1. **Author details**.

Jonathan William Minton [corresponding author]

Orcid id: 0000-0003-1207-6259

Twitter handle: @JonMinton

Email address: [jonathan.minton@glasgow.ac.uk](mailto:jonathan.minton@glasgow.ac.uk); [nate.minton@gmail.com](mailto:nate.minton@gmail.com)

Telephone: +44 7866 022543

Room 110, 25 Bute Gardens, School of Social & Political Sciences, University of Glasgow, Scotland, UK. G12 8RS

1. **Abstract.** [150-200 words]
2. (Video Abstract)
3. 3-6 **keywords**.

Brexit; Northern Ireland; Mortality

1. **Funding details**.

This research received no specific funding.

1. **Disclosure statement**.

No potential conflict of interest was reported by the authors.

1. **Biographical note.**  [up to 100 words]
2. **Geolocation information.**

Scotland, UK

1. **Supplemental online material.**
2. **Figures.**
3. **Tables.**
4. **Equations**.
5. **Units.**

# Manuscript [5000 words]

## Section one: Introduction [882 / 1000 words]

In the run up to the EU referendum, amidst discussions of migration, identity, expertise and economic impacts, the issues of Northern Ireland and its border with the Republic of Ireland received scant attention. This lack of focus on pan-Irish issues seems a conspicuous oversight given: that the Republic of Ireland will remain an EU member state, to which other EU citizens have rights of migratory access; the long and porous border between Northern Ireland and the Republic of Ireland; and more troublingly the long history of violent sectarian conflict in the region. At the time of writing (5 June 2017), just days prior to yet another political vote of seismic political importance, issues of terrorism have taken centre stage due to two barbarous attacks on English citizens over the campaign period; firstly the suicide bombing of concert-goers on 22 May 2017 in Manchester, resulting in 22 deaths and over one hundred injuries; (Www.bbc.co.uk, 2017) then later a combined vehicle and knife attack by three individuals around London Bridge on the night of 3 June 2017, resulting in the deaths of ten people and the malicious injuring of dozens more. (Www.bbc.co.uk, 2017) In the wake of these events, discussion of terrorist threats and the effective management of risks to UK citizens have only rarely drawn parallels with the UK’s experience of conflict in Northern Ireland. Once again, this absence of focus appears odd in light of the UK’s, and Western Europe’s, longer-term history of terrorism, where available statistics of deaths clearly indicate that the ‘Troubles’ in Northern Ireland consistently led to much higher levels of civilian deaths in Europe than have been associated with Islamic terrorism after 2001; indeed, for many decades Northern Ireland, along with the Basque region of Spain, have been the geographic fulmination points of terrorism-related deaths in Western Europe. (Www.economist.com, 2016)

This paper argues there is a pressing need for a deeper analysis and understanding of the causes and consequences of violent conflict in Northern Ireland, for learning from the history of the region about how a series of political and military mis-steps by the British Government over many years initiated a wave of lethal violence which propagated itself through the fabric of Northern Irish society for over two decades, and for considering whether the socioeconomic and cultural conditions still exist in the region such that further political mis-steps risk reinitiating violent instability in Northern Ireland and additional terrorist risk throughout the UK. I argue such issues seem particularly pertinent given a lack of clarity regarding plans for the Irish border in Brexit negotiations, and the importance of daily freedom of movement across the border in the island of Ireland for both cultural and economic reasons. Three specific empirical aims of this paper are: to use demographic data to visually illustrate the ‘excess deaths’ that appear attributable to the initiation of violent conflict in the early 1970s; to produce a number of estimates of total numbers of excess deaths attributable to the conflict, based on observed patterns and trends in overall mortality, and compare these with estimates based on deaths directly attributed to violence; and to characterise the particular pattern of excess mortality observed in Northern Irish demographic data, and describe why this is consistent with a tit-for-tat form of sectarian conflict. The main substantive aim of these empirical findings is, combined with a discussion of the political and military history of the island of Ireland, to highlight that the fundamentals which led to this earlier wave of death and instability both may still be present within Northern Irish society, and that poorly handled Brexit negotiations risk re-initiating a fresh wave of violence that, once started, may take decades to settle down again. Apropos to this argument about the self-sustaining nature of conflict in the region is a fundamental challenge to a dominant causal narrative about the peace process in Northern Ireland: a suggestion that key political events in this process, such as the IRA’s ceasefire announcement in 199X and the Good Friday Agreement in 1998, followed rather than led trends towards reduced violence in the region.

