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Regional Resources and Democratic Secessionism

Abstract

Although regional resources have been shown to influence secessionist conflicts in developing countries, their effect in established democracies has largely been neglected. We integrate regional resource value and inter-regional transfers in a model on the optimal size of nations, and show that regional wealth correlates positively with secessionist party success in a large panel of regions. To establish causality, our difference-in-differences and triple-differences designs exploit that Scotland and Wales both feature separatist parties, but only an independent Scotland would profit from oil discoveries off its coast. We document an economically and statistically significant positive effect of regional resources and rule out plausible alternative explanations.

JEL-Codes: D700, H770, N900.

Keywords: fiscal federalism, inter-regional transfers, redistribution, secession, separatism, size of nations, resources, economic voting.

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> "The foolish ones said to the wise, 'Give us some of your oil; our lamps are going out.' 'No,' they replied, 'there may not be enough for both us and you. Instead, go to those who sell oil and buy some for yourselves.' "
>
> Matthew 25, 8-9 – *The Parable of the Wise and Foolish Virgins*

1 Introduction

While many regions around the world experienced a surge in the vote share of secessionist parties, other democracies with comparable levels of cultural heterogeneity did not. The existing literature on the optimal size of nations, mostly focusing on scale advantages like improved trade opportunities as the main benefits from larger states and on preference heterogeneity fostering secession and smaller entities, does not sufficiently explain this phenomenon. We argue that, in addition to these factors, regional resources and their changing value are crucial to explain the success of secessionist parties. This relates to the literature on natural resource wealth and state stability in developing countries (see, e.g., Arezki & Brückner, 2012; Berman *et al.*, 2017), where emerging distributional conflicts often culminate in armed conflicts and severe civil wars (e.g., Collier, 2010; Morelli & Rohner, 2015). As outright conflict is fortunately less likely in wealthier countries with stable democratic systems (Collier & Rohner, 2008), the role of regional resources has mostly been overlooked. We argue and show that taxable resources boost the vote share of democratic parties that advocate secession from a re-distributive nation state.[1]

Our simple probabilistic voting model integrates the potential advantages and disadvantages of a larger nation state, emphasized by authors like Alesina & Spolaore (1997), but augments them by including differences in regional resource endowment. Resources generate taxable revenue, which is subject to fiscal redistribution across regions, relating our study to the literature on fiscal federalism and transfers (e.g., Becker *et al.*, 2010; Persson & Tabellini, 1996; Baskaran *et al.*, 2016; Asatryan *et al.*, 2017). The resources, on which regional wealth is based, can be of very different types. Several examples illustrate that they comprise natural resources, but also advantageous geographic characteristics that make a region suitable for tourism or as a transport hub, as well as superior human capital or historically better institutions.

To get an idea about the relevance of our mechanism, we then use regional wealth (a region's GDP p.c. in relation to the national average) to proxy for the revenues generated from regional resources. Using a newly gathered panel data set covering elections from 1970 to 2016 in 29 regions from culturally diverse countries, we show that changes in relative regional wealth correlate positively with secessionist party success. A 10

[1] Resources are known to affect, among others, local election outcomes (Ferraz & Monteiro, 2014), and local government behavior (Caselli & Michaels, 2013), but understanding their effect on separatism is of broader importance for the stability of nations today and in the foreseeable future.

percentage point increase in relative regional wealth is associated approximately with a 3 percentage point increase in votes for separatist parties. The results are robust to using different fixed effects, control variables and time trends, as well as to the omission of individual regions and years.

This strong correlation underlines the general importance and external validity of the hypothesized mechanism, but does not identify a causal effect of regional resources. We then exploit the discoveries of North Sea oil in the United Kingdom (UK) as a natural experiment to estimate a causal effect of regional resources. The discoveries were almost exclusively within Scottish maritime boundaries (Kemp & Stephen, 2000), while there were no such discoveries in the region of Wales. Moreover, qualitative evidence indicates that the *Scottish National Party* (*SNP*) and the Welsh *Plaid Cymru* as well as both regions in general are sufficiently comparable for that purpose (see, e.g., Levy, 1995).This allows us to assess the performance of the two major existing secessionist parties in Scotland and Wales in a difference-in-differences (DiD) and triple-differences framework.

The main analysis is based on a panel dataset containing 1883 observations from UK general elections and by-elections on the constituency-level, which we assembled for the 1945 to 2001 period. Resources did not play an important role in the political calculus of the secessionist parties in Scotland and Wales initially, however the situation fundamentally changed with the unexpected and large Scottish oil discoveries in 1970 (MacKay & Mackay, 1975). Hereafter, politicians from the *SNP* have tried to instrumentalize the large potential oil revenues as an argument for Scottish independence, and support for the party increased sharply (McGuinness *et al.*, 2012).[2] The slogan "It's Scotland's oil", invented in 1972 and often quoted even today (Harvie, 1995), concisely reflects how politically relevant the oil discoveries were and still are for the *SNP* (Collier & Hoeffler, 2006; MacKay & Mackay, 1975).

The setting is not only ideal for the reasons cited above but also because both parties exhibit indistinguishable parallel pre-trends. Moreover, instead of relying on a simple pre-/post comparison we can use data about the exact size and timing of individual oil discoveries. The main specification uses giant discoveries, which are most salient to voters and account for the bulk of the revenue. Our results show that the *SNP*'s vote share significantly increased by about 2 percentage points for each additional giant oil discovery in the pre-election years. Simple back-of-the-envelope calculations suggest that this boosted the initial rise of the *SNP* after 1970 by 12-16 percentage points, explaining a large part of the party's ascent.

[2] Support for independence provisionally culminated in the referendum held on September 18, 2014, in which the Scottish people faced the choice of separating from the rest of the United Kingdom or staying unified. Even though a close majority of the Scots voted against independence, the fact that an independence referendum was held in a stable West-European country with a wealthy society is remarkable in itself. The official electoral outcome of the referendum is as follows; yes: 1,617,989 (44.5 percent); no: 2,001,926 (55.5 percent); turnout: 84.6 percent. The question asked on the ballot paper was: "Should Scotland be an independent country?" (see `http://www.scotreferendum.com/information/`, last accessed on 26th October 2018). But Scotland is no isolated case: in Québec, for instance, an independence referendum closely failed the majority in 1995 (Holitscher & Suter, 1999; Lynch, 2003).

The result is robust to a wide range of specifications, different lag-structures, and different proxies for the importance of oil. Including leads of the discoveries, pre-/post-specific time trends, decade×region fixed effects or an indicator for the Thatcher era confirms the results. A triple-differences design exploiting plausibly exogenous changes in world oil prices further supports the findings, and a placebo test reveals that oil prices matter in the post-treatment period, but not before. The effect size varies to some degree with constituency characteristics capturing the relative advantages and disadvantages of independence. In combination with the cross-country evidence, this highlights that regional resources are a crucial factor to better understand the success and failure of secessionist parties.

The paper is structured as follows: section 2 relates our contribution to the existing literature on secessionism in developing countries and on the size of nations, and presents our theoretical model. We then demonstrate the importance of regional resources and the external validity of our findings with correlational evidence from a large panel of separatist parties in regions around the world (3). Subsequently, we introduce the main data and identification strategy, focusing on the causal effect of oil discoveries on the electoral performances of the Scottish and Welsh independence movements (4.1). Section 5 then presents our regression results, estimates heterogeneous effects, and discusses the robustness of the estimates. Section 6 concludes.

2 Linking Resources and Secessionism

2.1 The Political Economy of Resources and Conflict

There is a large strand of literature examining the positive and negative economic consequences of resource endowments and discoveries for economic development in the context of developing countries (for an overview see, e.g., Caselli *et al.*, 2015; Ploeg, 2011). Numerous studies suggest that an abundance of natural resources leads, among others, to more corruption, lower political accountability (Ferraz & Monteiro, 2014), increases in violence and reduced electoral competition (Carreri & Dube, 2017), as well as civil war (see, e.g., Berman *et al.*, 2017). Secessionist civil wars, in particular, represent a violent form of secessionism, which often arises due to distributional conflicts about resources (see, e.g., Adhvaryu *et al.*, 2018; Collier & Hoeffler, 2004; Ross, 2004b), for instance, after the discovery of oil (Lei & Michaels, 2014),

In addition to grievances and oppression in the respective regions, various authors highlight the relevance of an economic calculus to explain the onset of separatist conflicts. Specifically, Morelli & Rohner (2015) argue that the winner of a civil war gains control over the resource repositories in the contested area. If the expected revenue from regional resources is sufficiently high, a secessionist conflict is likely to arise (Ross,

2004a).[3] Collier & Hoeffler (2004) support this so-called greed hypothesis: their results indicate that, beyond ethnic differences, potential separatist movements and rebellions are more likely to be initiated when it is both financially feasible and potentially rewarding (see also Collier & Hoeffler, 2006).

Still, neither greed nor grievance can solely fuel secessionist conflicts. Ethnic, cultural or linguistic differences are important factors that affect secessionist movements, but the degree to which they effectively carry over into secessionist actions is often depending on the economic considerations revolving around resource distribution. This also becomes apparent in Morelli & Rohner (2015). When interacting resource and ethnicity concentration, they demonstrate that a civil war is more likely to occur when both factors are densely concentrated. More specifically, resources need to be geographically concentrated and the different groups within the country need to be distinct enough to enable group leaders to instrumentalize the unequal distribution for their purpose. In their setting, a shift from full oil equality to full oil inequality, ceteris paribus, quadruples the baseline risk of civil war. Gancia *et al.* (2018, p.1) note that, with political progress and development, "negotiation replaces war as a tool" to adjust political structures. We argue that the channels highlighted above are also at work in established democracies, but, instead of outright conflict, they affect non-violent secessionism.

2.2 Economic Voting and Secessionism

2.2.1 Benefits and Costs of a Union

Tufte (1978, p. 65) appeals to readers: "When you think economics, think elections; When you think elections, think economics." On average, economic factors explain about one third of voting outcomes (e.g., Powell & Whitten, 1993). Voters can react to changes in macroeconomic indicators like the unemployment rate or increased government spending in their districts (see, e.g., Drazen & Eslava, 2010; Cole *et al.*, 2012). This can be done retrospectively to reward incumbent governments or more future-oriented if the electorate takes past economic performance as an indicator of future developments. Sorens (2005) suggests that voters do also take cost-benefit-considerations into account when voting for a secessionist party. It seems natural that voters adopt a prospective view accounting for their future expected utility under different options (see Kuklinski & West, 1981; Elinder *et al.*, 2015). The discovery of resources or an increase in their value improves voters' expectations about their future benefits. Munoz & Tormos (2015), for instance, argue that economic expectations contribute to shifting preferences from more autonomy

[3] This claim fits empirical evidence and case studies. Explaining possible chains of effects, Ross (2004a) provides case study evidence for three separatist wars where a resource rich region wanted to secede. Lopes da Fonseca & Baskaran (2015) suggest that conflict has large economic costs using nighttime light as a measure of economic development. Dhillon *et al.* (2018) estimate the effects of secession for resource poor and rich regions.

towards full independence in Catalonia.

A large literature in economics has evaluated the reasons behind regional integration and disintegration both theoretically and empirically. In the initial seminal paper, Alesina & Spolaore (1997) argue that the equilibrium number of nations is a result of the trade-off between the costs and benefits of being a member of a larger political entity. Goyal & Staal (2004) highlight the roles of size, location, and diversity within regions, and Buchanan & Faith (1987) argue that the secession option places an upper limit on the tax burden that a ruling majority can impose on the minority. Bolton & Roland (1997) concentrate on the fact that people in different regions might exhibit different preferences on income redistribution within the chosen political entity. In contrast to their paper, we are mostly interested in differences in resource allocation and distribution amongst regions, but we likewise highlight the role of economic considerations. A simple model helps us to understand how economic arguments about the distribution of regional resources can be integrated in existing frameworks to explain the electoral success of secessionist parties.

Assume that the utility of the representative citizen of a region r in a union of R regions of equal size contains costs and benefits of integration in the union (nation state). The level of integration is indicated by $I_r \in [0, 1]$, with 1 indicating full integration into the nation state and 0 indicating complete separation. We focus on the cases where $I_r = 0$ and $I_r = 1$. Some voters might actually prefer higher decentralization and more local autonomy to outright secession, and vote for a secessionist party strategically to improve the region's bargaining position. Still, they are willing to accept a possible secession and, all else equal, prefer it to the alternatives. If preferences for more autonomy and secession are strictly positively correlated (see, e.g., arguments by Rode *et al.* (2017)), a stronger preference for more autonomy also translates into more support for secession.[4]

As in the framework of Alesina & Spolaore (1997), citizens bear heterogeneity costs C_r of integrating into larger units. These costs are defined as:

$$C_r = h_r(I_r) \tag{1}$$

with $h'(I_r) \geq 0$. Costs from heterogeneity exist due to a deviation of r's preferences from the rest of the nation. The term refers to preference heterogeneity within the nation and can be expressed as the Euclidean norm:

$$h_r = ||\phi_r - \phi_{\bar{N}}|| \cdot I_r,$$

[4] Eerola *et al.* (2004) provide a model of independence referendums and their effect on bargaining about transfer payments. Adaptions within federal systems are, however, extremely hard to agree on, especially if unanimous support of all regions is required. Morelli & Rohner (2015), for instance, present a bargaining model with two regions and show how commitment problems can prevent reaching a stable equilibrium. The protests and tensions surrounding the attempts for more autonomy of the relatively rich region of Catalonia from the rest of Spain in 2017 show the difficulties of reaching peaceful agreements, even in a stable democracy.

where ϕ_r is a vector representing the preferences and values of the average citizen in region r. $\phi_{\bar{N}}$ can be understood as representing either the preferences of the majority in the nation, the pivotal region in bargaining processes or the median voter. Hence, heterogeneity costs increase with a larger difference between preferences in region r and the national majority ($h_{\bar{N}}$). These costs are often forgotten in the political discussion because they are non-monetary and non-quantifiable as they relate to regional identity, common values, cultures, and norms (Alesina *et al.*, 1995; Dehdari & Gehring, 2018). In case of secession, the provision of public goods (Alesina & Spolaore, 1997) and redistribution (Bolton & Roland, 1997) could be more aligned with regional preferences.

Citizens also derive benefits from national integration B_r. This includes benefits b_r, e.g., from trade, other economies of scale or enhanced public good provision, but also transfer receipts based on resource revenues. Benefits are defined as:

$$B_r = b_r(I_r) + \frac{\sum_{i=1}^{R} V_i}{R}, \tag{2}$$

with $V_i = x_i \times p_i$ and $b'(I_r) \geq 0$.[5] The value of regional resources (V_i) is simply modeled as the quantity of resources available (x_i) times the price of the resource (p_i). Note that there might be more than one resource in reality, but this would simply mean to apply the sum of the respective resource values instead. Resources can be important for the secession decision in various ways. When we think of the costs of public good provision, resource revenues can enable regional governments to secure a similar or even higher level of public goods provision than in the case of remaining in the union. Another argument in the existing literature is that setting up and operating a complete state apparatus leads to huge direct monetary costs of uncertain extent, which might only be feasible if enough own resources are available (Lynch, 2003).

