. In this analysis, $T_0$ is the first quarter of 2016, the period before the Brexit vote took place.

For each region, we observe the outcome variable of interest $Y_{jt}$ and a set of $k$ predictor variables contained in the matrices $X$. Let $X_1$ be the matrix containing the predictor variables of the treated region, and let $X_0$ be the equivalent matrix for the regions in the control group. The objective of the SCM approach is to find $W$, a vector of weights per region, which will be helpful to obtain a weighted average of regions that best resembles the region of interest during the pre-treatment period, i.e. a vector $W^*$ that minimises the gap between matrices $X_1$ and $X_0$, represented by the following function:

$$\left|\left|X_1 - X_0 W\right|\right|v = \sqrt{(X_1 - X_0 W)' V (X_1 - X_0 W)} \quad (1)$$

Equation (1) is subject to the following restrictions: (1) the sum of regional weights in $W$ must add up to 1; and (2) each weight $w_j$ must lie between 0 and 1. While $W$ is the vector of weights per region, $V$ is a $(k \times k)$ symmetric diagonal matrix with nonnegative components $v$, which are the weights given to each of the predictor variables.

Note from Equation (1) that the calculation of $W^*$ depends on $V$, which can be defined following different approaches. The choice of V has a direct influence in the calculation of the root mean squared prediction error (RMSPE). Following Abadie and Gardeazabal (2003) and Jardon et al. (2018), we choose a matrix V that minimises the root mean squared prediction error (RMSPE) of the outcome variable $Y_{jt}$ in the pre-treatment period, expressed as follows:

$$RMSPE = \sqrt{\frac{1}{T_0}\sum_1^{T_0}\left(Y_{1t} - \sum_{j=2}^{J+1} w_j^* Y_{jt}\right)^2} \quad (2)$$

Apart from the main predictor variables that we will list afterwards, the set of covariates in matrices X may also consider pre-treatment values of the outcome variable. There is no consensus on the optimal combination of pre-treatment outcomes. Hence, we follow Jardon et al. (2018) and Serwicka and Tamberi (2018) by experimenting with a set of 5 alternative specifications, that differ in the linear combination of the pre-treatment outcome variable used as a predictor:

- Specification 1: Predictor variables plus pre-treatment values of the outcome variable of the 1st quarter.
- Specification 2: Predictor variables plus pre-treatment values of the outcome variable of the 2nd quarter.
- Specification 3: Predictor variables plus pre-treatment values of the outcome variable of the 3rd quarter.
- Specification 4: Predictor variables plus pre-treatment values of the outcome variable of the 4th quarter.
- Specification 5: All the pre-treatment observations of the outcome variable.

We run each of these specifications and calculate their goodness of fit ($R^2$), defined as 1 minus the sum of squared deviations of $Y_{1t}$ from the outcome variable of the synthetic group, over the sum of squared deviations of $Y_{1t}$ from its mean:

$$R^2 = 1 - \frac{\sum_{t=1}^{T_0}(Y_{1t} - \widehat{Y_{1t}})^2}{\sum_{t=1}^{T_0}(Y_{1t} - \overline{Y_1})^2} \quad (3)$$

This $R^2$ can range from minus infinity to 1, 1 being the perfect match between the treated unit and the synthetic control group. When it comes to the main results, we will report our preferred specification, which obtains the largest goodness of fit and minimum RMSPE.

**Outcome variables:**
Number of FDI-related new jobs in region j at quarter t. Centred moving average with 2 lags and 2 leads.

**Predictor Variables:**

- Predicted probability of choosing region j to start a new greenfield FDI project (estimates reported by Siedschlag and Tong Koecklin 2019)
- Real wage and real wage growth
- Real regional GDP growth
- Tertiary education attainment, age group 25-64
- Research and Development expenditures as % of GDP.

**Pre-treatment Period:** 2003Q1 to 2016Q1.

**Treatment Period:** 2016Q2 (Brexit Referendum)

**Post-treatment Period:** 2016Q3 to 2018Q4.

**Empirical Approach:** Weighted average predictors and mean squared prediction errors calculated for the full pre-treatment period.