The structure of this paper is as follows: section two, history, will provide a brief history of both the origins of Northern Ireland as a distinctly administered political territory, of the events which led to an initiation of violence in the early 1970s, and of key events and trends in violence and peace which occurred in the decades since. Section three will introduce the data and methods used to both visually identify the impact of sectarian conflict on deaths in Northern Ireland, and produce estimates of the total number of additional deaths which might be attributable to the conflict. Section four will present firstly visual representations of mortality patterns seen in Northern Ireland, in comparison to neighbouring countries and regions; and secondly estimates total excess mortality associated with the conflict. Finally, section five, the discussion, will begin by comparing my estimates of conflict-attributable mortality with extant estimates of conflict-attributable deaths; then conclude with a discussion of political, sociological and social psychological literature which may shed light on the patterns uncovered, before highlighting a number of critical pitfalls that Westminster should be mindful of in Brexit negotiations to reduce the risk of a new initiation of conflict in the region.

## Section two: History: Ireland, Northern Ireland, and the Troubles [1745 / 1000 words]

Understanding the causes of the eruption of violence in Northern Ireland in the early 1970s requires a broader understanding of the longer-term history and dynamics of the island of Ireland and its complex relationship with British rule. An understanding of historical dynamics requires going somewhat beyond the listing of historical and political facts, and briefly considering some broader theories, even grand theories, of empire formation and the functional role of religion therein.

The mathematical ecologist turned historian Peter Turchin has argued that one of the central challenges in the establishment and maintenance of complex, large, hierarchical societies – empires – has been the promotion of social cohesiveness across ethnic groups. Turchin thus suggests that complex societies can emerge only once ­*meta­ethnic ­*communities, in which group membership can be readily identified through ‘symbolic markers’, have been established and agreed upon. Turchin states that the “most commonly used kind of symbolic marker to delineate metaethnic communities is religion – particularly, the exclusive, proselytizing kinds such as Christianity or Islam.” [p. 181] Common metaethnic identity allows for greater within-group cohesiveness and for the assimilation of otherwise ethnically heterogeneous populations, but where distinct and mutually exclusive metaethnic groups are territorially contiguous, *metaethnic* frontiers form, and at these frontiers competition and conflict between societies is often intense.

This sweeping characterisation of societies as metaethnic communities, and metaethnic frontiers as endemic sources of conflict, is useful to consider in reference to the following sweeping generalisation about the spread of Catholicism and Protestantism throughout Europe: Catholic religion pre-existed Protestantism, began in Southern Europe, and spread north and west, including to Ireland at Europe’s western periphery. Protestantism then emerged later, from Northern Europe, and spread south and west. The conditions for a metaethnic frontier in the island of Ireland, demarcated along Catholic-Protestant religious distinction, were thus centuries in the making.

Within the political organs of an imperious, expansionist state united by Protestant identity, positions for Catholics were limited, and there were concerns amongst British imperialists that Ireland could be used as a cultural and potentially military ‘back door’ through which the Catholic Spanish and French Empires could undermine British imperial power and influence. Ireland thus held an ambivalent position within the British Empire, geographically proximate yet culturally distant, a ‘colony within the core’. Many of the patterns of political control and population management developed in the case of Ireland later formed a blueprint for British colonialism for later, larger overseas territories such as India. (Anderson & O’Dowd, 2007)