Regarding the effect of differences in wealth levels, the political science literature has shown a correlation between the relative wealth of a region and separatist tendencies in democracies (Van Houten, 2007). One important reason is that wealthier regions are often the net-contributors in a union subsidizing other regions. We choose a simple option to integrate resources and surplus sharing in the model as there is not much additional analytical value from further complications for our purpose. It assumes that resource

[5] In this respect, supra-national entities like the European Union are important for secessionist movements in member states. Many European regions run their own representations in Brussels. Gehring & Schneider (2018) show that minor European states can achieve significant economic gains by making targeted use of key EU positions.

revenues are pooled and then evenly redistributed among all regions.[6]

For a given level of integration, citizens optimize in terms of consumption, leisure, etc. The indirect utility for the representative citizen in region r is then given by $W_r = W_r(B_r, C_r) = W_r(b_r(I_r), V_r, \sum_{j \neq r}^{R} V_j, h_r)$. In case the region remains a part of the union or the nation state, the utility is:

$$W_r^N = b_r(I_r) + \frac{\sum_{i=1}^{R} V_i}{R} - h_r(I_r). \tag{3}$$

In the case of secession, the region can keep all the benefits derived from the resources. We focus on the case of complete secession $I_r = 0$ with $b(0) = 0$ and $h_r(0) = 0$, so that we get

$$W_r^S = V_r. \tag{4}$$

2.2.2 Support for Secession

Assume citizens can vote to either stay in the nation-state ($I_r = 1$) and get W_r^N or vote for secession, which means choosing $I_r = 0$ and receiving W_r^S. A citizen i from region r will agree to secede and choose $I_r = 0$ if

$$W_r^S > W_r^N + \sigma_{i,r} \Leftrightarrow \sigma_{i,r} < W_r^S - W_r^N \tag{5}$$

where W_r^S indicates the indirect utility for the representative citizen in region r. σ_r is the idiosyncratic preference of citizens in region r for remaining in the union and follows a uniform distribution on $[-\lambda_r/\gamma_r, (1-\lambda_r)/\gamma_r]$, with $0 < \gamma_r \leq 1$ (see Persson & Tabellini, 2002). γ_r determines the width of the distribution, and $\lambda_r \in (0, 1)$ can be understood as the baseline approval for secession that determines the position of the distribution. $\sigma_r = W_r^S - W_r^N$ is the threshold value for which citizens are indifferent between secession and the *status quo*. Plugging (3) and (4) into this equation, we get

$$\sigma_r = W_r^S - W_r^N = V_r - b_r(I_r) - \frac{\sum_{i=1}^{R} V_i}{R} + h_r(I_r)$$

$$\Leftrightarrow W_r^S - W_r^N = \frac{R-1}{R} V_r + h_r(I_r) - \frac{\sum_{i \neq r}^{R} V_i}{R} - b_r(I_r). \tag{6}$$

[6] One straightforward extension could integrate the usage of the resources, e.g., for a public good. In the case of a true public good, there might be benefits from pooling resources at the national level. Still, due to the differences in preferences captured by h_r, the level of the public good would deviate from the optimal level of region r. Another extension could relax the equal size assumption. A resource-rich large region in a union with a few small regions would gain little from secession, as the share of its revenues being redistributed to other regions is relatively small. Finally, a more complex model could also consider the impact of resource wealth on the bargaining power regarding within-country redistribution, augmenting the existing literature like Dixit & Londregan (1998) and Persson & Tabellini (1996). Our model can also be understood as assuming certain secession probability and fixed sharing arrangements. A related model is from Perez-Sebastian & Raveh (2016), who indicate that resource booms would cause more centralization due to risk-sharing preferences of the regions, but do not take regional distribution into account. None of these extensions is necessary to derive our main implications.

An individual voter i supports secession if $W_r^S - W_r^N \geq \sigma_{i,r}$. For simplicity we define the relative value of region r's resources relative to the other regions as $\omega_r = \frac{R-1}{R} V_r - \frac{\sum_{j \neq r}^{R} V_j}{R}$. Based on the features of the uniform distribution, the share of voters supporting secessionism in region r is then given by

$$\pi_r(\omega_r) = \begin{cases} 0, & \text{if } \omega_r < b_r(I_r) - h_r(I_r) - \frac{\lambda_r}{\gamma_r} \\ \lambda_r + \gamma_r[\omega_r + h_r(I_r) - b_r(I_r)], & \text{if } b_r(I_r) - h_r(I_r) - \frac{\lambda_r}{\gamma_r} \leq \omega_r \leq b_r(I_r) - h_r(I_r) + \frac{1-\lambda_r}{\gamma_r} \\ 1, & \text{if } \omega_r > b_r(I_r) - h_r(I_r) + \frac{1-\lambda_r}{\gamma_r}. \end{cases}$$

It is evident from our model that there are cases where no one in the electorate supports the separatism option. This is the case even when $\omega_r \geq 0$, i.e., a region possesses more resources than other regions, if benefits from remaining in the union are always larger (high b_r, low h_r, low λ_r). Similarly, for certain parameter constellations it is theoretically possible that all voters support secession, although this case seems empirically less relevant. In between these extreme cases exists an interval in which regional resources affect secessionist party support. For smaller values of γ_r, this interval is wider.

These are the cases we are interested in. Using simple comparative statics, it becomes obvious that π_r increases in ω_r. If the value of resources in region r increases, secession becomes the more attractive option for a larger share of people. More precisely, as $\omega_r = \frac{R-1}{R} V_r - \frac{\sum_{j \neq r}^{R} V_j}{R}$, it is the relative value of regions r's resources compared to the resources of the other regions that influences secessionist party support.

A second take-away from our model regarding the choice of the different empirical specifications in sections 3 and 4 is that we need to focus on regions that feature an existing secessionist party. If there is no established party, this is a strong indication that we are outside the interval on which our model predicts that relative regional resource wealth influences separatist party support.

3 Relationship in a Panel of Regions Around the World

As our model indicates, separatist movements are almost always influenced by a combination of cultural and economic factors. The challenge that the existing literature has struggled to overcome is to disentangle economic reasons, such as the redistribution of tax revenues based on regional resources, from cultural factors. There can be regions in which economic arguments play no or only a very minor role for secessionism. Although those cases seem rather rare, secessionism can arise for purely cultural reasons if those are dominating the effect of differences in regional resources. Nonetheless, we argue that in many regions support for separatism is strongly influenced by economic reasons beyond existing cultural differences.

An extreme example is the formerly secessionist *Lega Nord (*now *Lega)*, whose central political goal was

the independence of the historically wealthier regions in the North of Italy. The example underlines the importance of economic reasons as the movement "is not based in an area that has historic claims to nationhood. Instead, the *Lega* has attempted to invent an ethnicity [...(Padanian)] in order to justify its political claims for the protection of the economic interests of the region" (Cento Bull & Gilbert, 2001, p. 446). Despite no pre-existing "Padanian" identity, the movement was politically successful by campaigning against fiscal redistribution.[7]

Variation in regional resource value over time often suggests a positive correlation with secessionist party success. Belgium, for instance, features two culturally distinct regions; the mainly French speaking and historically politically dominant Wallonia, and the Flemish (Dutch) speaking Flanders. Up until the 1960s, Wallonia was one of the richest regions in Europe due to natural resources like coal and a comparative advantage in sectors such as steel production (Mnookin & Verbeke, 2009). Flemish independence movements campaigned on the suppression of Flanders and the Flemish language, but electoral success remained low. Declining demand for coal and steel on the Wallonian side and the increased value of possessing the port of Antwerp as well as higher demand for skills available in Flanders, however, raised the relative value of Flanders' regional resources. This reversal of fortunes correlates with increasing vote shares for Flemish secessionist parties. Since 2012, the secessionist *New Flemish Alliance*, claiming that "wealthy Flanders should not be subsidizing poorer Wallonia, whose regional government is alleged to be wasting money", is the largest party in the Belgian federal parliament.[8]

Resources, on which regional wealth is based, can be of very different types. Natural resources matter, for instance, in *Silesia* in Poland (coal, lignite, zinc, lead, and iron), in the *Republika Srpska* in Bosnia-Herzegovina (e.g., bauxite, marble, and silica sand), and in the former French colony New Caledonia (nickel). By contrast, the resource that helps the separatist cause in the Croatian region of Istria is the attractiveness of its beaches for tourists (Ashbrook, 2008, p. 151). In the case of Northern Italy mentioned above, resources include better functioning institutions (Guiso *et al.*, 2016). The value of regional resource endowments can change over time, partly for exogenous reasons, like the (changing) value of possessing an important transport hub in Flanders. Similarly, in Greenland, the melting of the Arctic ice makes larger areas feasible for mining (e.g., rare metals and radioactive substances) and oil drilling, which led to a strong increase in support for secession from Denmark. These examples suggest that the value of regional resources often contributes to secessionist success (details about numerous regions in Appendix B).

For a systematic analysis covering multiple countries and regions, one difficulty is to precisely quantify

[7] This culminated in a secession referendum in the 1990s (see *The Economist* from May 27, 1997, at http://www.economist.com/node/150513, last accessed October 26, 2018.

[8] See http://knowledge.wharton.upenn.edu/article/secession-answer-case-catalonia-flanders-scotland/, last accessed October 26, 2018.

and compare the value of those different resources. Instead of measuring resource value directly, we can begin by considering regional wealth, measured as regional relative to national GDP per capita, as a proxy for taxable resource revenues (as in Van Houten, 2007). Of course, this is an imperfect proxy. In regions without large changes over time, the variation is limited, and the GDP data that are available for a larger set of regions are net of redistribution, i.e., they underestimate the relative wealth of net contributors to fiscal redistribution schemed. Still, the sign and significance of the relationship provides a meaningful measure of the general importance of economic reasons beyond cultural factors for secessionism.

Where possible we adapt existing data sets by Massetti & Schakel (2013) and Sorens (2005), but expand on them by collecting data for both national and regional elections for a wider range of regions. The 29 regions include the examples described above, as well as regions in countries as diverse as Canada, Romania, Spain, and the United Kingdom, covering national as well as regional elections between 1970 and 2016. Appendix A provides a full list of the regions and elections. We follow the existing literature and include regions conditional on the existence of separatist parties (cf., Massetti & Schakel, 2013). The reason is that we are interested to assess whether secessionist support is affected by the region's relative wealth, conditional on the existence of a separatist party. It is evident from our model that there are regions where other issues dominate the political agenda. If there is no underlying separatist tradition, the incentives to set-up a secessionist party are not sufficiently high, and moderate changes in relative regional wealth should not affect secessionism in a measurable way. The regression equation for this multi-country analysis is

$$\textit{Secessionist vote share}_{i,c,t} = \beta \frac{GDP\,p.c.\,(Region)_{i,t}}{GDP\,p.c.\,(Nation)_{i,t}} + \gamma_1 x_{i,c,t} + \gamma_2 x_{i,c} \vartheta_t + \lambda_{i,c} + \tau_t + \lambda_{i,c} T + \varepsilon_{i,c,t}.$$

The outcome variable is the combined vote share of all parties in region i in country c, which openly declare themselves as regionalist, separatist or secessionist (the three categories are often used interchangeably and are difficult to distinguish). The variable of interest is *Relative wealth*, a proxy for the relative value of the respective regions' potentially taxable resources. $\lambda_{i,e}$ are fixed effects for the regions times election types (regional/national), which eliminate omitted variable bias stemming from time-invariant factors related to a particular region and election type. τ_t are fixed effects for the election years that control for period-specific events, which affect all regions in the same way. Our most restrictive specification also includes different linear time trends for each region and election type $\lambda_{i,e} T$.

We adapt three variables from Massetti & Schakel (2013) and Sorens (2005), which are relevant and suitable controls for our purpose. *Population* matters if the feasibility of establishing a nation depends on the number of inhabitants, for instance because the cost of public goods like defense can be spread among a large enough population. The effective number of parties (*ENP*) running for election might influence voting decisions for a separatist party as it measures the available choice set across the political spectrum.

For instance, if the only separatist party is right-wing, a moderate voter might decide not to support the separatist cause. For these two measures, we use time-varying values $x_{i,c,t}$. For *ENP*, we lag the variable by one electoral period to avoid reverse causality problems, for population, we adopt the value at the beginning of the respective election year. Finally, we interact the fixed share of regional language speakers, a crucial source of regional identity, with the year dummies to allow for time-varying effects, $x_{i,c}\tau_t$.

Note that our aim in this section is not to proof causality, but rather to study the conditional correlations as an indication of the general relevance of our main empirical study. Thus, we do also not address issues like differences in the fiscal redistribution scheme or differences in the level of trust citizens from a particular region have in the central government (e.g., based on historical experiences). Note also that we do on purpose refrain from solving endogeneity issues through an instrumental variables approach. As we argue above, the resources and their transformation in regional wealth differ strongly across most regions, while an IV approach relies on a common exogenous source of variation in the potentially endogenous variable. Instead, we are interested in whether there is sufficient variation over time in regional wealth to observe the positive relationship that our model predicts. Moreover, we want to test the sensitivity of this relationship regarding different specifications, controls, and particular years or regions. Appendix A visualizes the variation in vote share and relative wealth over time for each region, indicating a positive relationship.

Table 1: **Multi-Country Panel Results**

Dependent variable:	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*
Relative wealth	0.321	0.300	0.282	0.381	0.399
	[0.129]	[0.133]	[0.106]	[0.125]	[0.127]
p-value: *Relative wealth*	0.013	0.024	0.008	0.002	0.002
Time FE	*no*	*yes*	*yes*	*yes*	*yes*
Controls	*no*	*no*	*yes*	*yes*	*yes*
Time trends	*no*	*no*	*no*	*yes*	*yes*
Adj. R-Squared	0.69	0.80	0.82	0.85	0.86
Number of observations	403	403	396	396	368

The table shows OLS regression results with the vote share of separatist parties in selected regions over the 1970-2016 period as the dependent variable. *Relative wealth* refers to the ratio of regional to national per capita GDP. All regressions include region-election type (regional/national) fixed effects. 'Controls' include regional population, the effective number of electoral parties (time-varying), and the population share speaking a regional language (time-invariant, interacted with time dummies). Time Trend is a region-election type-specific linear time trend. Standard errors are multiway clustered at the year and region-election type level. Appendix A provides more details. Column 5 drops Scotland and Wales.

Column 1 in Table 1 shows this correlation in a first regression, only conditioning on region-election-type FE. Column 2 adds time FE, and column 3 the control variables. Finally, column 4 adds a linear time trend for each region and election type. The coefficient in column 1 already points towards a clear

positive relationship between *Relative wealth* and *Secessionist vote share*. It suggests that a 10 percentage point wealth increase raises *Secessionist vote share* by 3.21 percentage points. The conditional correlation is remarkably robust across all specifications. Including time trends even increases the coefficient to 3.81 percentage points. The p-values indicating statistical significance range from 0.002 to 0.024.