## Appendix B

## List of EU Regions included in the SCM analysis

| NUTS 1 Code | Country | Region |
|---|---|---|
| AT2 | Austria | Sudosterreich |
| AT3 | | Westosterreich |
| BE1 | Belgium | Reg Bruxelles-Cap |
| BE2 | | Vlaams Gewest |
| BE3 | | Region Wallonne |
| BG3 | Bulgaria | North & South Eastern |
| BG4 | | South Western and Central |
| CY0 | Cyprus | Cyprus |
| CZ0 | Czech Republic | Czech Republic |
| DE2 | Germany | Bayern |
| DE4 | | Brandenburg |
| DE5 | | Bremen |
| DE8 | | Mecklenburg-Vorpommern |
| DEC | | Saarland |
| DEE | | Sachsen-Anhalt |
| DEF | | Schleswig-Holstein |
| DEG | | Thuringen |
| DK0 | Denmark | Denmark |
| EE0 | Estonia | Estonia |
| EL3 | Greece | Attica |
| EL5 | | Northern Greece |
| ES1 | Spain | Northwest |
| ES2 | | Northeast |
| FI1 | Finland | Mainland Finland |
| FI2 | | Aland |
| FR1 | France | Ile-de-France |
| FR2 | | Bassin Parisien |
| FR4 | | Est |
| FR6 | | Sud-Ouest |
| HR0 | Croatia | Croatia |
| HU2 | Hungary | Transdanubia |
| HU3 | | Great Plain and North |
| IE0 | Ireland | Ireland |
| ITF | Italy | South |
| ITH | | North - East |
| LT0 | Lithuania | Lithuania |
| LU0 | Luxembourg | Luxembourg |
| LV0 | Latvia | Latvia |

## List of EU Regions included in the SCM analysis (continued)

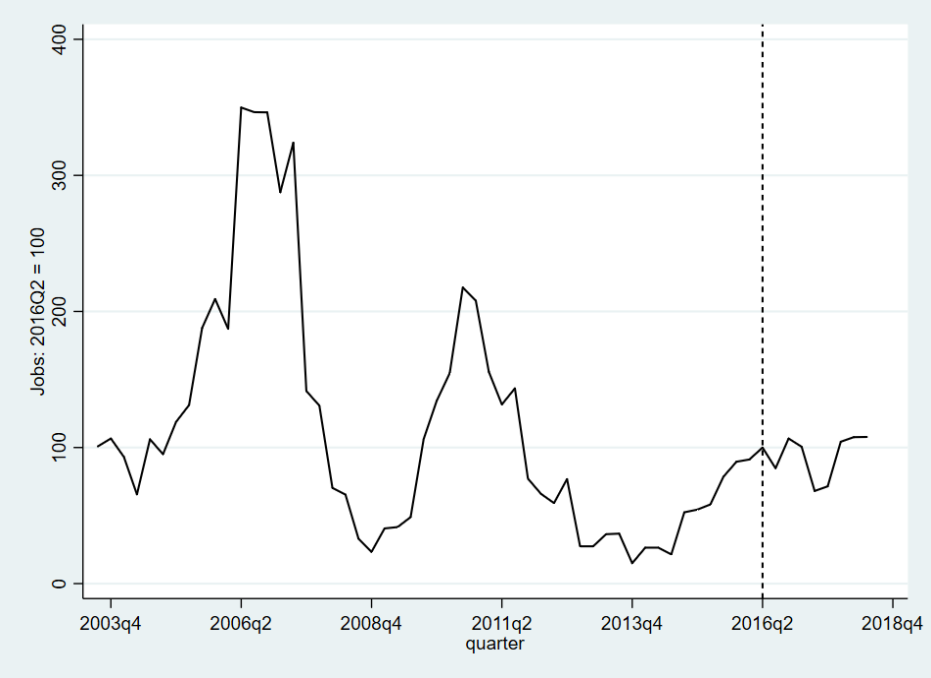
| NUTS 1 Code | Country | Region |
|---|---|---|
| MT0 | Malta | Malta |
| NL1 | Netherlands | Noord-Nederland |
| NL4 | | Zuid-Nederland |
| PL1 | Poland | Central Region |
| PL3 | | Eastern Region |
| PL5 | | South Western Region |
| PL6 | | Northern Region |
| PT1 | Portugal | Continente |
| RO2 | Romania | North-East and South-East Romania |
| RO3 | | South-Muntenia and Bucuresti-Ilfov |
| RO4 | | South-West Oltenia and West Romania |
| SE2 | Sweden | Southern Sweden |
| SE3 | | North Sweden |
| SI0 | Slovenia | Slovenia |
| SK0 | Slovakia | Slovakia |
| UKN | United Kingdom | Northern Ireland |