The longstanding harsh British indifference to the conditions of the Irish was the target of Jonathan Swift’s 1729 satirical essay ‘A Modest Proposal’. Such indifference and colonial mismanagement had contributed to the Great Famine of the 1840s, leading to mass emigration and population decline. Together with a steady influx of Protestants over many generations, by the end of the 19th century the demography and economy of Ireland had shifted to the North East of the island, in particular to the city of Belfast, and the populist Protestant Orange Order had emerged in response to increasing political agitation from Catholic populations for improved voting rights and the return of Irish Home Rule which had been abolished with the Act of Union in 1801. Whereas in Westminster the Tory party supported Irish Unionists in opposing Home Rule, the Whigs supported this measure, and in the 1910 General Election the Whigs were able to establish a minority government with the support of Irish Nationalists, leading to the passing of the Third Home Rule Bill in 1912. The backlash to Home Rule from Ulster Unionists led to the establishment of paramilitary organisations by both sides, and a period of civil war which continued with the Great War of 1914, and culminated in the Easter Rising of 1916, in which fifteen Irish nationalists launched a failed coup attempt and were executed by firing squad. These executions then enflamed rather than quelled nationalist opposition to British rule, and in 1918 the newly formed Sinn Féin party were elected with more than three quarters of Irish seats in Westminster; when political demands for independence over the whole of Ireland were unsuccessful, civil war intensified, and the paramilitary Irish Republican Army (IRA) fought a guerrilla war into the 1920s. Ireland was partitioned through the Fourth Government of Ireland Act in 1920, into territories defined as ‘Northern Ireland’ and ‘Southern Ireland’, and a truce was established in 1921. The majority Protestant ‘Southern Ireland’ renamed itself the ‘Irish Free State’ and became an independent state in 1922, leading also to the formation of Northern Ireland in that year as a distinct administrative geography, which voted against Home Rule and to remain a British territory.

(Anderson & O’Dowd, 2007) summarise the legacy of the establishment of the Northern Irish border as follows:

Under one-party unionist rule for 50 years, Northern Ireland provide to be the most problematic legacy of partition. It provided a ‘cage’ for two communal blocs locked into a mutually antagonistic and self-reproducing relationship with each other. The sizeable nationalist minority – initially a third of its population but threatening to erode unionism’s ‘safe’ majority – was the main loser, disaffected and permanently excluded from state power. The majority unionist bloc maximised its micro-territorial control within Northern Ireland, but it retained endemic fears of being undermined by nationalist population growth, and/or physical attacks on partition, and/or being ‘sold out’ by British governments. The relegation of Ireland, including Northern Ireland, once again to the status (of a now reconfigured) imperial frontier, had clearly reduced the capacity or willingness of British governments to combat the dynamics of separation and division set in train by the partition settlement. The eruption of ethno-national violence a half-century after partition was part of the imperial legacy. [p. 947]

The dormant but unresolved tensions described above led to the conditions for a reignition of conflict beginning in the late 1960s. A series of errors in the British Army’s deployment to Northern Ireland between 1969 and 1972 have been identified as important in making the situation much worse, and turning the initially envisaged task of ‘peace support’ into one of fighting an insurgency.(Thornton, 2007)

