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Commuting across the Irish border

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ABSTRACT

The border between the Republic of Ireland and Northern Ireland is often characterised as 'invisible'. Using data drawn from censuses in both jurisdictions, we show a substantial discontinuity in commuting behaviour at the Irish border. Residents on both sides of the border have a low propensity to work on the other side. Local areas in Northern Ireland with larger Catholic populations are more prone to commuting from North to South, hinting at a possible role for socio-cultural factors.

1. Introduction

Often described as 'invisible', the border between the Republic of Ireland (RoI[1]) and Northern Ireland (NI) has become a focus of attention during the UK's process of leaving the EU. A common travel area and customs union have linked the UK and Ireland for decades, and since the removal of security infrastructure following the Belfast Agreement of 1998, the only physical signs of the border are limited indications from road signage. As one would expect in an integrated market, the border is highly frequented by commercial and non-commercial vehicles: 14 million vehicles crossed the border from Northern Ireland to Ireland on national roads in 2016, 2 million of which are estimated to have carried goods (O'Donovan et al., 2017). Officially there are 208 crossings along the 499 km border (DfI and DTTaS, 2018), yet there are believed to be more (Sheehan, 2018).

Up to the 1970s, citizens of RoI needed a work permit to work in NI, though not in Great Britain. In 1969, civil strife began in NI involving nationalists (mainly Catholic) favouring accession to the RoI (also predominantly Catholic) and unionists (mainly Protestant) who wished to continue the union with Great Britain. The conflict, known as 'The Troubles', made the border a more dangerous and challenging place. It also resulted in the closure of many cross-border roads. RoI and the United Kingdom, including NI, joined the European Economic Community in 1973, and freedom of movement eliminated the need for work permits. The advent of the Single Market from 1993 further simplified cross-border commerce by removing customs barriers. A ceasefire in 1997 and the Belfast Agreement in 1998 ended communal violence and resulted in the reopening of many border crossings, thus making cross-border working more attractive. Working across the border was also made easier by EU and bilateral agreements providing a framework for taxation, social benefit payments and diploma recognition for cross-border workers.[2]

Our analysis is predicated on the assumption that households choose their location of residence and workplace while minimising commuting costs, which are increasing in distance. Location of residence will be affected by personal preferences, location of family, local amenities and other factors including the price of accommodation. Choice of work location similarly involves individual-specific factors, but should also be affected by local availability of employment and wage levels. Freedom of movement would suggest that, if there were no other economic or socio-cultural constraints, the propensity to work in RoI should be approximately the same for workers living in direct proximity of the border on the North and South side. However, persistence in socio-economic processes and remaining political tensions may

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[1] The official name is Ireland but, to avoid ambiguity, we use Republic of Ireland (RoI) throughout the paper.

[2] In 1976, UK and Ireland signed an agreement eliminating double-taxation (last amended in 1998). Recognition of foreign diplomas is promoted by two EU frameworks. See Supplementary Material for more information.

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impede willingness to move across or seek employment on the other side of the border. Indeed, in this article, we show that, despite the openness of the border, we still find a substantial discontinuity in commuting patterns at the Irish border when examining census data from 2011.

We contribute to the literature studying political boundaries and commuting patterns across borders in particular. Beerli et al. (2020) study the gradual liberalisation of cross-border commuting rules in Switzerland over 1999–2004. They find an increase in cross-border commuters, no negative effect on native's employment rates and a positive wage effects for high-skilled Swiss workers, highlighting potential benefits from an integrated cross-border labour market (see also Parenti and Tealdi, 2019). Past research on cross-border commuting has also highlighted the importance of common languages, distance and employment opportunities (Mathä and Wintr, 2009; Persyn and Torfs, 2015).

2. Methodology and data

Data for those residing in RoI is from POWSCAR (Place of Work, School or College) which was collected as part of RoI's 2011 and 2016 censuses by the Central Statistics Office. POWSCAR includes micro-data on commuting for the full population of RoI, including the location of work, location of residence and means of transportation.[3] In part of the analysis, we aggregate the data to the level of Electoral Divisions (ED). There are 3440 EDs in Ireland. Categorical variables capturing individual characteristics included in POWSCAR are the industry group in which each individual works, affiliation to socio-economic group, highest level of education attained, age group and whether the person resided at the same address a year ago.

For data on employed persons residing in Northern Ireland, we use aggregate data tables that were kindly prepared on special request by the Northern Ireland Statistics and Research Agency (NISRA) based on the 2011 census. In this case the data were supplied for 582 Wards, which correspond in size approximately to EDs.