## Appendix C

Additional analysis on FDI-related new jobs by sector and by the origin of the investors[14] indicates that the largest Brexit uncertainty costs in terms of lost potential FDI-related new jobs two years after the June 2016 referendum have been in the cases of FDI in services and FDI by EU investors. These results are visualised in Figures C1-C8.

The number of FDI-related new jobs in services two years after the Brexit referendum is estimated to be lower by 34% than what the number would have been in a situation without the Brexit uncertainty. The corresponding Brexit uncertainty cost amounts to an estimated 652 additional new jobs in services that could have been created. The number of FDI-related jobs from projects by EU investors is estimated to be lower by 39% equivalent to 644 FDI-related jobs which could have been created. The estimated effects of the Brexit uncertainty on the FDI-related new jobs in manufacturing and by non-EU investors are marginal and less clear-cut.

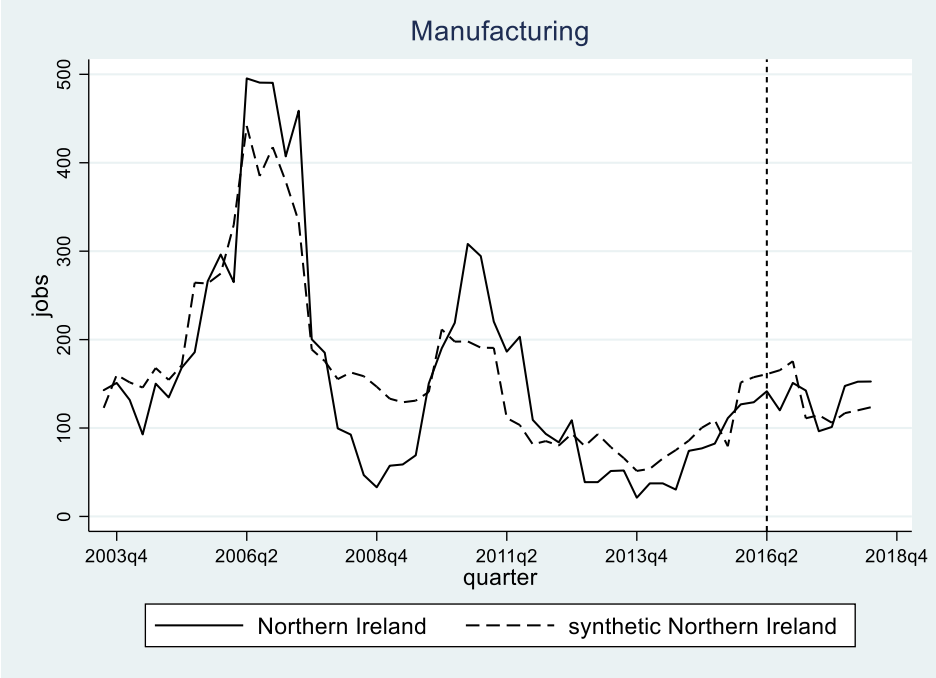
**Figure C1: Northern Ireland – Number of FDI-related New Jobs 2003-2018**
**Manufacturing - Quarterly Data**




Source: Authors' elaboration based on data from fDi Markets.
Note: Moving averages over the two preceding and the two subsequent quarters, normalised to 100 in 2016Q2.