The post-War background to the Northern Ireland conflict has been summarised as follows: in the late 1960s a Catholic protest movement emerged, inspired by the civil rights’ movement in the United States, prompting an often violent Protestant counter-movement opposed to Catholic marches, leading to widespread clashes between sides. By 1969 such clashes could not be controlled by the police forces in Belfast and Londonderry (numbering around three thousand full time officers and ten thousand reservists), and around 2,500 troops from the British Army were mobilised. Though the forces were somewhat successful at containing violence by keeping the sides separate, large amounts of Catholic property – including homes – were still damaged, and little guidance was provided about how the Army should operate, and strategies and tactics developed for the containment of insurgencies in British colonies, such as Malaya in the 1950s, may have been applied. In 1969 and 1970, the Army was considered relatively effective in protecting Catholics from Protestant attacks, and restrained in its response to violence, and so resistance to the Army from the IRA remained limited, as were IRA reprisal attacks on Protestants. The IRA was conflicted in its response to both the Army presence and Protestant reprisals, however, and in 1969 split into the less-militant Official IRA (OIRA), and the more militant Provisional IRA (PIRA). The Army, the OIRA and the PIRA then each competed to win favour and appear legitimate from the perspective of Catholic communities, with the PIRA to some extent hoping and goading the Army into behaviours which would de-legitimise the Army’s presence in these communities, in particular through their handling of sectarian tensions during marches. Examples of subsequent Army mis-steps included: the deployment of the Protestant-sympathising Scots Guards in 1970; and deploying too few troops for peaceful containment (‘minimal force’) strategies to be effective. This lack of numbers possibly led to excessive use of CS gas in riots which lasted for many days in Ballymurphy, the creation of Army ‘no go’ areas and so a power vacuum which the PIRA was able to fill, and being unable to properly defend the Catholic Short Strand enclave against Protestants in June 1970. Army attempts to disarm Catholic communities, combined with a lack of success defending them on all occasions, further acted to delegitimise the Army amongst affected Catholic communities. With reduced support for the Army in Catholic communities, the PIRA then began attacking the Army in 1971; worsening Army-PIRA relations led the Army to publicly name IRA leaders on 5 February 1971, swiftly followed by the first killing of a British soldier by the IRA the following day. Internment, i.e. indefinite detention without trial of suspected Republican paramilitaries, then swiftly followed, and on a large scale; on 9 August 1971, 342 people were arrested (of which only 55 were PIRA members), leading to protests over the following days in which 23 people died, including a Catholic priest. Army troop numbers increased by around a quarter within the year, reaching nearly 16,000 by October, and PIRA bombings and killings intensified. The effect of internment was to bring an end to Army-IRA relations in 1971; amity was then further increased through the deployment and actions of the Parachute Regiment (‘the Paras’), who were more inclined to use deadly force than existing forces. It was the Paras who faced a 7,000-strong Catholic civil rights march on 13 January 1972, ‘Bloody Sunday’, and shot dead 14 people later found to be unarmed, further delegitimising the Army and legitimising PIRA within many Catholic communities. This event, more than any other, can be seen to have ignited the decades of sectarian conflict that followed.(Gerike et al., 2016)

The lack of effective military intelligence in Northern Ireland between 1969 and 1975 is considered to have had a detrimental impact on security and violence reduction and containment in the region.(Sanders, 2011)

Paramilitary ceasefires in late 1994 were identified near the time as important developments in the peace process, and the best hope for resolution of the conflict for over twenty five years.(Boyle & Hadden, 1995) Paramilitary operations by the Irish Republican Army (IRA) officially ended on 31 August 1994; six weeks later, on 13 October 1994, a cessation of violence was announced by Loyalist forces, leading to a situation described in 1995 as a ‘cold peace’.(O’Leary, 1995) A resumption of IRA violence occurred on 9 February 1996, marked by the bombing of Canary Wharf in London.(Kyle, 1996)

## Section three: Data and Methods [732/500 words]

Data on all-cause mortality and population size, disaggregated by gender, age in single years and year, were extracted from the Human Mortality Database (HMD). Mortality rates were calculated by dividing death counts by population exposure (adjusted population counts). All data management and analyses were performed using the R statistical programming environment.

In the first stage of the analysis, mortality rates by age and year were explored visually using level plots in which each column is a different year, each row a different age, and each cell is a mortality rate or log mortality rate for a specific combination of year and age in single years. This arrangement is known as a Lexis surface. A qualitative colour scheme, ‘Paired’ from the RColorBrewer package, was used to colour cells in the level plots such that different ‘bands’ of mortality rates or log mortality rates can be identified by cross-referencing the colour of cells with colour key legends to the right of each plot. The R packages Lattice and latticeExtra were used to produce the visualisations.

In the second stage of the analysis, level plots for males aged between 15 and 45 years inclusive were produced, again using the same ‘Paired’ colour scheme but with a narrower scale of values, meaning cells are coloured differently. This gender and age range was focused on as a mortality pattern that appears attributable to the conflict post 1972 appears very clearly for this group, whereas in females and males at other ages no similar pattern is apparent.