The NISRA data records the share of residents "whose place of work is outside of Northern Ireland". Due to the geographic location of NI, it is plausible to assume that the vast majority of Northern Irish international commuters works in the RoI. To avoid confounding by commuters travelling to other destinations for work by plane, we limit the sample in our regressions to areas within 40 km of the border, which excludes the two Belfast airports, and control for distance to airports with international flights in the regressions.

Explanatory variables available for those residing in Northern Ireland include the share of residents in the Ward with particular characteristics: age group, socio-economic classification, and Catholic religion. Religion might not seem relevant to commuting behaviour in other contexts, but willingness to commute to RoI could be affected by feelings of cultural and political affiliation, and may serve as a proxy for membership of the nationalist or unionist communities in NI. Unfortunately we do not have corresponding data in POWSCAR on the religious affiliation of commuters in RoI.

The analysis proceeds in three steps. We first focus on the discontinuity of commuting at the Irish border in 2011 (the latest year in which a census was held in both jurisdictions) using aggregate ED/Ward-level data. Based on these insights, we identify determinants of cross-border commuting on both sides of the border separately. For the RoI, we exploit micro-level POWSCAR data to explain the probability of working on the other side of the border. For NI, we utilise a fractional response model with Ward-level aggregate data to identify determinants of the share of employees that commute across the border. One reason for choosing this three-step approach is that we were not able to link micro-level data from RoI and NI due to data access restrictions, which would have allowed us to model commuting patterns in a joint framework, e.g. using a gravity model of commuting flows. We present additional results, descriptions and summary statistics in the Supplement.

[3] Access to POWSCAR microdata is restricted. For more information, see https://www.cso.ie/en/census/census2016reports/powscar/.

3. Results

3.1. Is there a discontinuity at the border?

Fig. 1 illustrates the share of employees crossing the border for work by location of residence. As expected, the number of cross-border commuters is highest near the border, reflecting the central role of distance. The RoI county of Donegal generally exhibits a higher level of cross-border commuting than other parts of RoI. This is likely due to Donegal's remote geographical location, as it shares most of its border with NI and is connected with RoI only through a narrow strip of land. There is a particularly high density cluster of RoI-to-NI commuters visible in near the NI city of Derry/Londonderry.[4,5] To allow for local differences, we separate Donegal from the rest of the RoI in the next step of our analysis.

In Fig. 2, we plot the share of residents working in RoI against the distance to the border, where we restrict the sample to EDs/Wards within ±40km distance to the border.[6] The left side of the vertical line corresponds to the RoI and the right side to NI. If the hypothesis of no border effect is correct, the propensity to work in RoI should take similar values immediately adjacent to both sides of the border, starting at 1 far from the border in RoI and falling to 0 for NI residents with increasing distance from the border. The figure provides evidence of a substantial discontinuity of commuting propensities. Fitting a fractional logistic regression model with third-order distance polynomials, we find the probability of working in RoI is lower by 79.5 p.p. ($s.e. = 0.0213$) for NI residents at the border relative to RoI residents living in direct proximity to the border. In the Donegal sample, the discontinuity amounts to 57.6 p.p. ($s.e. = 0.1013$).

3.2. Commuting from RoI to NI

Turning to RoI-to-NI commuting, Table 1 reports marginal effects from logistic regression for the probability of RoI workers to commute across the border using 2011 POWSCAR data. Model 1 includes all of RoI's EDs within 40 km from the border; Model 2 is limited to residents of Donegal. Both models include distance up to a third-order polynomial, county fixed effects and age group effects.

Distance from the border has a negative and highly significant coefficient, consistent with the expectation that commuting long distances is costly. The propensity of cross-border commuting is higher among those with a tertiary education and lower for semi and unskilled workers. We show in the Supplement that the propensity of cross-border commuting does not appear to vary across the age distribution (Figure S.2).[7]

[4] Hereafter referred to as Derry.

[5] Section 1.2 in the Supplementary materials provides more information about the distribution of population along the border.

[6] Distance to the border is measured as the Euclidean minimum distance from the centroid of the Electoral Division (ED).

[7] In the Supplement, we also report results for 2016, which are qualitatively similar (Table S.6 and Figure S.1).