Appendix A, Figure 8 shows the coefficients from individual regressions, each omitting one region. The stability of the coefficient underlines that the strong positive correlation is not driven or influenced by outliers. Appendix A, Figure 9 analogously drops individual years. Of course, this specification does not establish causality, but it is a very robust correlation. We can also apply the ideas in Altonji *et al.* (2005) and Oster (2017) to estimate the sensitivity of the estimates. Potential selection on unobservables would have to be 7.37 times as strong as selection on included observables to fully account for the positive relationship. The identified coefficient set taking the unexplained share of variation in the outcome into account is [0.24,0.28], i.e., rather narrow and far from including zero as a value (see Appendix A, Table 8).

Naturally, considering multiple countries at the same time is an imperfect approach. Relative GDP per capita is a noisy and potentially endogenous measure of regional resources, among others because it does not properly account for inter-regional transfers. Several requirements should be met to convincingly study the causal effect of regional resources. Ideally, we want to compare regions within a common political setting, each featuring an existing comparable secessionist party, in order to establish a convincing counterfactual. In addition to that, changes in regional resource value should be exogenous, and precisely quantifiable. Furthermore, there should be observations over a sufficiently long period to critically examine potential pre-treatment trends. Finally, the fiscal transfer system should resemble our theoretical model and remain largely unchanged over the sample period. In the following, we explain why Scotland and Wales, in the United Kingdom (UK), are in that regard well-suited to further support that the positive correlations described above represent a causal relationship.

4 Main Data and Empirical Strategy

4.1 Data

We analyze the electoral performances of the *SNP* and the Welsh *Plaid Cymru*, the two major parties promoting independence of Scotland and Wales from the UK, on the constituency-level over the 1945-2001 period. Initially, oil was not an issue in either of the two regions (Harvie, 1995). After the Geneva Convention (1958) confirmed the nations' coastal rights, and offshore gas was discovered by the Netherlands in the early 1960s, "[t]he hunt was on for North Sea oil" (MacKay & Mackay, 1975, p. 184). Following several years of unsuccessful exploratory drilling in the British Sector, however, "oil companies were becoming

disillusioned with the prospects of finding oil in the North Sea" and commonly gave up (Whaley, 2010, p. 77). Against this background, the discovery of the *Forties* oil field off the Scottish coast appears even more like an unexpected shock, upon which further discoveries would follow, spread over the subsequent decades (see Figure 2).

We collect data on oil discoveries from official UK government sources, which we cross-verify with other sources.[9] Using GIS software as well as various other sources, we verify the size and year of each individual discovery. With regards to oil discoveries, we distinguish between giant oil fields, which include all fields above 500 million stock tank barrels of oil (MMstb.) and all oil fields (containing every field above 50 MMstb).[10] It is plausible that oil discoveries need to exceed a certain threshold size so that they are realized by voters or provide enough potential to be instrumentalized by the nationalist party. *Discoveries (giant)* and *Discoveries (all)* indicate the number of giant/all oil fields that have been discovered in the year of and the year before an election. We make use of this distinction as Lei & Michaels (2014) argue that 'giants' provide the most precise measurement and account for a large share of profits. Voters base their decision on the expected value of future revenues, rather than on current production. Arezki *et al.* (2017, p.17) emphasize that, in contrast to small oil discoveries, 'giants' "signal significant increases in production possibilities in the future."

To estimate the Scottish share of British oil, we follow the common convention applying the maritime border that is also used to define Scottish fishery grounds, which is equidistant in all points to the Scottish and English coast (UK Statistics Authority, 2013, pp. 6-7). Figure 1 shows the maritime borders and the distribution of the oil fields.[11] A summary table containing all (giant) discoveries in the Scottish sector is provided in Appendix C. There is generally no doubt that an independent Scotland would own the mineral rights for the mentioned sector (MacKay & Mackay, 1975; Kemp & Stephen, 2000). The hypothetical share of oil production in Scottish waters has generally exceeded 90 percent of the total UK oil production (see Kemp & Stephen, 2000, and figures in Appendix I) and the direct economic impact of the oil sector is also

[9] See `https://www.gov.uk/guidance/oil-and-gas-uk-field-data#uk-oil-and-gas-reserves-and-resources`, last accessed on 26th October 2018. We do not consider gas deposits, which were economically less important and never emphasized in election campaigns. All sources are listed in Appendix C.

[10] Worldwide 'giants' are estimated to account for 74 percent of the estimated global oil reserves although less than 1 percent of all oil fields are 'giants' (Ivanhoe & Leckie, 1993). They are also much more profitable due to economies of scale. As we only know the year and not the exact month of each discovery, we consider discoveries in the year of and the year before the election in our baseline specification. When we use oil prices, we refer to the real price of Brent crude oil in constant 2001-US-$, which is the major benchmark for oil produced in the North Sea. *Oil price* is coded as the annual average of the Brent price.

[11] All Scottish oil fields are offshore. This matters when considering conflict about resources in developing countries because onshore oil fields can be occupied more easily (Andersen *et al.*, 2017), but the only distinction relevant for 'democratic secessionism' is that the fields would be within the boundaries of an independent Scotland. Alternative drawings of the border do not change the results as "there are just a handful of fields, and not very important ones" between the two plausible borders (Brocklehurst, 2013). However, our choice is the most conservative as the alternative would assign even more southern oil fields to the Scottish sector. All details are provided in Appendix I.

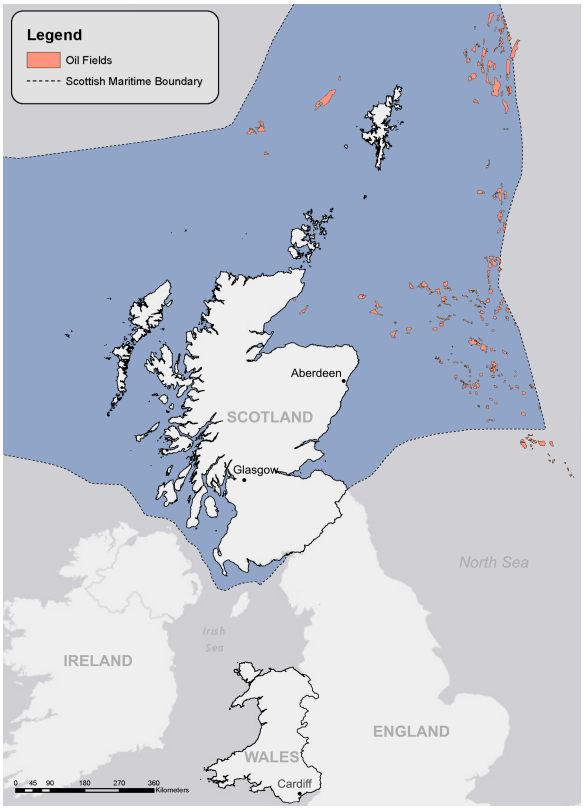

Figure 1: **Oil Fields**

The map shows the hypothetical Scottish maritime boundaries as well as the locations of the oil fields discovered in the UK sector (based on official UK government sources).

mostly concentrated in Scotland (Scott, 2004). Up to 90,000 new jobs were for instance created in Scotland, particularly in Aberdeen (Lee, 1995).

We analyze the effect of oil discoveries for electoral outcomes using results from 72 Scottish and 40 Welsh constituencies in British general elections (GEs) over the 1945-2001 period. Going back to 1945 helps us to reliably establish whether a parallel trends assumption is justified. We do not include election results after the 2001 GE because – as a consequence of the implementation of further local government competencies – the number of constituencies changed and Scotland lost 13 of its previous 72 seats in the House of Commons (McGuinness *et al.*, 2012).[12]

[12] Note that the period from 2001 onwards coincides with both rising oil prices and increases in the vote share of the SNP; including it would thus most likely strengthen our results. Constituency boundaries are reviewed by Boundary Commissions in each of the four UK regions (see `http://www.parliament.uk/about/how/elections-and-voting/constituencies/`, last accessed on 26th October 2018). For details about the redistribution process, see `http://aceproject.org/ace-en/topics/bd/bdy/bdy_gb`, last accessed on 26th October 2018. Constituency boundaries changed several times within our sample period. From 1945 to 2001, the amendments of five redistribution rounds have come into force: in 1947, 1954, 1969, 1983, and 1995. As a result, the number of constituencies ranges between 71 and 72 for Scotland and 35 and 40 for Wales. We resolve this issue by projecting the election results to the constituency boundaries in the 2001 GE, on which we draw on for our estimations. The detailed algorithm used to match the constituencies and results is described in Appendix G. The final dataset comprises 16 GEs held in the UK since 1945, which were collected from Brancati (2015) and Outlaw (2012). GEs have been held in 1945, 1950, 1951, 1955, 1959, 1964, 1966, 1970, 1974 (Feb.), 1974 (Oct.), 1979, 1983, 1987, 1992, 1997, and 2001.

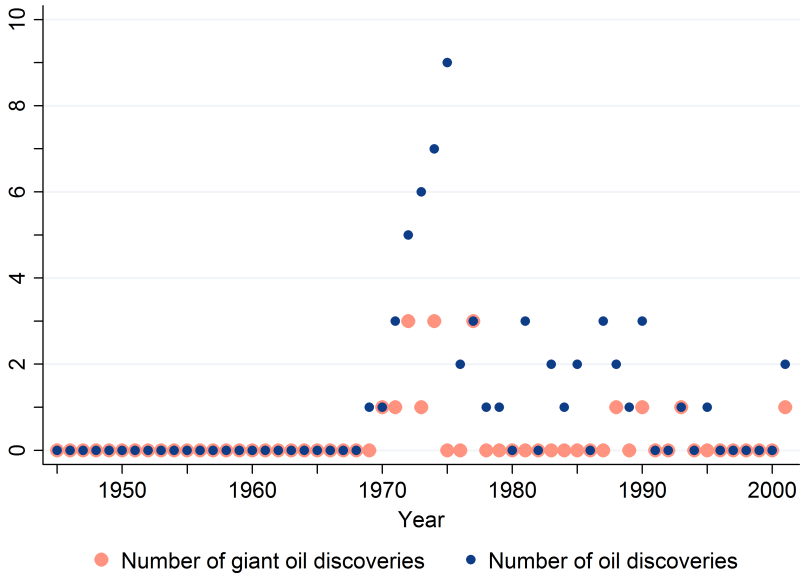

Figure 2: **Distribution of Oil Discoveries over Time**

Giant oil discoveries include all fields above 500 million stock tank barrels (MMstb.), and oil discoveries all fields above 50 MMstb. The main data source is the government of the United Kingdom, but we verified each discovery, its discovery data and size using various sources. Details about individual discoveries and all sources are specified in Appendix C.

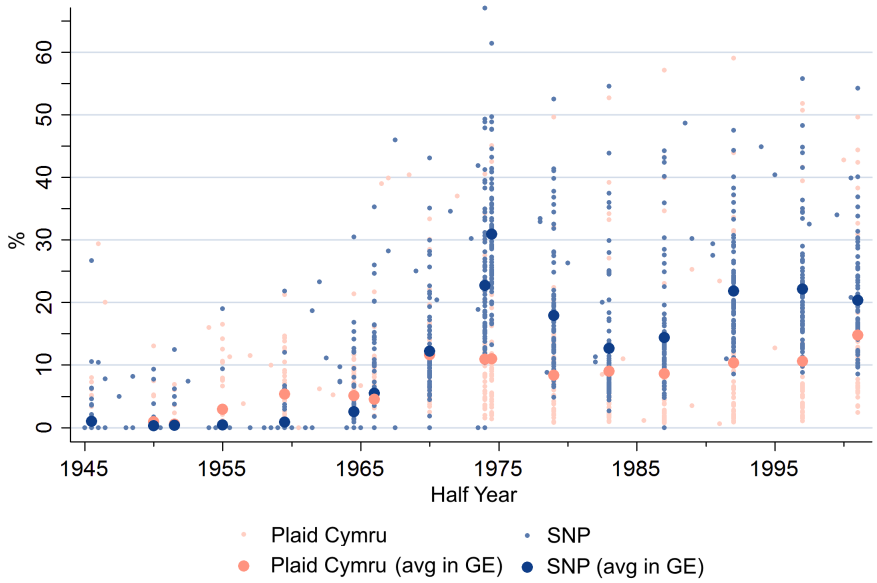

Figure 3: **Election Results**

Share of votes received by *SNP/Plaid Cymru* in GEs and Westminster by-elections. The graphic displays constituency results and the total average vote share of the two parties in GEs.

The dependent variable *Secessionist vote share* is defined as the percentage share of votes received by the *SNP* or *Plaid Cymru* in UK GEs and by-elections in a constituency i at time t (McGuinness *et al.*, 2012). If no nationalist candidate stands for election, *Secessionist vote share* is coded as 0. The time interval in our

study is biannual to account for by-elections, although some of the control variables are only available at a yearly frequency.[13] Figure 3 displays the shares of *Plaid Cymru* (in light red) and the *SNP* (in dark blue). Both parties received only a small share of votes in the first years of the observation period. Single by-election victories in 1966 (*Plaid Cymru*) and 1967 (*SNP*) marked the beginning of a slight ascent for both parties. It is clearly visible that trends begin to diverge only after 1970, and the *SNP* started to become more successful. For instance, it received more than 30 percent of the Scottish vote in October 1974 after the first major discoveries. In contrast, *Plaid Cymru*'s highest share was 14.3 percent in the 2001 GE. Besides these trend differences, visually comparing the pattern of oil discoveries and vote share differences already indicates a strong positive correlation (see Figures 2 and 3). The next subsection explains how we further verify this apparent relationship in a more systematic way.

4.2 Identification Strategy

We use a difference-in-differences (DiD) approach with constituencies in Scotland as the treated group and those in Wales as the control group to estimate the causal effect of oil discoveries on the vote share of nationalist parties. Analyzing over-time variation within Scotland is also interesting, but obviously problematic as the treatment can coincide with other time-specific events. In contrast, DiD only relies on assuming common trends. This is often a rather strong assumption, but we show below why this specific case fits the assumptions particularly well and explain how we cope with all potential threats to identification.

Prior to the earliest discoveries, oil played as little a role for the *SNP* as for the Welsh *Plaid Cymru*. Historical evidence shows that nobody expected large discoveries prior to 1969 (Bamberg, 2000), and the oil exploration process was conducted by private companies (including *BP*, *Shell*, *Amoseas*, and *Guld*) based on periodic licensing by the responsible central UK ministry (Bamberg, 2000). Neither the *SNP* nor *Plaid Cymru* (both parties of negligible influence back then) were responsible for these decisions or could influence them. Both foreign and domestic companies could apply, as oil import tariffs protecting British companies ended when the UK entered the European Free Trade Association (EFTA) in 1964.[14]

[13] Miller *et al.* (1977) show that independence is the main criterion to vote for the two nationalist parties. Hence, the share of votes for a nationalist party is commonly taken as a proxy for the public support for independence (Sorens, 2005). Brand *et al.* (1994) notes that the amount of protest voters can be neglected. We also include 91 by-elections which were held in either Scottish or Welsh constituencies when an incumbent had to be replaced (e.g., due to death or resignation). Data for by-election results are provided by Pippa Norris following the link `https://sites.google.com/site/pippanorris3/research/data`, last accessed on October 26, 2018. Note that the results are not affected by omitting or including by-elections.