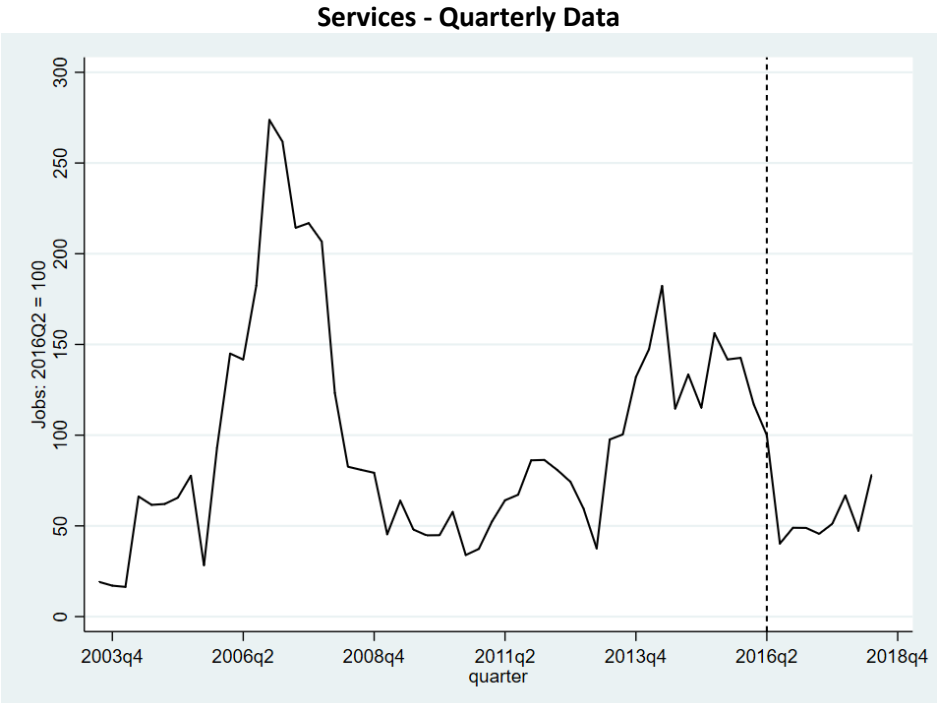
[14] This analysis uses data from a smaller number of EU countries and regions.