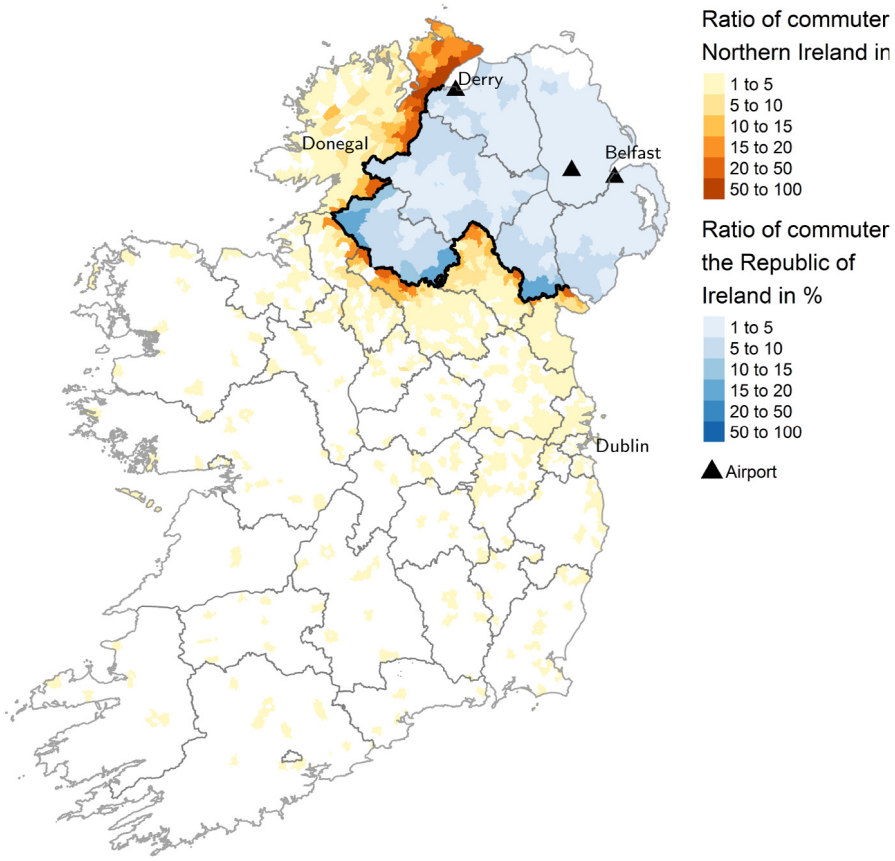

Fig. 1. Share of employees crossing the border for work by Electoral Division (RoI) and Ward (NI), respectively.

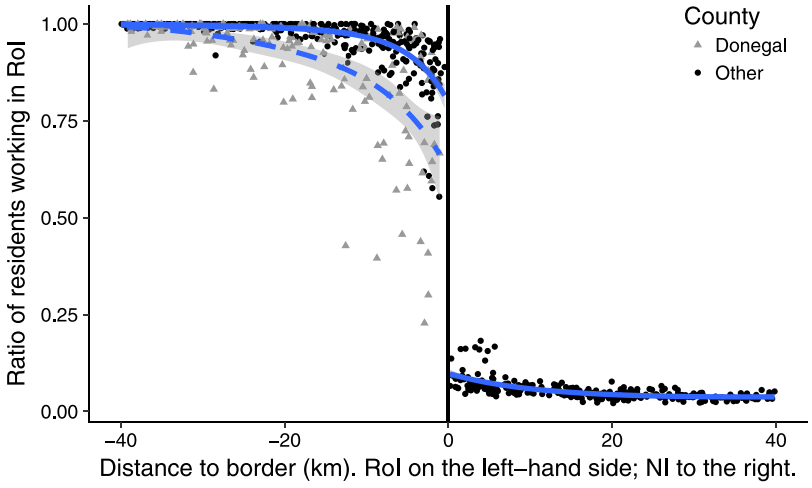

Fig. 2. Share of residents commuting to RoI by Electoral Division (RoI) and Ward (NI). *Notes:* The lines are fitted values from fractional logistic regression with third-order polynomial. Donegal (dashed line) is separated out from RoI.

3.3. Commuting from NI to RoI

Table 2 reports marginal effects from fractional logistic regression using Ward-level data on NI residents where we again use only areas within 40 km from the border and include distance up to a third-order polynomial. As in the RoI models, the distance to the border has a negative association with commuting. Socio-economic classification is not significant, and there is little evidence of age effects.