[14] The most relevant licensing period for our case, covering the first giant discoveries, runs from 1965-1971. A list of the licensing periods and more information is available at `http://webarchive.nationalarchives.gov.uk/20121030145806/http://og.decc.gov.uk/en/olgs/cms/licences/lic_rounds/past_licensing/past_licensing.aspx`, last accessed on August 10, 2017.

After some initial drillings, there were no signs of significant upcoming discoveries. “By mid 1968 exploration in the British sector of the North sea had slumped” (Bamberg, 2000, p. 202). Myles Bowen from *Shell* is quoted as saying: “in May 1969 the view was that all the worthwhile gas fields in the Southern North Sea had been found, while the search for oil in the north was doomed to failure” (Whaley, 2010, p. 77). Accordingly, the first major discovery was a surprise even for industry experts, and all the more for voters and both parties.

In addition, our estimation does not only rely on the binary distinction between the pre- and post discovery period, but also uses the number and extent of discoveries over time. Although the probability of finding a new oil field could correlate with previous finds in nearby areas (Lei & Michaels, 2014), the degree of uncertainty is high, which is why the individual discovery year and its size (giant or smaller discovery) are regarded as exogenous (Arezki *et al.*, 2017). Overall, our findings do not rely on a specific choice regarding the estimation approach. We are able to show a robust positive effect in a simple pre/post-design, when using the timing of only giant discoveries or all discoveries, and applying various interactions of discoveries with the exogenous world oil price in a triple-difference design. Any potential changes in omitted variables would have to coincide with all these different operationalizations of the treatment to jeopardize our results.

It is crucial for the analysis that both countries feature comparable independence movements and secessionist parties. The *SNP* was established in the 1930s and *Plaid Cymru* in 1925, so that we observe the dependent variable *Secessionist vote share* for both regions over a sufficiently long time period. *SNP* and *Plaid Cymru* are also sufficiently alike to regard them as a treatment and control group facing – to a large extent – similar success in elections in absence of the treatment. Both parties emphasize their regions’ distinct cultural identities distinct (Fusaro, 1979) and promote regional interests and full independence for their respective region (Fusaro, 1979). They can be classified as nationalist left-of-centre parties (Mitchell *et al.*, 2012; Levy, 1995), usually strongly opposing what they call “English Tory government” (Levy, 1995, p. 296). The two parties also perceive themselves as belonging to the same category, for instance highlighted in a speech by *Plaid Cymru* leader Gwynfor Evans in 1974 (Fusaro, 1979, p. 365).

Oil was clearly deemed a crucial factor influencing electoral success by the parties themselves. This was visible in the *SNP’s* "It’s Scotland’s oil" campaign, which was perceived as a huge success by the party as well as by the public (Lee, 1976). The Scottish election study, conducted in 1979, shows that, among SNP voters, a large majority thinks that Scotland deserves a higher share of the revenues and stated that the

distribution of oil was important for their voting decision (Appendix K, Figure 13).[15]

There is no reason to assume Welsh voters or the *Plaid Cymru* would react to oil discoveries off the Welsh coast in a different way. Two anecdotal examples support this. First, *Plaid Cymru* also (unsuccessfully) attempted to run election campaigns on the issue of natural resources. Proclaiming the slogan 'Hands off Welsh water', it decried the overexploitation of Welsh springs to supply English cities (Collier & Hoeffler, 2006) and also protested against rising water charges in Wales (Levy, 1995). Second, in the 1970s *Plaid Cymru* leader Gwynfor Evans "constantly affirm[ed] that oil lies under the Celtic Sea, as if trying to wish it and Welsh independence into existence" (Lee, 1976, p. 307). The absence of differing trends in Figure 4 also suggests the absence of systematically differing trends in Scottish or Welsh identity (proxying for perceived preference heterogeneity) prior to the first discoveries.[16] Additionally, Appendix K shows that trust in the labor as well as in a potential conservative central government did not differ between Wales and Scotland initially. Of course, over time tensions about oil revenue distribution can affect trust in the central government endogenously.

Regarding the fiscal redistribution mechanism, our simple theoretical model postulates that all resources are pooled at the central level and then redistributed. In that regard, the UK resembles our simplified case quite well. All state revenues from oil accrue to the central government in England, so the Scottish government currently does not profit directly from more oil or higher prices. Regional transfers were mostly based on fixed formulas, since 1888 the "Goschen formula" and from 1979 to 2001 the "Barnett formula" (Bryant, 2006, pp. 54-55). Although there are no data on fiscal transfers for our full sample period, all sources report that the level of public spending that Scotland receives is not lower than that of Wales. Crucially for our setting, there was no potentially problematic sudden change in transfers coinciding with the first discoveries, and pure trend differences arising due to the "Barnett formula" are picked up by a specification with a Scotland-specific time trend. Moreover, voters are clearly aware of the relationship between pooling oil revenues and regional redistribution. In a poll conducted for the Daily Telegraph in Scotland in April 2007, 48% said the statement "The tax revenues from North Sea Oil belong to Scotland; when these are taken into account, Scotland subsidizes the rest of the UK" comes closest to their own view.[17]

[15] Surveys can at best provide an indication, for instance because people might be reluctant to cite assumedly egoistic economic reasons as their motivation to vote. As suggestive evidence, even in the referendum in 2014, when oil prices were very low, 20% of voters opting for independence named oil as their reason. Source: www.lordashcroftpolls.com, accessed and downloaded March 9, 2018. In earlier years, shares seem to have been similarly high. In 1978, 21% cited North Sea Oil as an important issue when asked about devolution, see https://ems.ipsos-mori.com/researchpublications/researcharchive/2806/Scottish-Devolution-Survey-April-1978.aspx, last accessed March 9, 2018.

[16] Although there is no time-varying measure for regional identity, survey data from the Scottish and Welsh election study in 1979 shows that even 9 years after the first discovery, Scottish regional identity had not become stronger than Welsh identity (see Appendix E).

[17] See https://reformscotland.com/wp-content/uploads/2008/11/fiscal_powers.pdf, last accessed April 10, 2018.

Figure 4 shows the constituency level electoral results prior to the first oil discovery in 1970, as well as their average trend separately for Wales (light red) and Scotland (dark blue). We observe nearly indistinguishable linear parallel trends. If anything, the trend of *Plaid Cymru* is a little more positive, biasing against finding a positive effect for the *SNP* after the oil discoveries following 1970. Regressing a Scotland-specific linear time trend on *Secessionist vote share* prior to 1970 also yields an insignificant coefficient (p-value = 0.699).

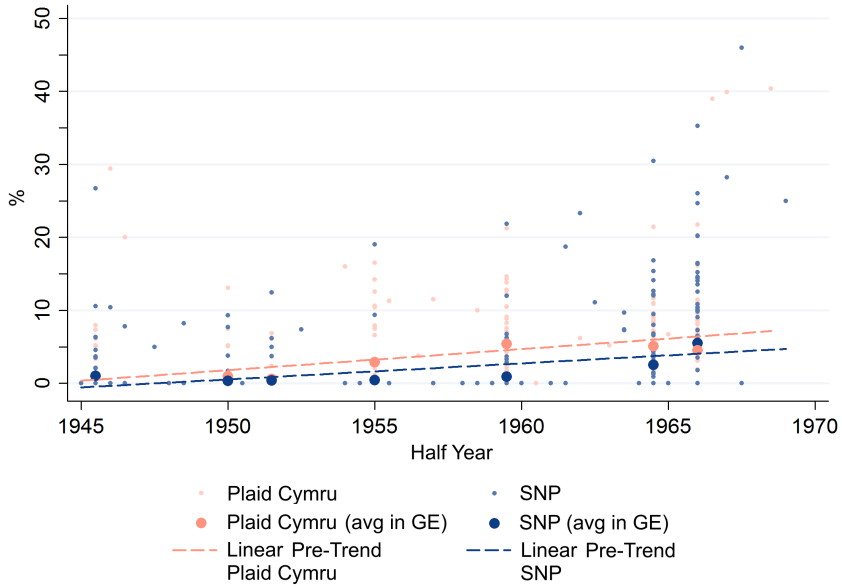

Figure 4: **Linear Pre-Trends**

The graphic shows the share of votes received by the *SNP/Plaid Cymru* in elections before 1970. The dashed lines indicate the linear trends of the two parties in the period prior to the first oil discoveries. The unconditional linear trend of *Plaid Cymru*'s vote results is stronger than the trend of the *SNP*.

Our results do not depend on including control variables, which is what we ideally expect in a DiD design if the treatment is orthogonal to the controls. Nonetheless, we control for the most important macro developments for which regional data are available over the full time period. *Unemployment rate* indicates the rate of registered unemployed ("Claimant Count") for Scotland and Wales, respectively, as a yearly average.[18] *Regional GDP per capita*, measures the Scottish/Welsh GDP per capita as a percentage share of the UK average.[19] GDP can be considered as pre-determined and not as a bad control variable, since we use discoveries as a treatment and actual oil exploration usually begins several years after the discovery. Relative

[18] Data for *Unemployment rate* are retrieved from Mitchell (1988), for all years prior to 1965, and the Office for National Statistics (ONS) following the link `http://www.ons.gov.uk/ons/rel/lms/labour-market-statistics/june-2015/dataset--labour-market-statistics.html`, last accessed on 26th October 2018, for the subsequent years.

[19] Both regional GDP and unemployment should also pick up changes in Wales due to the decline of the coal industry, on which we have no detailed data itself. Data sources: Regional Accounts (Office for National Statistics), for 1971-2001; Scott (2004, p. 338), for 1951, 1954, 1958, 1962, 1966; Lee (1995, pp. 53-57), for 1945-1970 (for Scotland; approximately from graphic); missing values for Wales in the 1940s, 1950s, and 1960s are filled using a linear approximation. Values for Wales before 1951 are assumed as constant.

government expenditure is not accessible for the entire period, but given the mechanical distribution of revenues based on the "Goschen" and "Barnett" formula this should not be an issue. Further variables to test for heterogeneous effects are described in section 5.2. The data cover the 1945-2001 period and include a maximum of 1883 constituency-half-year observations. Descriptive statistics are provided in Table 2.

Table 2: **Descriptive Statistics**

	N	*Mean*	*SD*	*Min*	*Max*
Secessionist vote share	1883	10.25	11.89	0	67.05
Discoveries (giant)	1883	0.62	1.31	0	4
Discoveries (all)	1883	1.40	2.26	0	7
Amount of new reserves	1883	1.49	2.65	0	8.90
Scotland	1883	0.65	0.48	0	1
Oil price	1883	25.83	19.10	7.62	81.39
Unemployment rate	1883	4.95	3.11	1.80	13.10
GDP per capita	1883	90.58	5.21	78.50	102.40
Near border (50)	1883	0.25	0.43	0	1
Near border (75)	1883	0.40	0.49	0	1
Near border (100)	1883	0.58	0.49	0	1
Coastal access	1883	0.57	0.49	0	1
Distance to Aberdeen	1883	311.11	207.57	3.19	641.06
Avg. soil suitability	1883	3.76	1.26	0.17	5.32
Ruggedness index	1883	53.37	36.72	1.93	170.47

The table shows descriptive statistics for all variables used in the analysis over the 1945-2001 period. N = number of observations, Mean = arithmetic mean, SD = standard deviation, Min = minimum value, Max = maximum value. *Amount of new reserves* is measured in million stock tank barrels (MMstb.) in period *t* and *t-1*. *Discoveries (giant/all)* denotes the number of giant/all oil fields discovered in *t* and *t-1*. Distances are in kilometers. For details on the other variables see Appendix H.

Our main estimation equation is as follows:

$$\textit{Secessionist vote share}_{i,c,t} = \delta\, \textit{Discoveries (giant)}_t \times \textit{Scotland}_c + X'_{c,i,t}\gamma + \lambda_{c/i} + \vartheta_t + \tau_{i/c}T + \varepsilon_{i,t},$$

with *Secessionist vote share* being the vote share of the respective nationalist party in constituency i in region $c \in \{\textit{Scotland; Wales}\}$ at time t. The treatment effect is measured as δ, the coefficient of the interaction term of *Discoveries (giant)* and *Scotland* (the binary indicator for Scotland). It measures the average treatment effect on the treated (ATT); that is, the additional vote share of the *SNP* caused by one additional oil discovery compared to the counterfactual trend indicated by the performance of *Plaid Cymru*.

The main effect of *Discoveries (giant)* is captured by biannual FE ϑ. Depending on the specification, the main effect of *Scotland* is either captured directly by a binary variable λ_c or by fixed effects λ_i for each constituency. Using λ_i in the panel DiD-setting mainly serves to increase efficiency, but would also pick up any constituency-specific characteristics that are time-invariant, e.g., a specific culture or the degree of urbanity. X' is the vector containing the time-varying control variables. T is a linear trend variable and $\tau_{i/c}$

represents a region- or constituency-specific trend coefficient. Allowing for region-specific trends relaxes the common trend assumption by allowing linear region-specific trend deviations.[20] ε is the error term. Later, we also show specifications using a triple-differences design, which further alleviates potentially remaining concerns. Standard errors (two-way clustered, applying the implementation by Baum *et al.*, 2010) allow for arbitrary correlation both within constituencies and across units at one point in time. The results are robust to alternative clustering choices, as we discuss in detail later.

5 Main Results

5.1 Main Results

We start by looking at the simple fixed effects regression of the *SNP* vote share on the number of giant oil discoveries in the year of the election and the year before, focusing on within-Scotland variation only (Table 3, column 1). This estimation includes time fixed effects and the two time-varying control variables *Unemployment rate* and *GDP per capita*. Constituency fixed effects pick up any time-invariant omitted variables, but the estimates could still be biased by time-varying omitted factors. The conditional correlation is clearly positive. It indicates a treatment effect for *Discoveries (giant)* of 4.494, which is significant at the 1-percent level. One additional giant oil discovery would thus be linked to an increase of about 4.5 percentage points for the *SNP*. This treatment effect estimate might obviously be biased, as there could be omitted variables, which are correlated with oil discoveries and affect the vote share of the *SNP*.

Hence, we turn to the first DiD estimation in column 2. This specification includes Welsh constituencies, as well as time fixed effects, a binary variable that takes on the value of 1 for all constituencies within Scotland, and the interaction of this variable and the oil discoveries (*Discoveries (giant)* $\times$ *Scotland*). We focus on this interaction term, which is our treatment variable in the DiD setting. The DiD treatment effect of 3.262 is smaller, but remains significant at the 1-percent level. Column 3 relaxes the common trend assumption to some extent by adding a treatment-specific time trend, which would capture any linear deviation from the common trend assumption. The coefficient decreases only slightly to 2.862 and remains significant at the 1-percent level. Column 4 adds the region-specific control variables and constituency fixed effects. As any potential bias affecting the treatment effect would have to occur at the region level, constituency fixed effects mainly serve to increase the efficiency of the estimations. Including constituency fixed effects

[20] Technically, the common trend assumption refers to the change, i.e., the first derivative of the dependent variable. Instead, including treatment-specific trends only assumes parallel growth between treated and untreated units, i.e. the same second derivative, while the first derivative is allowed to differ. Note as well that all our results hold in a balanced panel excluding by-elections (see Appendix N, Table 17).