**Figure C2: Brexit Uncertainty Effect on FDI-related New Jobs in Northern Ireland Manufacturing**



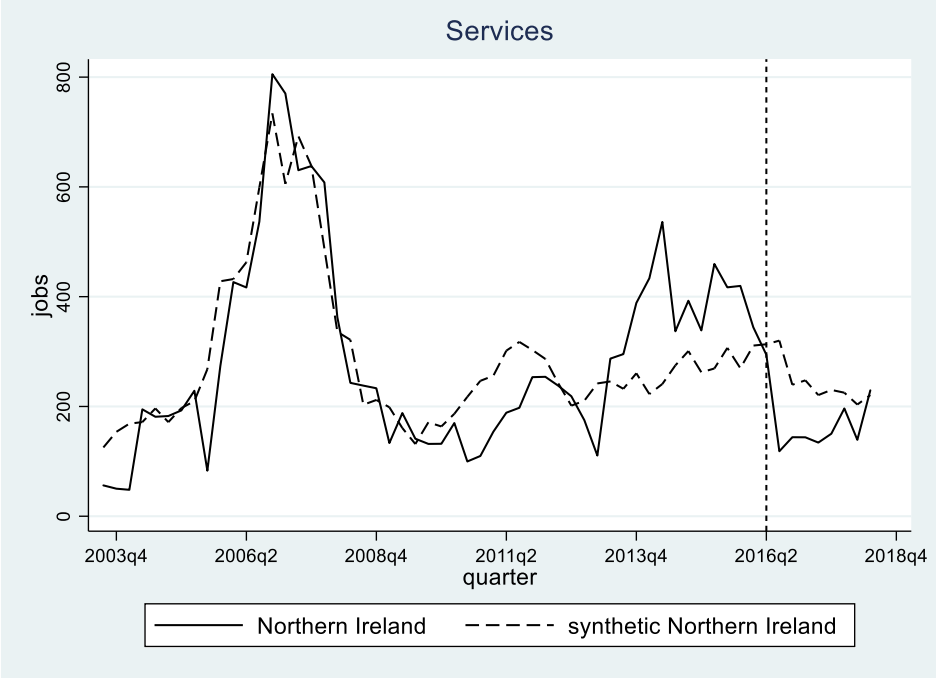

*Source*: Authors' estimates based on data from fDi Markets, Eurostat and OECD data.
Notes: The "synthetic" Northern Ireland is constructed as the weighted performance of the following EU countries and regions: Cyprus (53.1%), Malta (15.9%), North-East Spain (12.1%), Mecklenburg-Vorpommern (8.7%), South-Western Poland (4.9%), Bruxelles-Capitale (4.8%), and Bremen (0.5%). The goodness of fit of the counterfactual performance reflecting the quality of the matching with the actual performance of Northern Ireland before the Brexit vote is 81%.

**Figure C3: Northern Ireland – Number of FDI-related New Jobs 2003-2018**



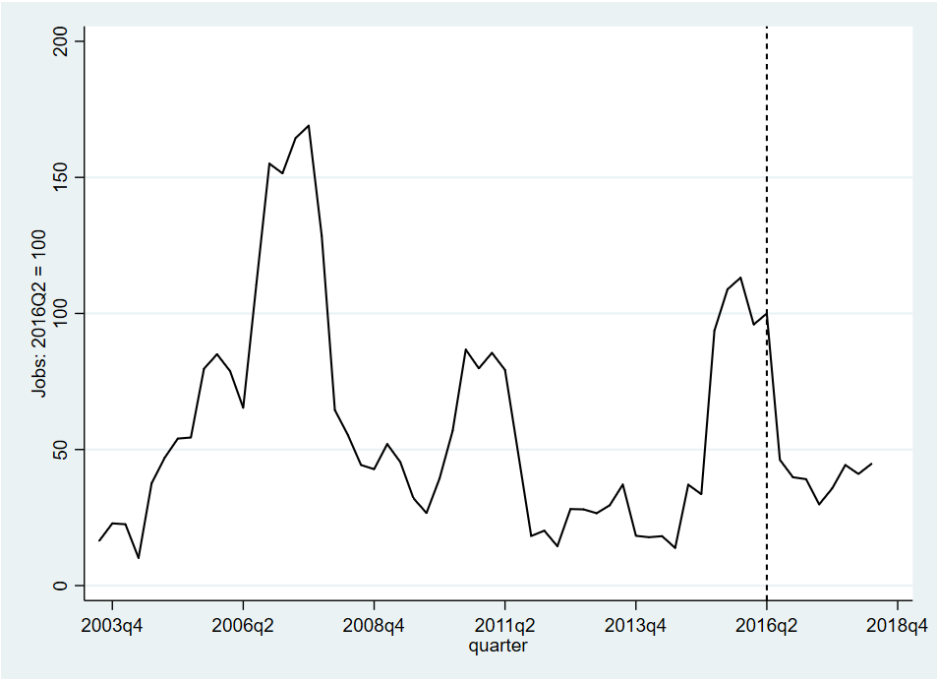

*Source*: Authors' elaboration based on data from fDi Markets.
Note: Moving averages over the two preceding and the two subsequent quarters, normalised to 100 in 2016Q2.

**Figure C4: Brexit Uncertainty Effect on FDI-related New Jobs in Northern Ireland Services**




*Source*: Authors' estimates based on data from fDi Markets, Eurostat and OECD data.
Notes: The "synthetic" Northern Ireland is constructed as the weighted performance of the following EU regions: Vlaams Gewest (3.11%), Bassin Parisien (30.1%), Mainland Finland (18.9%), Bremen (13.0%), Ile-de-France (6.4%), South Western and Central Bulgaria (0.4%). The goodness of fit of the counterfactual performance reflecting the quality of the matching with the actual performance of Northern Ireland before the Brexit vote is 70%.