In the third stage of the analysis, a model was developed which aims to reproduce the main features of the level plot of mortality values over this Lexis surface for this gender and age group, and in which the conflict-attributable pattern of excess deaths is modelled as a separate variable. The final model specification was developed by comparing the penalised model fit of different model specifications using AIC and BIC, as well as the root mean square (RMS) error, and by visually exploring both the Lexis surfaces of predicted values, and of residuals (differences between predicted and actual values) in order to assess whether the model appears to capture the most salient features of the Lexis surface of the data itself. The model specification is as follows:

Where indicates the mortality rate for males of age in year , the superscript indicates which of three distinct phases in mortality improvement to which year belongs, and indicates the number of years since the start of the mortality improvement phase to which year belongs. The three mortality improvement phases, identified through visual exploration of the Lexis surfaces, are: Phase One: 1922 to 1938 inclusive; Phase Two: 1939 to 1955 inclusive; and Phase Three: 1956 and later. Within these three phases, the rate of age specific mortality improvement tended to be greatest in Phase Two (1939 to 1955), despite this period including World War Two.

is the function which models the mortality effect of the conflict. It assumes that the additional mortality effect is greatest in the first year of the conflict, then decays exponentially with each subsequent year. The rate of decay in additional mortality is modelled using the parameter , and can have any value from 0 to 1 inclusive. In the fourth phase of the analysis, numerical optimisation is used to select k such that AIC (penalised model fit) is minimised. Given , the ‘half life’ of the conflict, i.e. number of years it takes for the additional mortality risk to fall by half, can also be calculated using the formula .

Finally, in the fifth phase of the analysis, the numbers of deaths at each age and in each year are estimated by applying the model’s predicted mortality risks to the populations exposed to these risks, i.e. , where is the number of deaths at age and in year under the active conflict scenario A, and indicates the size of the population at this age and in this year exposed to the mortality risk. A counterfactual surface of risks is modelled by setting to 0 in all years. The total number of conflict-attributable deaths estimated by the model in this age range is then the sum of differences in deaths estimated under both scenarios, i.e. .

## Section four: Results [1500 words]

## Section five: Discussion [1500 words]

# References [1000 words]

Anderson, J., & O’Dowd, L. (2007). Imperialism and nationalism: The Home Rule struggle and border creation in Ireland, 1885–1925. *Political Geography*, *26*(8), 934–950. http://doi.org/10.1016/j.polgeo.2007.10.001

Boyle, K., & Hadden, T. (1995). The Peace Process in Northern-Ireland. *International Affairs*, *71*(2), 269–283.

Gerike, R., de Nazelle, A., Nieuwenhuijsen, M., Panis, L. I., Anaya, E., Avila-Palencia, I., … Götschi, T. (2016). Physical Activity through Sustainable Transport Approaches (PASTA): a study protocol for a multicentre project. *BMJ Open*, *6*(1), e009924. http://doi.org/10.1136/bmjopen-2015-009924

Kyle, K. (1996). Murder at Canary Wharf. *World Today*, *52*(3), 76–78.

O’Leary, B. (1995). Introduction: Reflections on a cold peace. *Ethnic and Racial Studies*, *18*(4), 695–714. http://doi.org/10.1080/01419870.1995.9993887

Sanders, A. (2011). Northern Ireland: The Intelligence War 1969–75. *The British Journal of Politics and International Relations*, *13*(2), 230–248. http://doi.org/10.1111/j.1467-856X.2010.00416.x

Thornton, R. (2007). Getting it Wrong: The Crucial Mistakes Made in the Early Stages of the British Army’s Deployment to Northern Ireland (August 1969 to March 1972). *Journal of Strategic Studies*, *30*(1), 73–107. http://doi.org/10.1080/01402390701210848

Www.bbc.co.uk. (2017). Manchester attack: What we know so far. Retrieved June 5, 2017, from http://www.bbc.co.uk/news/uk-england-manchester-40008389

Www.economist.com. (2016). Terrorism: learning to live with it. Retrieved June 5, 2017, from http://www.economist.com/news/international/21706250-people-are-surprisingly-good-coping-repeated-terrorist-attacks-america-and