However, the share of the Ward population that is Catholic shows a significant positive association with cross-border commuting. To illustrate the scale of the association between religious affiliation and commuting, Fig. 3 shows the predicted probability of cross-border commuting as a function of distance for Wards with 25%, 50% and 75% share of Catholic population. The predicted share of cross-border commuters is always higher for areas with a larger share of Catholic residents than in those with a lower share across all distance levels. Evaluated at the border, the predicted level of cross-border commuting is between 7% and 10%.

Table 1
Cross-border commuting from RoI to NI: Logistic regression.

	Dependent variable: Working in NI	
	(1)	(2)
Distance	−0.00416***	−0.0179***
	(0.000626)	(0.000581)
Industry group		
Agriculture, forestry and fishing	−0.00562	−0.143***
	(0.00525)	(0.0240)
Construction	0.0311***	0.0757***
	(0.00447)	(0.0117)
IT, Financial, Real estate or Professional	−0.00102	0.0289***
	(0.00199)	(0.00651)
Manufacturing, mining, quarrying & energy	0.00916	0.0300***
	(0.00493)	(0.00791)
Other services	−0.00222	−0.0298*
	(0.00268)	(0.0116)
Public Administration and Defence	−0.00218	−0.00131
	(0.00198)	(0.00762)
Retail & transport	0.000741	−0.0275***
	(0.00134)	(0.00676)
Employers & managers	0.00256	0.0243**
	(0.00240)	(0.00922)
Socio-economic group		
Farmers or Agricultural workers	−0.00595	−0.00870
	(0.00644)	(0.0279)
Higher professional	0.00547*	0.0562***
	(0.00230)	(0.0107)
Lower professional	−0.00159	0.0185
	(0.00439)	(0.0100)
Non-manual	−0.00792**	−0.0206*
	(0.00272)	(0.00913)
Others	−0.00382	−0.00436
	(0.00237)	(0.0137)
Semi- or unskilled	−0.00801***	−0.0361***
	(0.00142)	(0.00960)
Other		
Female	0.00428***	0.00167
	(0.000705)	(0.00454)
Tertiary education or higher	0.00650***	0.0372***
	(0.00124)	(0.00511)
Same residence than 1 year ago	−0.00637***	−0.0258**
	(0.00165)	(0.00817)
Observations	87112	27051
Sample	Ireland	Donegal
County fixed effects	Yes	Yes
Age group effects	Yes	Yes

Results are from logistic regression with a third-order polynomial applied to distance, county fixed effects and age group effects. The sample is restricted to EDs within 40 km from the border. Robust standard errors are in parentheses. The base group for industry is Education, Human Health and Social Work. The socio-economic base group is Manual skilled. Marginal effects reported.
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

Table 2
Cross-border commuting from NI to RoI: Fractional logistic regression.

	Dependent variable: Share working outside of NI		
	(1)	(2)	(3)
Distance to border	−0.00164***	−0.00164***	−0.00171***
	(0.000268)	(0.000253)	(0.000317)
Share Catholic	0.0331***	0.0321***	0.0299***
	(0.00463)	(0.00514)	(0.00471)
Share age group (base = 60 to 75)			
16 to 24	−0.143*	−0.110	−0.128*
	(0.0679)	(0.0723)	(0.0648)
25 to 34	−0.104	−0.0626	−0.104
	(0.0550)	(0.0604)	(0.0532)
35 to 44	−0.0963	−0.0589	−0.0829
	(0.0663)	(0.0668)	(0.0636)
45 to 54	−0.176**	−0.111	−0.166**
	(0.0600)	(0.0639)	(0.0576)
55 to 59	0.00553	0.0762	0.0272
	(0.119)	(0.119)	(0.112)
Socio-economic group (base = Semi & unskilled)			
Higher professional		−0.0133	
		(0.0243)	
Supervisory		−0.0179	
		(0.0267)	
Skilled manual		0.0172	
		(0.0136)	
Distance to airport			
Derry City			−0.00183**
			(0.000564)
Belfast City			0.000375*
			(0.000153)
Belfast International			0.00158**
			(0.000580)
Observations	284	284	284

Results are from fractional logistic regression with a third-order polynomial applied to distance and local district fixed effects. The sample is restricted to Wards within 40 km from the border. Robust standard errors in parentheses. Marginal effects are reported.
*$p < 0.05$.
**$p < 0.01$.
***$p < 0.001$.