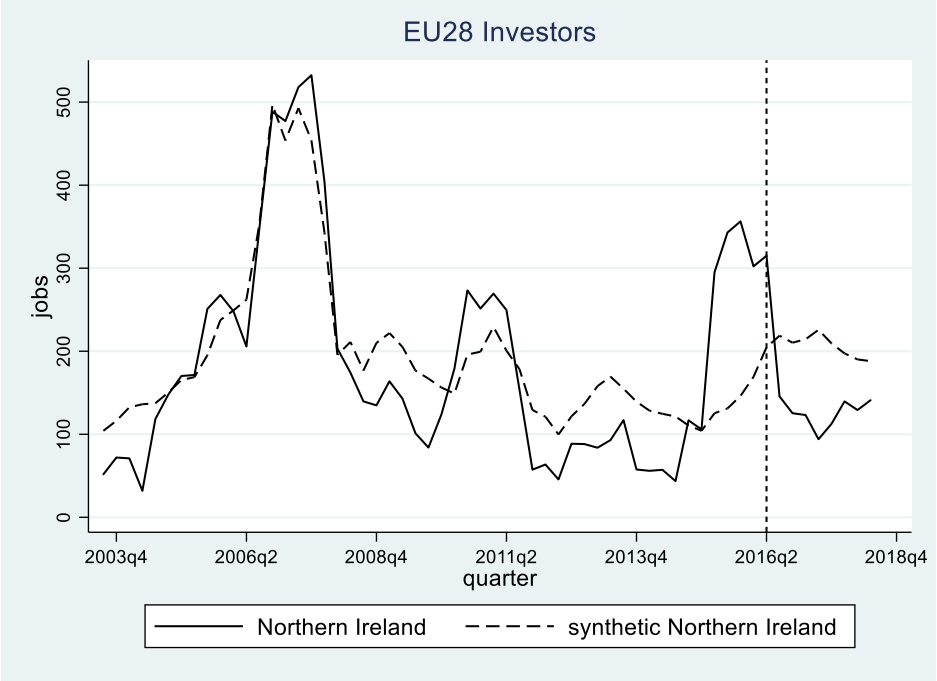
**Figure C5: Northern Ireland – Number of FDI-related New Jobs 2003-2018 EU Investors - Quarterly Data**




*Source*: Authors' elaboration based on data from fDi Markets.
Note: Moving averages over the two preceding and the two subsequent quarters, normalised to 100 in 2016Q2.

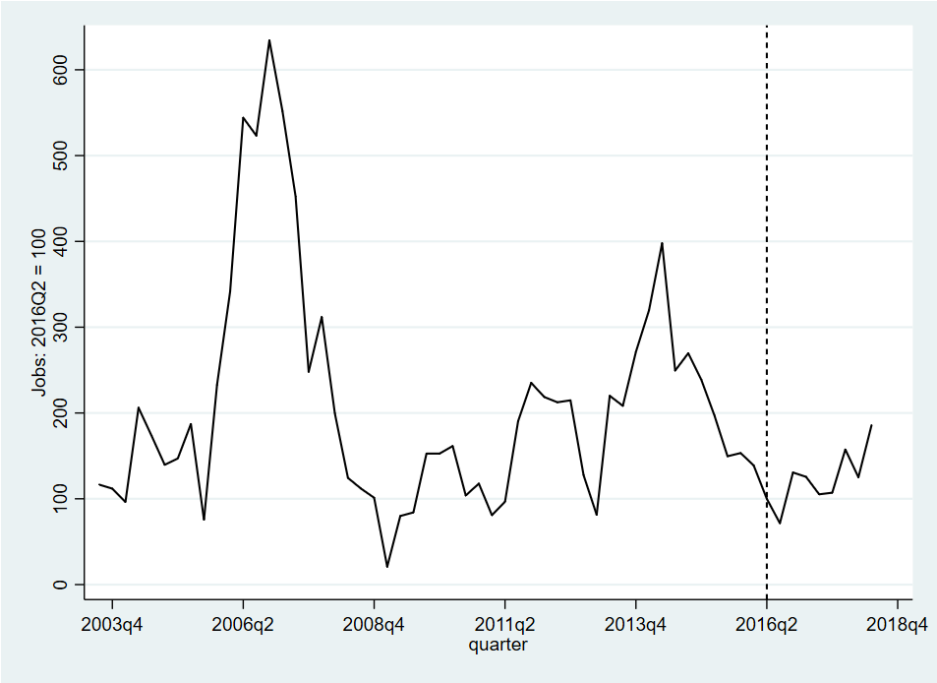
**Figure C6: Brexit Uncertainty Effect on FDI-related New Jobs in Northern Ireland**