Table 3: **Regression Results**

Dependent Variable	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*
Scotland × Discoveries (giant)	-	3.261	2.862	1.923	1.926
		[0.799]	[0.744]	[0.882]	[0.898]
Scotland	-	2.263	−3.500	-	-
		[1.762]	[1.439]		
Discoveries (giant)	4.494	-	-	-	-
	[0.253]				
Unemployment rate	0.977	-	-	1.737	1.754
	[0.099]			[1.097]	[1.206]
GDP per capita	1.185	-	-	0.725	0.721
	[0.093]			[0.214]	[0.231]
p-value: *Scotland × Discoveries (giant)*	-	0.000	0.000	0.029	0.032
Biannual fixed effects	*no*	*yes*	*yes*	*yes*	*yes*
Constituency fixed effects	*yes*	*no*	*no*	*yes*	*yes*
Linear time trend Scotland	*no*	*no*	*yes*	*yes*	*no*
Constituency-specific time trends	*no*	*no*	*no*	*no*	*yes*
Adj. R-squared	0.58	0.50	0.52	0.74	0.83
Number of observations	1216	1883	1883	1883	1883

The table displays regression coefficients with standard errors in brackets. Standard errors are twoway-clustered on the constituency level and biannual level using the *ivreg2* command in Stata. *Discoveries (giant)* denotes the number of giant oil fields discovered in *t* and *t-1*. The unit of analysis is the constituency-half-year level and the sample covers the 1945-2001 period.

and control variables is related to a smaller treatment effect estimate of 1.923, which is significant at the 5-percent level. If our assumptions hold, inserting constituency-specific time trends in column 5 should also not affect the coefficient, as these would only capture the treatment-specific trend more precisely. Indeed, the coefficient remains almost identical.

Giant oil discoveries thus lead to an increase in the vote share of nationalist parties of about 2 percentage points. To take a conservative approach, we choose column 4, which yields the smallest treatment effect estimate, as our preferred specification for all further tests. In order to get a first rough idea of the economic impact of discoveries, we can consider the pre-election period directly after the first discovery: there have been 8 giant discoveries in the 1971-1974 period, so that a back-of-the-envelope calculation suggests that the initial rise of the *SNP* might have been fostered by as much as 16 percentage points.

Conceptually, an increase of Scottish resource wealth could also make it relatively less attractive for Welsh voters to support *Plaid Cymru* and secession, as they would lose their fraction of the transfers stemming from Scottish resources. In line with our model, the coefficient in Table 3 measures the effect of a change in relative, not absolute resource wealth. Nonetheless, it is also interesting to think about the absolute effect size. We can partly rely on our model to assess this magnitude. The benefit for Scotland is easy to compute.

It is the value of the resource revenue that is currently redistributed to other parts of the country. The loss of other regions is limited to the respective share of Scottish resources that they receive as transfers in the status quo. Assuming that fiscal transfers are approximately determined based on the population share of a region, we can estimate the potential size of the Welsh reaction and the share of the effect it might account for.

One approach is to assume that Welsh voters react proportionately to Scottish voters. This yields an absolute effect of 1.733, only slightly smaller than the relative effect. Note that this is already rather conservative, as oil discoveries and their size are in all likelihood more salient in the region possessing the resources. Figure 5 also shows two alternative boundedness computations. For the absolute Scottish effect to remain only barely statistically significant, Welsh voters would already have to react more than 2.456 times stronger than Scottish voters. For the absolute effect to become 0, we would even have to assume that Welsh voters react more than 10 times as strong (computations in Appendix J). Hence, we conclude that the absolute effect would also be of a meaningful size under plausible assumptions.

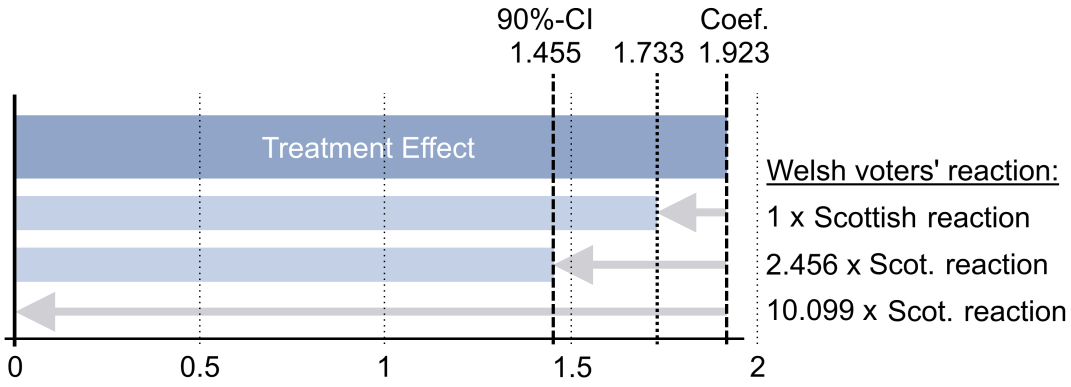

Figure 5: **Effect of Relative vs. Absolute Resource Wealth: Potential Reaction of Welsh Voters**

This figure displays the actual regression coefficient, i.e., the effect of relative changes (dark blue), as well as the potential effects of absolute changes in (light blue) based on hypothetical reactions of Welsh voters. The number on the right hand side indicates how strong Welsh voters would need to react relative to Scottish voters to reach the displayed coefficient size. The calculation is explained in Appendix J.

This supports our hypothesis that separatist parties can exploit changes in regional resource wealth as a signal of the potential benefits of secession, which they try to communicate to voters and instrumentalize in their campaigns. It seems likely that voters also take further years prior to the election into account when making their electoral choices. We examine this in two ways, returning to the main specification. First, we code variables that count the number of giant discoveries over the last 2, 3, and 4 years prior to the election in year t. *A priori*, we would expect that the effect is decreasing the longer the time period over

which they accumulate. Voters most likely only incompletely remember all past events, so that a certain share will not take them into account in their optimization decision any more as time passes by. This is exactly what we observe: the treatment effect decreases from 1.923 in column 1 to 1.309 in column 4 (at the same time the standard errors decrease even more).

We are also interested in knowing whether voters react stronger if the number of additional discoveries per year is stable over the course of several years. A steady series of oil discoveries affirms voters that there are indeed potential benefits of secession. Row 2 in Table 4 shows the coefficients of the individual regressions. The treatment effect increases from 3.487 for average discoveries in the election year and the year prior to election, to 6.545 if the number of discoveries per year is confirmed over the four years prior to an election. This is to some degree mechanical and what we would expect: compared to considering the average discoveries over the last two years, an increase by one unit in average discoveries over the course of four years means that there were twice as many additional discoveries in total. It is also plausible that voters react more cautiously to single discoveries until further finds reduce the uncertainty about the long-term economic benefits of these regional resources, which the *SNP* claims in its campaigns. Using another rough calculation, this suggests that the initial rise of the *SNP* was fostered by 6.545 times the 1.8 discoveries per year (the average in the 1971-1974 period), equalling about 12 percentage points.

Table 4: **Regression Results – Sum and Average Number of Oil Discoveries**

Dependent Variable: *Secessionist vote share*	$t=\{-1,0\}$	$t=\{-2,-1,0\}$	$t=\{-3,...,0\}$	$t=\{-4,...,0\}$
$\sum$ *Discoveries (giant)*$_t$ × *Scotland*	1.923	1.555	1.365	1.309
	[0.882]	[0.483]	[0.425]	[0.390]
Discoveries per year (giant)$_t$ × *Scotland*	3.847	4.664	5.462	6.545
	[1.765]	[1.448]	[1.701]	[1.949]
	$t=\{-1,0\}$	$t=\{-2,-1,0\}$	$t=\{-3,...,0\}$	$t=\{-4,...,0\}$
$\sum$ *Discoveries (all)*$_t$ × *Scotland*	0.718	0.585	0.521	0.483
	[0.266]	[0.193]	[0.165]	[0.135]
Discoveries per year (all)$_t$ × *Scotland*	1.437	1.754	2.083	2.414
	[0.533]	[0.580]	[0.660]	[0.676]

The table displays coefficients of 16 individual regressions with standard errors in brackets. All estimations also include constituency fixed effects, biannual time fixed effects, a linear time trend for Scotland as well as the control variables *GDP per capita* and *Unemployment rate* (as in Table 3, column 4). Standard errors are twoway-clustered on the constituency level and biannual level using the *ivreg2* command in Stata. $t = \{-x, 0\}$ denotes the sum/average number of (giant) oil discoveries in t and the x years prior to t. The sample covers the 1945-2001 period and the number of observations is 1883 at the constituency-half-year level.

Rows 3 and 4 in Table 4 serve as a robustness tests using the number of all discoveries (*Discoveries (all)* × *Scotland*in row 3, and *Discoveries per year (all)* × *Scotland*, row 4). While it is common in the literature to use giant oil discoveries, which are more likely to be noticed (see, e.g., Lei & Michaels, 2014), it would increase

our confidence in the results if they hold for a larger sample of discoveries as well. We use all discoveries above 50 MMstb. since smaller oil fields are unlikely to have any economic significance. As expected, row 3 and 4 show lower coefficients compared to row 1 and 2. Anything else would have been surprising: as the average discovery is now much smaller in size, the additional effect of an additional discovery on *Secessionist vote share* should be smaller in a linear regression framework. However, all coefficients are significant at the 1-percent level. Moreover, they further support the pattern we observed before, with larger coefficients for a steady flow of discoveries over several years (columns 2-4).

It seems intuitive that voters react to the number of discoveries, and more so to giant discoveries, which cross a certain threshold to make it into the news regardless of being instrumentalized by the nationalist party or not. Still, it is also informative whether voters also react to the amount of oil that is discovered. This is less obvious than it seems: while more oil is related to higher benefits of secession, it is unlikely that voters gather detailed information about the exact extent of the oil resources. The effect might thus not be linear in the *Amount of new reserves*, or at least it is a less precise measure of the signal that the voters actually receive.

Table 5: **Regression Results – Amount of New Oil Reserves**

Dependent Variable: *Secessionist vote share*	$t=\{-1,0\}$	$t=\{-2,-1,0\}$	$t=\{-3,...,0\}$	$t=\{-4,...,0\}$
$\sum$ *Amount of new reserves*$_t$ × *Scotland*	0.735	0.787	0.655	0.532
	[0.494]	[0.277]	[0.217]	[0.168]
Amount of new reserves per year$_t$ × *Scotland*	1.470	2.362	2.621	2.661
	[0.988]	[0.831]	[0.869]	[0.838]

The table displays coefficients of 8 individual regressions with standard errors in brackets. All estimations include constituency fixed effects, biannual time fixed effects, a linear time trend for Scotland as well as the control variables *GDP per capita* and *Unemployment rate* (as in Table 3, column 4). Standard errors are twoway-clustered on the constituency level and biannual level using the *ivreg2* command in Stata. $t=\{-x,0\}$ denotes the sum/average amount of new discovered oil reserves in t and the x years prior to *t*. The sample covers the 1945-2001 period and the number of observations is 1883 at the constituency-half-year level.

Table 5 shows the results, first focusing again on the cumulative amount of oil discovered in all fields (row 1), and then on the average amount of oil discovered per year (row 2). The coefficients remain positive throughout in both cases. They become statistically significant at the 1-percent level when the amount of oil discovered is confirmed over a course of at least three years. Again, the results are in line with the hypothesis that voters react more strongly when the signals are confirmed over a longer period of time. Exploring the coefficients and standard errors also indicates that the exact amount of oil discovered is a much noisier measure of what voters actually perceive, indicating that it is best to use the number of discoveries as a proxy. Discovering an additional 1000 MMstb. of oil per year over the previous four year period leads to an increase in the *SNP's* vote share of about 2.5 percentage points. In terms of economic

significance, discoveries of 4000 MMstb. (about the scope of the discoveries in the early 1970s) explain an increase of around 10 percentage points in the *SNP*'s vote shares.

To sum up the findings and their interpretations so far, there is a strong positive correlation between *Discoveries (giant)* and the vote share of the nationalist *SNP* party in a standard FE regression. The causal average treatment effect on the treated from the DiD design, using Wales as a control group, yields a lower, but still highly significant coefficient. One additional giant oil discovery leads to an increase in *Secessionist vote share* of about 2 percentage points. We interpret this as the voters' reaction to the change in the benefits of separation. Further tests, taking into account several years prior to an election, support the robustness of our results and show that the effect becomes stronger if there is a steady series of discoveries over a longer course of time.

5.2 Heterogeneous Effects

This section examines whether there are heterogeneous effects across constituencies within Scotland. Table 6 assesses which voters are more receptive to secessionist claims based on regional resources. We consider three dimensions that heterogeneous effects could be based on to learn more about voter behavior: differences in other benefits from a larger union, the salience of regional resources, and economic geography. Note that this goes beyond the scope of our theoretical model, which assumes that factors like benefits from trade or preference heterogeneity are constant within regions.

If constituencies differ within regions, this could moderate the effect of increased regional resource value. Within a certain distance, commuting to work in England is feasible for people in Scotland or Wales and there will be more direct short-distance trade. Those voters are then involved in different discussions at work, get partly different media outlets, and are less exposed to *SNP* campaigns. To test this hypothesis, we coded whether a constituency was within 50, 75 or 100 km of the English border, and interacted these dummy variables with the treatment effect. Columns 1-3 show the results. The coefficient of the interaction term is about -1.5 for both the 50 and 75 km buffer, with standard errors around 0.5. In line with our expectations, the effect becomes smaller when our binary indicator also includes those within 75 to 100 km distance; it decreases to -0.456 and becomes statistically insignificant. Taking the main effect into account, the marginal effect is close to zero for those living in constituencies with proximity to England.

Secondly, we want to examine whether voters who are more directly affected by oil processing and whose jobs are potentially tied to the oil industry react differently with regards to nationalist party support. Column 4 shows the interaction of the treatment effect with a binary variable indicating coastal access of a constituency, capturing a port from which ships could leave to the oil rigs and potential jobs related to the oil industry.