4. Discussion

The analysis reveals a low propensity for residents of RoI and NI to cross the Irish border to reach their usual place of work. This seems surprising for several reasons: the absence of border controls and a large number of crossing points imply that the border can be easily crossed. Indeed, the traffic data cited in the introduction suggests that the border is frequently crossed by commercial and non-commercial vehicles. Furthermore, EU and bilateral agreements, such as the Double-Taxation Agreement, are in place to promote cross-border work.

Since average weekly earnings in RoI were significantly higher than in NI, we might expect to see a higher propensity to commute from North to South than vice versa (see Supplementary materials, Section 3.1). Fig. 2 suggests however the opposite pattern.

There is evidence that reluctance to commute cross-border from NI to RoI may be partially driven by political and cultural factors, as proxied by religious affiliation, although the effect is relatively small. This could point to a legacy effect from The Troubles, though we found little evidence of a systematic variations across age groups that one might expect if the border discontinuity were simply a historical artefact driven by older generations. We hope that future studies based on linked RoI-NI micro-level data, and the 2021 census, will shed light on the causes of the discontinuity.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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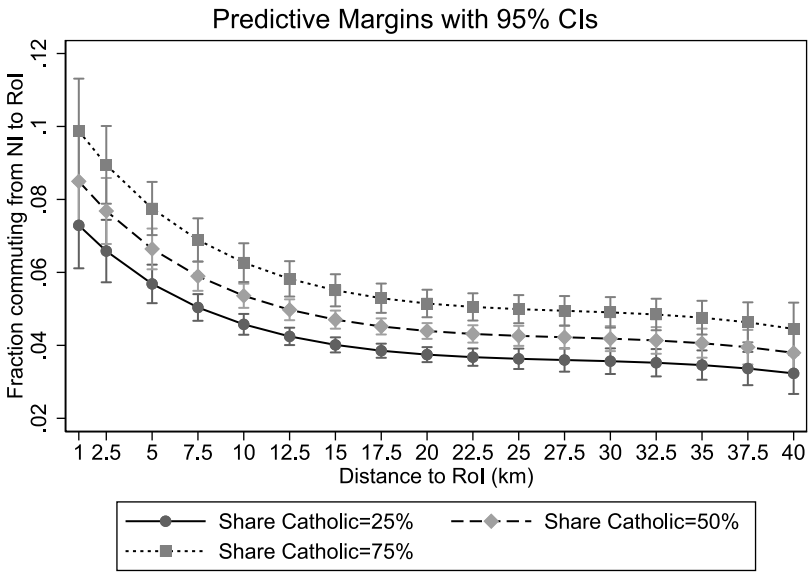

Fig. 3. Predicted probability of commuting from NI to RoI by share of Catholics in Ward.

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Appendix A. Supplementary Material

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.econlet.2020.109060.

References

Beerli, A., Ruffner, J., Siegenthaler, M., Peri, G., 2020. The Abolition of Immigration Restrictions and the Performance of Firms and Workers: Evidence From Switzerland. NBER Working Paper No. 25302. URL http://www.nber.org/papers/w25302.

DfI, DTTaS, 2018. Public Road Border Crossings Between the Republic of Ireland and Northern Ireland. Technical Report, Department of Transport, Tourism and Sport, Republic of Ireland, Department for Infrastructure, Northern Ireland Dublin.

Mathä, T., Wintr, L., 2009. Commuting flows across bordering regions: a note. Appl. Econ. Lett. 16, 735–738. http://dx.doi.org/10.1080/13504850701221857.

O'Donovan, D., Duffy, S., McGuinness, G., Walsh, K., 2017. Ireland and the UK – Tax and Customs Links. Technical Report, Office of the Revenue Commissioners and IGEES, URL https://www.revenue.ie/en/corporate/documents/research/ireland-uk-tax-and-customs-links.pdf.

Parenti, A., Tealdi, C., 2019. Does the implementation of the Schengen agreement boost cross-border commuting? Evidence from Switzerland. IZA Discussion Paper No. 12754. URL http://ftp.iza.org/dp12754.pdf.

Persyn, D., Torfs, W., 2015. A gravity equation for commuting with an application to estimating regional border effects in Belgium. J. Econ. Geogr. 16, 155–175. http://dx.doi.org/10.1093/jeg/lbv003.

Sheehan, M., 2018. Irish army mappers find 100 more border crossings ahead of brexit. URL https://www.independent.ie/business/brexit/irish-army-mappers-find-100-more-border-crossings-ahead-of-brexit-37630318.html.