**EU Investors**



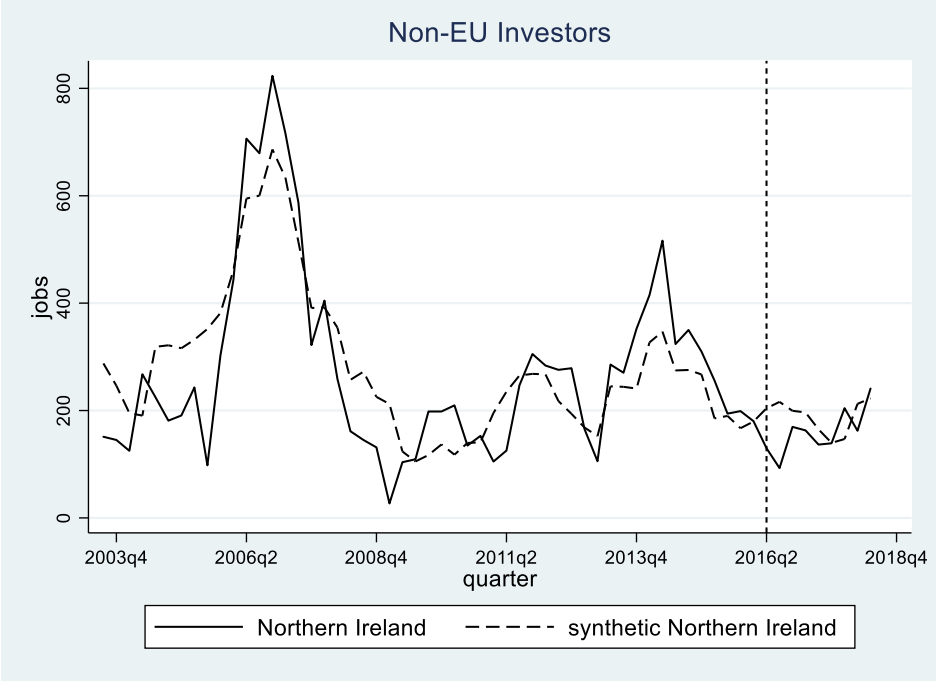

*Source*: Authors' estimates based on data from fDi Markets, Eurostat and OECD data.
Notes: The "synthetic" Northern Ireland is constructed as the weighted performance of the following EU countries and regions: Luxembourg (44.0%), Bassin Parisien (21.8%), Mecklenburg-Vorpommern (20.2%), Mainland Finland (9.3%), South Western Poland (2.6%), Bremen-Germany (1.5%), South Muntenia and Bucuresti Ilfov- Romania (0.5%), South Western and Central Bulgaria (0.2%). The goodness of fit of the counterfactual performance reflecting the quality of the matching with the actual performance of Northern Ireland before the Brexit vote is 70%.

**Figure C7: Northern Ireland – Number of FDI-related New Jobs 2003-2018**
**Non-EU Investors - Quarterly Data**




*Source*: Authors' elaboration based on data from fDi Markets.
Note: Moving averages over the two preceding and the two subsequent quarters, normalised to 100 in 2016Q2.

**Figure C8: Brexit Uncertainty Effect on FDI-related New Jobs in Northern Ireland**
**Non-EU Investors**




*Source*: Authors' estimates based on data from fDi Markets, Eurostat and OECD data.
Notes: The "synthetic" Northern Ireland is constructed as the weighted performance of the following EU countries and regions: Thuringen-Germany (46.6%), South-Muntenia and Bucuresti-Ilfov- Romania (13.4%), Bassin Parisien (10.4%), Bremen-Germany (10.1%), Zuid Nederland (8.9%), the Czech Republic (6.2%), Ile-de-France (4.4%). The goodness of fit of the counterfactual performance reflecting the closeness of the matching with the actual performance of Northern Ireland before the Brexit vote is 73%.