Table 6: **Regression Results**

Dependent variable	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*
Scotland × Discoveries (giant)	1.634	2.313	2.104	0.831	5.718	2.508	2.339
	[0.870]	[0.848]	[0.947]	[1.098]	[1.076]	[1.186]	[0.846]
Scotland × Discoveries (giant) × Near border (50)	−1.417	-	-	-	-	-	-
	[0.577]						
Scotland × Discoveries (giant) × Near border (75)	-	−1.498	-	-	-	-	-
		[0.423]					
Scotland × Discoveries (giant) × Near border (100)	-	-	−0.456	-	-	-	-
			[0.686]				
Scotland × Discoveries (giant) × Coastal access	-	-	-	1.716	-	-	-
				[0.615]			
Scotland × Discoveries (giant) × Distance to Aberdeen	-	-	-	-	−0.009	-	-
					[0.004]		
Scotland × Discoveries (giant) × Avg. soil suitability	-	-	-	-	-	−0.201	-
						[0.291]	
Scotland × Discoveries (giant) × Ruggedness index	-	-	-	-	-	-	−0.006
							[0.006]
Biannual fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Constituency fixed effects	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Linear time trend Scotland	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*	*yes*
Adj. R-squared	0.75	0.75	0.74	0.75	0.75	0.74	0.75
Number of observations	1883	1883	1883	1883	1883	1883	1883

The table displays regression coefficients with standard errors in brackets. All estimations include constituency fixed effects, biannual time fixed effects, a linear time trend for Scotland as well as the control variables *GDP per capita* and *Unemployment rate* (as in Table 3, column 4). Standard errors are twoway-clustered on the constituency level and biannual level using the *ivreg2* command in Stata. The main effects of the variables capturing potential heterogeneity are captured by the constituency fixed effects. *Discoveries (giant)* denotes the number of giant oil fields discovered in *t* and *t-1*. The unit of analysis is the constituency-half-year and the sample covers the 1945-2001 period.

While the main treatment effect remains positive, the positive interaction term with a point estimate of 1.716 and a standard error of 0.615 indicates that the effect of an oil discovery is higher if a constituency possesses coastal access. The simple binary measure still exhibits quite a bit of measurement error, e.g., as the Western coast of Scotland is not directly affected by oil regardless of its coastal access. Therefore, we also computed the distance to Aberdeen as a more precise measure and interact it in the same manner. Aberdeen is the main port serving offshore oil rigs and is often called the *Oil Capital of Europe*, with about half a million jobs being estimated to depend on the energy sector.[21]

The interaction term is negative with a point estimate of 0.009 and statistically highly significant. Hence, the closer to Aberdeen a constituency is, the stronger the effect of additional oil discoveries. There are two potential explanations for this difference. The first is that workers or companies in the oil industry might expect to be able to influence an independent Scottish government to a higher degree than the UK government, so that the oil industry would receive more support or that (for instance environmental) regulations would be relaxed. Accordingly, those in Scotland directly attached to the oil industry would profit to a larger degree from a Scottish government acting more in line with their preferences. A second explanation, based on the political science literature, would be the issue salience hypothesis. Parties have issue reputations, i.e., in our context, when people think of North Sea oil, the *SNP* is perceived as the party with the highest competence to handle this issue. The effect of an issue reputation on voter behavior is moderated by the attention and perceived importance of the respective issue (Bélanger & Meguid, 2008). For voters with coastal access and those closer to Aberdeen the issue of oil revenues and their distribution is potentially more salient. If that is the case, the positive effect of each discovery on secessionist party support should be relatively more pronounced.

Thirdly, we test whether the economic geography of constituencies affects our treatment effect. For that matter, we compute how suitable a district is to produce one of three main agricultural crops (potato, wheat, barley) and how rugged and therefore difficult to access and travel the constituency is. It seems possible that districts, which are very suitable for agriculture, would care less about revenues from other resources, and more rugged districts could be differentially affected for various reasons. In both cases, the interaction terms does not suggest that this influences the treatment effect. Both terms are negative, but far from conventional levels of significance. Thus, the effect of oil discoveries is not significantly altered by these considerations. Across the whole table, the main treatment effect always remains positive.

[21] See, e.g., *BBC* from May 27, 1997 at http://news.bbc.co.uk/2/hi/business/3236703.stm, last accessed on 26th October 2018. Appendix L depicts the spatial distribution of the vote gains for the *SNP* following the oil discoveries in the 1970s compared to the 1960s.Increases in vote shares were clearly higher for constituencies closer to Aberdeen and further away from the English border.

5.3 Robustness and Triple-Differences

5.3.1 Robustness: Standard Errors and Correlated Shocks

This final section considers possible remaining concerns regarding the causal interpretation of our results. Recall that the relationship between treatment and outcome is already graphically clearly detectable and varies with individual oil discoveries, not only by pre- and post-treatment period. The results remain significant when using only giant oil discoveries, which are scarcer and more credibly exogenous, or all discoveries, which are more frequent. There are two categories of concerns remaining that we want to discuss. First, different options to estimate the standard errors. Second, correlated shocks, referring a potential overlap of oil discoveries with other events influencing the relative success of the two parties.

Appendix M shows and explains that our main results in Table 3 are robust to all sensible choices of clustering the standard errors, including clustering at the region-times-decade level and using a wild-cluster bootstrap approach. Simulation evidence indicates that this approach yields consistent estimates even for few clusters (Cameron & Miller, 2015). For the sake of completeness, we also run specifications that cluster solely on the constituency or time level, and we use panel-corrected standard errors which model auto-correlation more specifically. In all specifications, the null hypothesis (the coefficient of the variable of interest being zero) is rejected with standard p-values of at least 0.05 or less, and with p-values between 0.066 and 0.100 for the wild-cluster simulations (see Appendix M, Tables 11-16).

Table 7 addresses our remaining concerns from the second category. First, we use a simple pre-/post-1970-specification to quantify the average size of the effect in such a setting. Estimated that way, the average effect of having oil in Scottish waters is 10.438 percent (column 1). To alleviate concerns that the relatively better development of the *SNP* since 1970 coincides with a change toward better or more charismatic party leaders, we code decade dummies in a way that one of the decades ends in 1969, just before the first major discovery in Scotland. One nice feature is the large overlap of the decade fixed effects with leader tenures in the *SNP* in the periods most interesting to us (see Appendix D). Of course, they also capture other factors like structural shocks that affected the Scottish and Welsh economy differently. We then include treatment×decade fixed effects, so that the treatment effect is only identified based on variation within decades.[22] Our treatment effect increases to 2.751 in this specification, with a p-value of 0.018 (column 2).

A second way to account for a possible relative upward trend in party leadership or other aspects of party attractiveness for the *SNP* after 1970 is to interact the Scotland-specific time trend with a pre-/post-1970

[22] Although these estimates are not necessarily unbiased, it is interesting to see that the coefficients and p-values of the decade fixed effects suggest no significant trend differences in prior decades relative to the first decade with relevant oil discoveries (1970-1979). The results are also unaffected when we exclude the years 1997 to 2001, after Scotland already gained additional political competences in the devolution process (Appendix N, Table 20, column 4).

Table 7: **Regression Results – Robustness**

Dependent variable:	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*
Scotland × Discoveries (giant)	-	2.629	2.534	1.819	3.222
		[0.313]	[0.824]	[0.839]	[0.849]
Scotland × Disc. (giant) (lead)	-	-	-	-	−1.521
					[1.506]
Scotland × Post-1970 Indicator	10.438	-	-	-	-
	[2.356]				
P-value	0.000	0.000	0.002	0.001	0.000
Number of observations	1883	1883	1883	1883	1680

The table displays regression coefficients with standard errors in brackets. All estimations include constituency fixed effects and biannual time fixed effects. Standard errors are twoway-clustered on the constituency level and biannual level using the *ivreg2* command in Stata. *Discoveries (giant)* denotes the number of giant oil fields discovered in *t* and *t-1*. The unit of analysis is the constituency-half-year and the sample covers the 1945-2001 period. Column 1 only contains a binary post-treatment indicator. Column 2 includes decade fixed effects interacted with a binary indicator for Scotland. Column 3 contains constituency-specific time trends that are allowed to have a different slope Post-1970. Column 4 contains constituency-specific time trends and a binary indicator for Margaret Thatcher's term in office interacted with a binary indicator for Scotland. Column 5 contains a lead variable measuring discoveries in t+1 and t+2 (omitting by-elections).

binary indicator. Column 3 shows that although the post-1970 trend is positive, the effect of individual discoveries (now identified only off of deviations from the trend) remains comparable at 2.534 with a p-value of 0.002. Similarly, controlling for the electoral term of Margaret Thatcher, who was a particularly disliked figure and and is associated with the decline of the coal industry in Wales, does also not affect our results (column 3). Finally, even though the literature clearly suggests that the exact size and timing of discoveries is unpredictable, we can include a lead-term of the giant discoveries to test for potential pre-trends even more directly. The lead-effect measuring discoveries in the subsequent election period is insignificant and our main effect remains robust and significant (column 4). Appendix N provides more detailed results.

5.3.2 Triple-Differences: Exploiting Exogenous Changes in the World Oil Price

To further confirm that the effect we measure is really driven by economic concerns about independence and no other Scotland-specific events, we make use of another plausibly exogenous variation. If voters react to changes in the benefits from secession, as we hypothesized, oil discoveries the monetary value of the discovered oil should also positively affect *Secessionist vote share*. We use the interaction between the average yearly world market price for oil and the amount of discovered oil times the Scotland dummy to

test this hypothesis.[23]

We follow the bulk of the existing literature and treat changes in the world market oil price as exogenous (Arezki & Brückner, 2012, 2011), which seems a plausible assumption in our case. One potential concern would be that both supply and demand in Scotland are related to the oil price and secessionist party success. This is a valid concern for large producers like the Arab countries, or countries that represent a sizeable share of world demand like the US (Kilian & Park, 2009), but the effect of variations in Scottish oil production and demand on the world oil price are widely estimated to be negligible. If regional resource value is driving nationalist party success, oil discoveries should matter more when the oil price is higher, i.e., when their net value as a potential benefit of secession is larger. The regression equation now becomes:

$$\begin{aligned} &\textit{Secessionist Vote Share}_{i,c,t} = \delta\, \textit{Discoveries}_t \times \textit{Scotland}_c + \theta\, \textit{Scotland}_c \times \textit{Price}_t \\ &+ \eta\, \textit{Discoveries}_t \times \textit{Scotland}_c \times \textit{Price}_t + X'_{i,t}\gamma + \lambda_i + \vartheta_t + \tau_c T + \varepsilon_{i,t}, \end{aligned}$$

and we focus on the triple interaction coefficient η. We show results for the interaction with all the different proxies for the positive oil shocks that we have used so far (*Discoveries (all)*, *Discoveries (giant)*, *Amount of new reserves (all)*, and *Amount of new reserves (giant)* in the year of and the year before the election). This ensures that a positive finding is not due to the choice of the proxy variable. Appendix N, Table 18 shows the full results including all coefficients and Table 19 shows results using the different period lengths as in Table 4.

Table 8: **Regression Results – Triple-Differences with World Oil Price**

Dependent variable: *Secessionist vote share*	*Discoveries (all)*	*Discoveries (giant)*	*Amount of new reserves*	*Amount of new reserves (giant)*
$X \times$ *Scotland* $\times$ *Oil price*	0.078	0.174	0.045	0.047
	[0.021]	[0.064]	[0.013]	[0.014]
p-value: $X \times$ *Scotland* $\times$ *Oil price*	0.000	0.007	0.000	0.001

The table displays coefficients of 8 individual regressions with standard errors in brackets. X refers to the proxy for discoveries that is used in the respective column. All estimations include constituency fixed effects, biannual time fixed effects, a linear time trend for Scotland as well as the control variables *GDP per capita* and *Unemployment rate* (as in Table 3, column 4), and all main effects. Appendix N, Table 18 shows the full table. The price is for Brent Crude oil in 2001 constant US$. Standard errors are twoway-clustered on the constituency level and biannual level using the *ivreg2* command in Stata. The sample covers the 1945-2001 period and the number of observations is 1883 at the constituency-half-year level.

Table 8 presents the results of these triple-differences specifications. Column 1 displays the effect for *Discoveries (all)* and column 2 for *Discoveries (giant)*. The effect of an additional oil discovery is 0.078 percentage points higher if the oil price is $1 higher, and the effect of an additional giant oil discovery 0.174 percentage

[23] We choose the price for *Brent Crude* which is suitable for North Sea oil. *Brent* trades at a higher price than the other major classification *West Texas Intermediate* (*WTI*), but as both are close substitutes, the prices are strongly correlated. Even if one assumes that the oil price is endogenous, we can interpret the interaction between an exogenous variable and an endogenous variable as causal under relatively mild assumptions (cf., Dreher *et al.*, 2016).

points higher. This is a sizable difference. It would mean that the positive effect of one additional giant discovery is about 10 percentage points higher if the oil price is $100 instead of $40.

We find the same positive relationship when considering the interactions with the amount of discovered oil, no matter whether we include the amount of oil in all or only in giant oil fields. All triple-interaction effects are statistically significant with p-values smaller or equal to 0.007. The results support our prior DiD results showing that regional resource value fuels secessionism.[24] Voters react more strongly when the benefits of secession at the moment of voting are more lucrative. This is in line with the literature on the nexus between development aid or natural resources and conflict, where an increased "price" is linked to more separatist conflicts (e.g., Morelli & Rohner, 2015). As we hypothesized, it seems that comparable mechanisms are at play within democratic systems, which have been overlooked so far.

The triple-differences design offers another advantage. We can make use of it to implement a placebo test which also implicitly tests the DiD assumptions. If the differences between Scotland and Wales are really caused by an increase in the value of regional resources and not by some unobserved other factor, we would expect that the oil price has a positive effect after the first discovery. On the contrary, we should observe no effect before the first oil was discovered. Table 9 shows the results of two models: the first column includes all observations before the discovery of the first oil field in 1970; the second column covers all observations from 1970 onwards.

Table 9: **Pre- and Post-1970 Effect of the Oil Price**

Dependent Variable	*Secessionist vote share*	*Secessionist vote share*
Observation period	1945-1969	1970-2001
Oil price × *Scotland*	−0.268	0.125
	[0.251]	[0.045]
p-value: *Oil price* × *Scotland*	0.286	0.005
Adj. R-squared	0.54	0.81
Number of observations	841	1042

The table displays regression coefficients with standard errors in brackets. The first (giant) oil discoveries were in 1970. Both estimations include constituency fixed effects, biannual time fixed effects, a linear time trend for Scotland as well as the control variables *GDP per capita* and *Unemployment rate* (as in Table 3, column 4). Standard errors are twoway-clustered on the constituency level and biannual level using the *ivreg2* command in Stata. The unit of analysis is the constituency-half-year level.

[24] Note that, in accordance with our prior approach, we use new discoveries instead of the stock of discovered oil. We find it more plausible that voters react to changes in the value of newly discovered oil. Remembering or estimating the cumulative amount of discovered oil and subtracting already exploited oil imposes higher search and information costs on the voters. We also compute the amount of discovered and unexploited oil for each point in time. It shows only little variation over much of the sample period, as oil production is relatively small most of the time compared to the stock of oil. Even with this limited variation in the treatment variable, the interaction with the indicator for Scotland and the oil price is positive in the whole sample and becomes significant at the 5-percent level in the standard specification without the additional Scotland-specific time trend.

The results are very reassuring. Before 1970, there is no significant positive effect of the oil price for Scotland. In fact the coefficient is negative, but far from any conventional level of significance. At the same time, the coefficient is positive and highly significant in the period after the first discovery. This further confirms our confidence in the causal interpretation of our main results. The post-1970 results suggest that an oil price of $40 instead of $100 alone would lead to a drop in *SNP* electoral support of 7.5 percentage points. Relating to the unsuccessful Scottish independence referendum in 2014, in which the "no-option" gained 55.3 percent of the votes, the low oil price might have played a crucial role. This is not implausible. In Greenland, a non-binding referendum on more self-governance won in a landslide in 2008, but the drastic collapse in crude oil prices since 2015 that made most Arctic oil unprofitable led "Greenland to again put off plans to split from Denmark."[25]

Overall, across a wide range of specifications and proxy variables, we reject the notion that resource wealth only matters in the context of developing countries where it leads to secessionist conflicts (see, e.g., Collier, 2010; Ross, 2004a). It also contributes to the success of secessionist parties in established democracies.

6 Conclusions

Our paper augments the existing literature on the size of nations and sheds light on the factors that determine the success of secessionist parties. The main argument is that citizens take the value of regional resources into account when deciding whether to support secession or not. Secessionist parties can successfully exploit regional resources to increase their vote share. Based on a theoretical model, we document a stable and robust positive correlation between regional wealth and separatist party success. A 10 percentage point increase in relative wealth increases secessionist vote shares on average by 3.81 percentage points. To overcome the caveats of such a multi-country approach, we then turned to the United Kingdom to test whether we can establish a causal relationship between resource value and secessionist party vote share.

As we argue, Scotland and Wales are suitable counterfactuals, so that we can use the discoveries of North Sea oil as a natural experiment. Our constituency-level analysis covering all UK elections over the 1945-2001 period shows that Scottish voters react in an economically and statistically significant way to oil discoveries, which increase the perceived benefits of secession. In the DiD setting, the vote share of the *Scottish National Party*, the main advocate of a secession of Scotland from the UK, significantly increased by about 2 percentage points after the discovery of giant oil fields off the Scottish coast. Based on a myriad of robustness tests and alternative specifications, we rule out the possibility that this effect is driven by a

[25] See *The Economist* from July 15, 2012 at https://www.economist.com/graphic-detail/2012/06/15/hidden-treasures, from March 31, 2013 at http://www.economist.com/blogs/newsbook/2013/03/economist-explains-why-greenland-election-global-implications, and January 21, 2015 at https://www.economist.com/europe/2015/01/21/independence-on-ice. All last accessed October 26, 2018.

coincidental change in party leadership or other events unrelated to oil discoveries. Accordingly, this is to the best of our knowledge the first causal evidence of an effect of regional resource distribution on the strength of democratic secessionist movements.

This finding adds an important dimension to the literature on democratic secessionism and the size of nations. It also connects the literature relating resources and violent conflict in the developing country context with studies on economic factors influencing political outcomes and stability in established democracies. The causal effect of a change in regional resource wealth on separatist party support demonstrates that secessionism is not only driven by ethnic or cultural differences. Cultural factors like language and the weak dynamics of ethnic group affiliation may define a certain baseline support, but do not seem to account for the larger part of the variation in support for Scottish independence. In a nutshell: "if the *SNP* were to emphasize its *Scottishness* over its concern for the prosperity of the country, it would lose the vast majority of its voters, members, and probably most of its leaders" (Brand *et al.*, 1994, p. 629). This notion is mirrored by our back-of-the-envelope calculation, suggesting that oil discoveries fostered the initial rise of the SNP after 1970 by 12-16 percentage points. To assess external validity, we described numerous anecdotal examples where (partly exogenous) changes in regional resource value correlate with secessionist party success. It highlights that this mechanism is relevant for a large number of countries and settings.

Of course, certain requirements have to be met for regional resources to play a decisive role. First, the resource value must be so significant that it alters the costs and benefits of secession in a sizeable way. Second, resources must be geographically concentrated in a region that regards itself as a group with some kind of pre-existing common group identity on which a campaign can be built. Third, the economic gains from the respective regional resource are currently to some extent redistributed within the country. Exploring these questions in more detail, and also evaluating on the choice between secession or decentralization, should provide a fruitful area for future research.

Within Scotland, the failed referendum in 2015 indicates that in times of low oil prices the mere cultural differences are not enough to convince voters of the benefits of secession. The future will show whether a potential second attempt will prove more successful for the Scots. Ironically, there might be another dynamic developing in such a case. As some Westminster politicians like to argue, the Shetland Islands could subsequently aim at a secession from mainland Scotland, motivated by the fact that large parts of the oil resources actually lie within their theoretical maritime borders. Hence, regional resources and their distribution will continue to matter in the near and distant future. In light of these potentially turbulent future secession dynamics, we revisit and continue the initial quotation from *The Parable of the Wise and Foolish Virgins*:

> "Therefore keep watch, because you do not know the day or the hour." – Matthew 25, 13

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Appendix (for Online Publication)

Contents

A Multi-Country Panel Analysis

We created a new comprehensive data set of secessionist parties in regions in established democracies on which we base our multi-country panel analysis. The structure of our data set and the starting point for our estimations are two previous publications in political science by Massetti & Schakel (2013) (a) and Sorens (2005). We expand upon their data both regarding the included countries and regions, as well as with regard to the coverage of elections in existing regions. To this end, we collect data on regional and national GDP per capita, secessionist party vote shares, regional and national population over time, the seat distribution in regional and national parliaments, as well as the number of speakers of a distinct regional language. We explain the construction of our data set in detail below. In addition, a list of sources for each variable is provided in Table 1 below.

1. First, we compile a list of regions which have secessionist potential. This is done in two steps. In a first step we classify parties as either secessionist or not based on the variable *dum_ideology_cp* from the data set compiled by Massetti & Schakel (2013). In a second step, we collapse the data set at the regional level. Thereafter, we drop those regions where a secessionist party was listed on the ballot sheet, but which were not part of the party's secessionist plans. For instance, while campaigning for the independence of a northern Italian state, the *Lega Nord* (Northern League) was also listed as a party in Southern Italian regions. Our approach solves this issues by dropping the Southern regions (b). To follow the existing literature, we also also drop regions where secessionist parties never managed to gain more than 2 percent of the vote in a single election (c).

2. Furthermore, we expand upon this initial list by adding secessionist regions from Central and Eastern Europe, which fulfill the criteria stated above, but were not included by Massetti & Schakel (2013). Also we update the regions in Massetti & Schakel (2013) and collect more recent electoral data.

3. In a next step we increase the number of variables by adding information for relative wealth, regional language and regional population. We use the information from Sorens (2005) and fill the gaps, where possible, with own research (4).

4. Variables for relative wealth, secessionist vote share, as well as regional population are varying at the region-year level, the variable for the effective number of parties (*ENP*) varies at the region-year-election type level, and the variable for regional language is time-invariant.

Notes:

(a) The data are taken from the list *Ideology scores and electoral strength for 77 regionalist parties* provided by Arjan Schakel at https://www.arjanschakel.nl/index.php/regional-parties, last accessed on July 18, 2018.

(b) This choice of regions for countries that were already covered is based on Table A1 from the appendix of Massetti & Schakel (2016). For new countries, we check the party websites and manifestos to determine which regions are a part of their separatist claims.

(c) Many countries with proportional electoral systems have a percentage barrier, which bars parties that receive less than a certain amount of votes from taking seats in parliament. Most countries that have such a barrier apply it from 3 percent upwards (Belgium for example has a 5 percent barrier at the constituency level). Furthermore, depending on the constituency size, the effective percentage barrier can be much higher. We have decided to be somewhat more conservative in our approach and have hence only excluded parties that never managed to gain 2 percent of the vote.

(d) The sources are listed in Appendix Table 1.

Table 1: **Multi-Country Panel Data**

Variable Name	Description	Source
Secessionist vote share	Vote share of all separatist parties in a region in that election.	For cases from 1981 until 1999 Sorens (2005) as well as own collection and for cases 2000 until 2016 Massetti and Schakel (2013) as well as own collection.
Relative wealth	Ratio of regional GDP per capita to national GDP per capita	For cases from 1981 until 1999 Sorens (2005) and for cases 2000 until 2016 own calculation based on Eurostat.
Regional election	Is election a regional election? 1 = regional election 0 = national election	For cases from 1981 until 1999 Sorens as well as own collection and for cases 2000 until 2016 Massetti and Schakel (2013) as well as own collection.
ENP	Effective number of electoral parties ($N = \frac{1}{\sum_{j=1}^{n} s_{i,t-1}^2}$, where n is the number of parties and s is the number of seats won by party i in the most recent election)	Own calculation based on Sorens (2005) as well as own collection.
Population	Regional population in thousands	For cases from 1981 until 1999 Sorens (2005) as well as own collection and for cases 2000 until 2016 own calculation.
Regional language	Percentage of regional population speaking regional language.	Own calculation based on Sorens (2005) as well as own collection.

Table 2: **Regions and Parties Used in the Multi-Country Panel Regressions**

Country	Region	Parties	Years
Belgium	Flanders	Nieuw Vlaamse Alliantie, Vlaams Belang, Volksunie	1977 - 2014
Belgium	Wallonia	Rassemblement Wallonie France	2003 - 2007
Bosnia and Herzegovina	Republika Srpska	Alliance of Independent Social Democrats, Serb Democratic Party	1996 - 2014
Canada	Alberta	Western Canada Concept (1)	1982 - 1986
Canada	Quebec	Action democratique, Parti Québécois, Bloc Québécois, Parti Nationalist du Quebec, Quebec Solidaire, Rassemblement pour l'Indépendance National	1981 - 2015
Canada	Saskatchewan	Western Canada Concept (1)	1982 - 1991
Denmark	Faroe Islands	Fólkaflokkurin, Sjálvstýrisflokkurin, Tjóðveldi	1946 - 2018
Denmark	Greenland	Inuit Ataqatigiit, Siumut	1979 - 2018
France	Brittany	Union démocratique bretonne	2007 - 2017
France	Corse	Corsica Nazione, Accolta Naziunale Corsa, Pè a Corsica	1978 - 2017
France	New Caledonia	Front de Libération Nationale Kanak et Socialiste, Libération Kanak Socialiste, Parti travailliste	1988 - 2017
Germany	Bavaria	Bayernpartei	1946 - 2017
Italy	Aosta Valley	Union Valdôtaine, Stella Alpina, Federation Autonomiste, Vallée d'Aoste Vive, Renouveau Valdôtain, Union Valdôtaine Progressiste, Autonomie Liberté Participation Écologie	1978 - 2018
Italy	Friuli-Venezia Giulia	Lega Nord	1979 - 2018
Italy	Liguria	Lega Nord	1979 - 2015
Italy	Lombardy	Lega Nord	1975 - 2018
Italy	Piedmont	Lega Nord	1975 - 2014
Italy	Sicily	Movimento per l'Autonomia	2006 - 2017
Italy	Trentino-Alto Adige	Lega Nord, Die Freiheitlichen, Südtiroler Freiheit, Südtiroler Volkspartei, Union für Südtirol	1948 - 2013
Italy	Veneto	Lega Nord	1975 - 2015
Poland	Upper Silesia	Ruch Autonomii Slaska	1991 - 2014
Romania	Bihor	Uniunea Democrata Maghiara din Romania	1990 - 2012
Romania	Satu Mare	Uniunea Democrata Maghiara din Romania	1990 - 2012

Country	Region	Parties	Years
Romania	Székely Land	Uniunea Democrata Maghiara din Romania	1990 - 2012 (2)
Spain	Catalonia	Convergéncia I Unió, Esquerra Republicana de Catalunya	1977 - 2017
Spain	Galicia	Bloque Nacionalista Gallego	1977 - 2016
Spain	Basque Country	Euzko Alderdi Jeltzalea - Partido Nacionalista Vasco, Herri Batasuna - Heuskal Herritarrok - Batasuna, Eusko Alkartasuna, Euskadiko Ezkerra, Aralar	1977 - 2016
United Kingdom	Northern Ireland	Sinn Fein, SDLP	1945- 2017
United Kingdom	Scotland	SNP, Scottish Greens, Scottish Socialist Party	1945 - 2017
United Kingdom	Wales	Plaid Cymru	1945 - 2017

(1) We analyze only provincial elections in Canada, as the separatist party did not run at the national level.

(2) Results reported for Székely Land are the average of the counties Covasna, Harghita and Mures.

Table 3: **Descriptive Statistics**

	N	*Mean*	*SD*	*Min*	*Max*
Secessionist vote share	403	22.90	19.47	0	79.80
Relative wealth	403	98.31	21.77	44.64	154.41
ENP	396	3.84	1.51	1.00	9.35
Regional language	403	38.76	35.89	0	95.00
Regional population	403	3474.71	3272.56	45.38	12562.00

The table shows descriptive statictics for all variables used in the analysis over the 1970-2016 period. N = number of observations, Mean = arithmetic mean, SD = standard deviation, Min = minimum value, Max = maximum value.

Correlation between regional relative wealth and secessionist vote share:

Note that secessionist vote share in our model is a function of cultural and economic factors. We are interested in seeing whether economic factors have an influence beyond cultural factors. Accordingly, we are interested in whether there is on average a positive relationship between relative wealth and separatism. There are also changes in secessionist vote share that are driven by cultural factors and other incidents. For instance, a particular legislative decision or policy measure by the central government can strongly in- or decrease support for secession even without changes in relative regional wealth. Nonetheless, the following graphs show that on average there actually is a strong positive correlation between relative regional wealth and the vote share of secessionist parties.

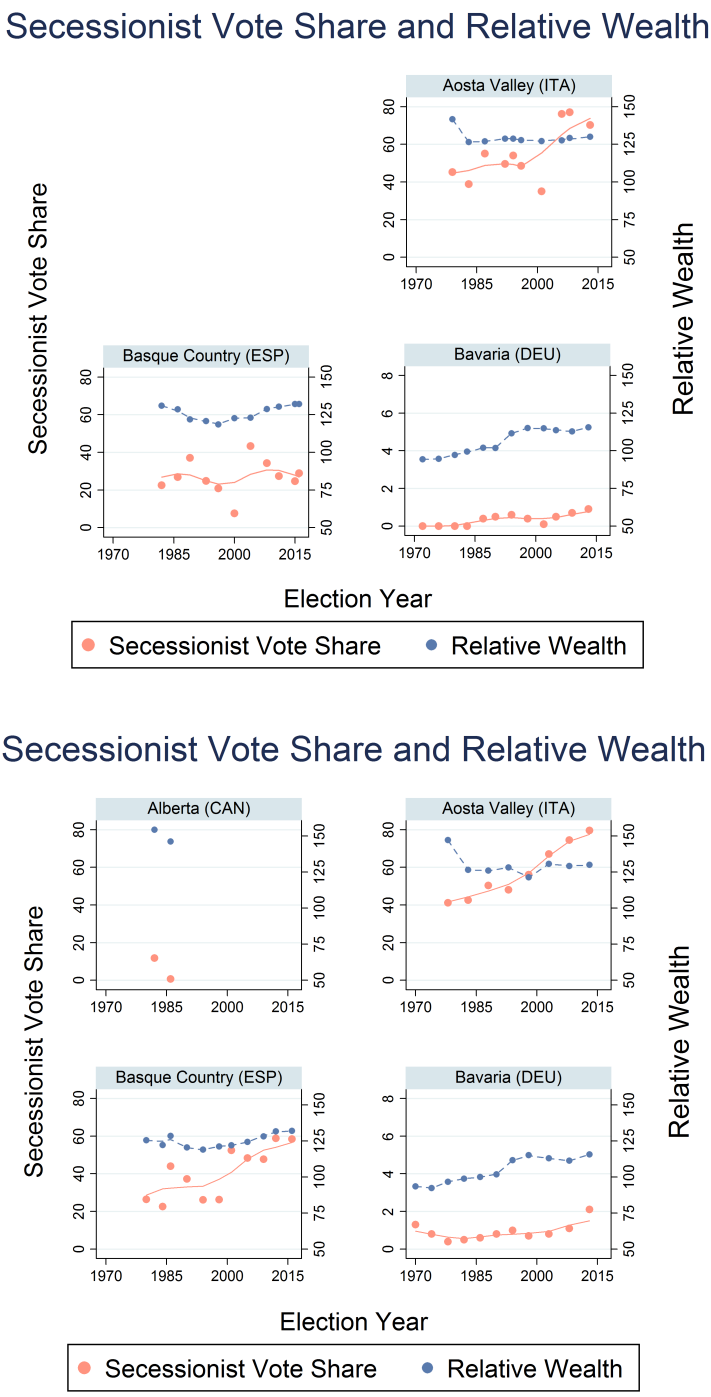


Figure 1: **Relative Wealth and Secessionist Vote Share**

The figures display relative wealth in blue, and secessionist vote share in light orange. The upper graphs depict the national elections, and the lower graphs the regional elections. Our specifications using region fixed effects explore variations in the two variables over time. The connecting lines are created using a lowess estimation in Stata.

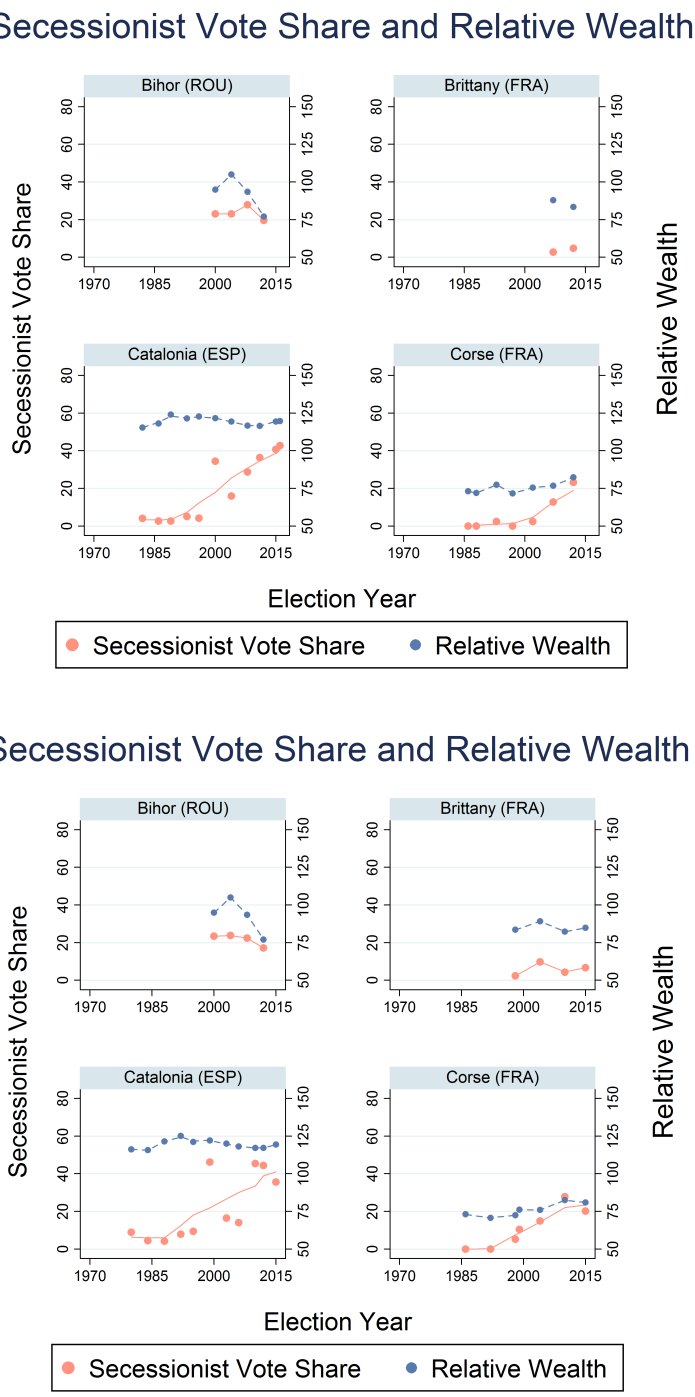


Figure 2: **Relative Wealth and Secessionist Vote Share**

The figures display *Relative wealth* in blue, and *Secessionist vote share* in light red. The upper graphs depict the national elections, and the lower graphs the regional elections. Our specifications using region fixed effects explore variations in the two variables over time. The connecting lines are created using a lowess estimation in Stata.

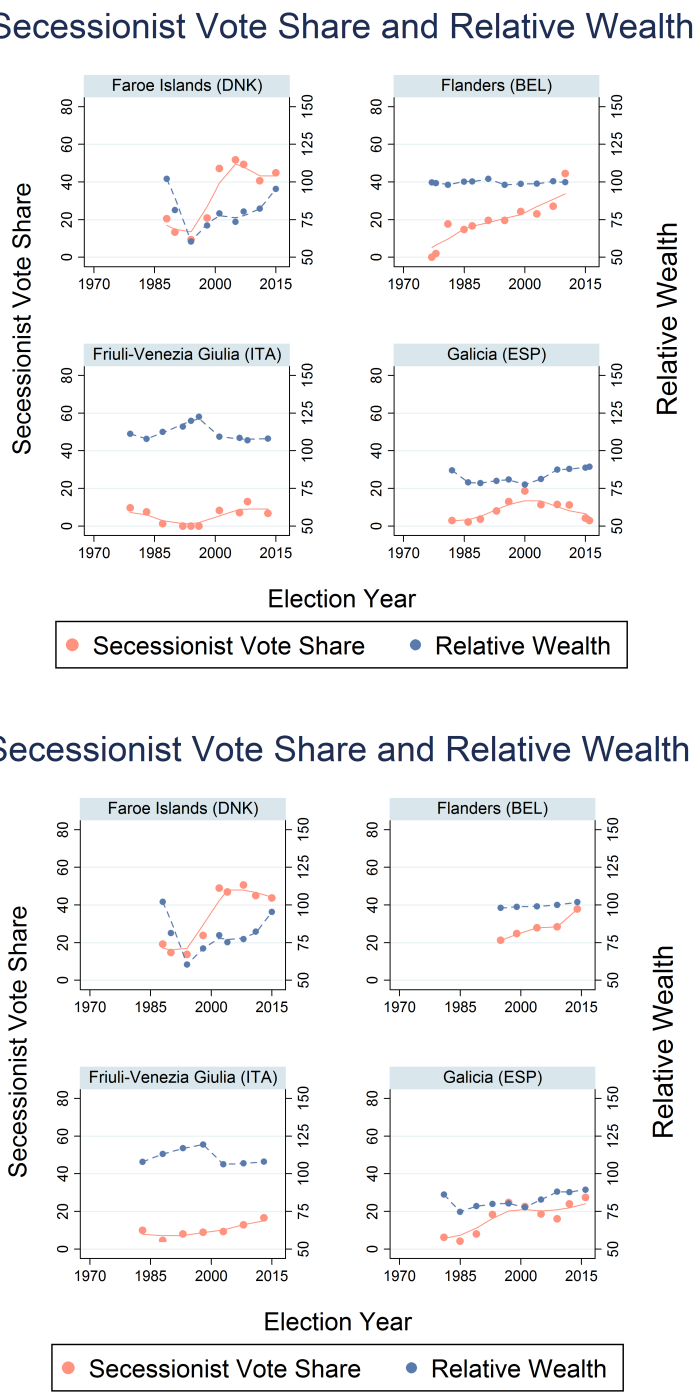


Figure 3: **Relative Wealth and Secessionist Vote Share.**

The figures display *Relative wealth* in blue, and *Secessionist vote share* in light red. The upper graphs depict the national elections, and the lower graphs the regional elections. Our specifications using region fixed effects explore variations in the two variables over time. The connecting lines are created using a lowess estimation in Stata.

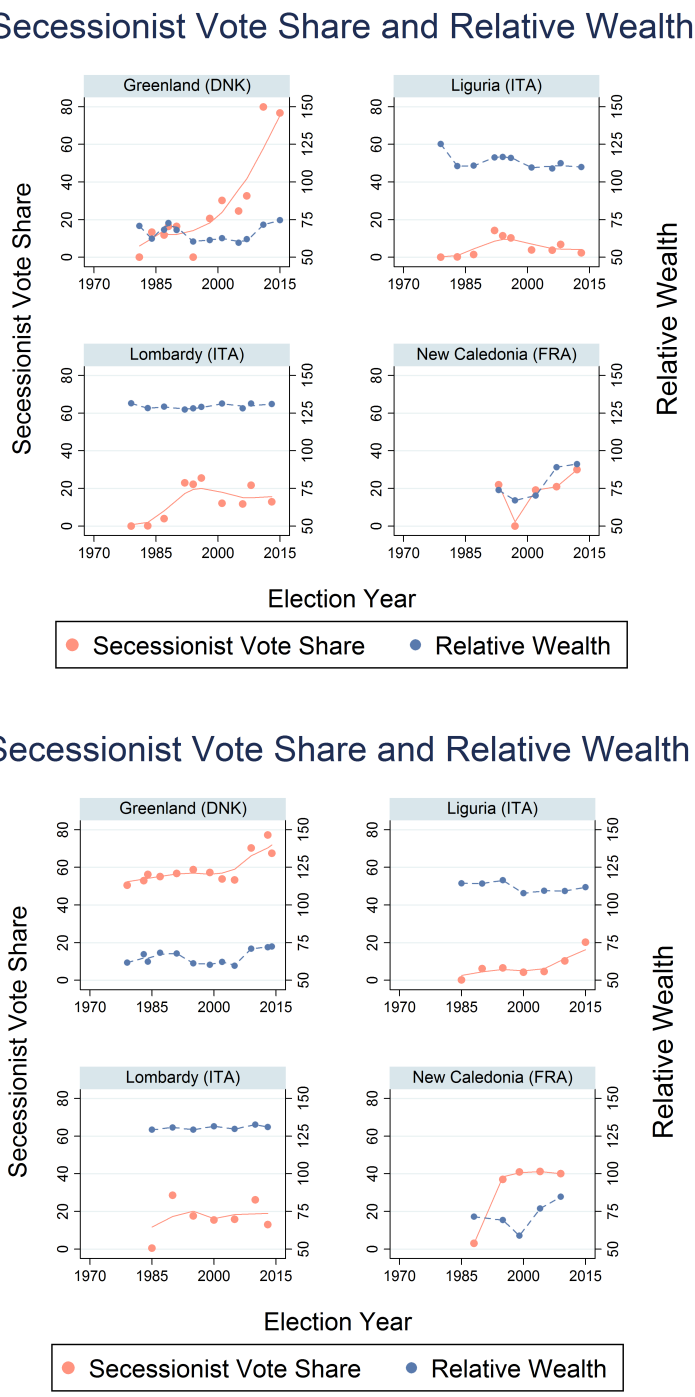


Figure 4: **Relative Wealth and Secessionist Vote Share**

The figures display *Relative wealth* in blue, and *Secessionist vote share* in light red. The upper graphs depict the national elections, and the lower graphs the regional elections. Our specifications using region fixed effects explore variations in the two variables over time. The connecting lines are created using a lowess estimation in Stata.

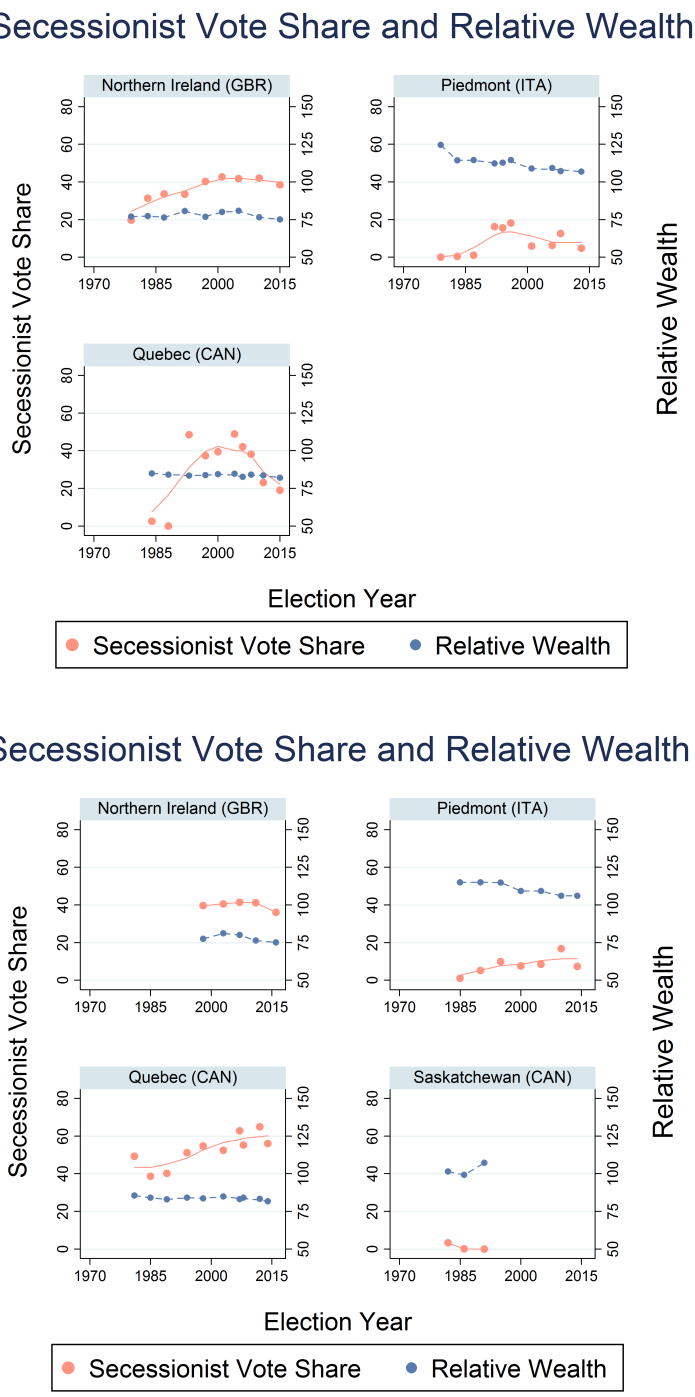


Figure 5: **Relative Wealth and Secessionist Vote Share**

The figures display *Relative wealth* in blue, and *Secessionist vote share* in light red. The upper graphs depict the national elections, and the lower graphs the regional elections. Our specifications using region fixed effects explore variations in the two variables over time. The connecting lines are created using a lowess estimation in Stata.

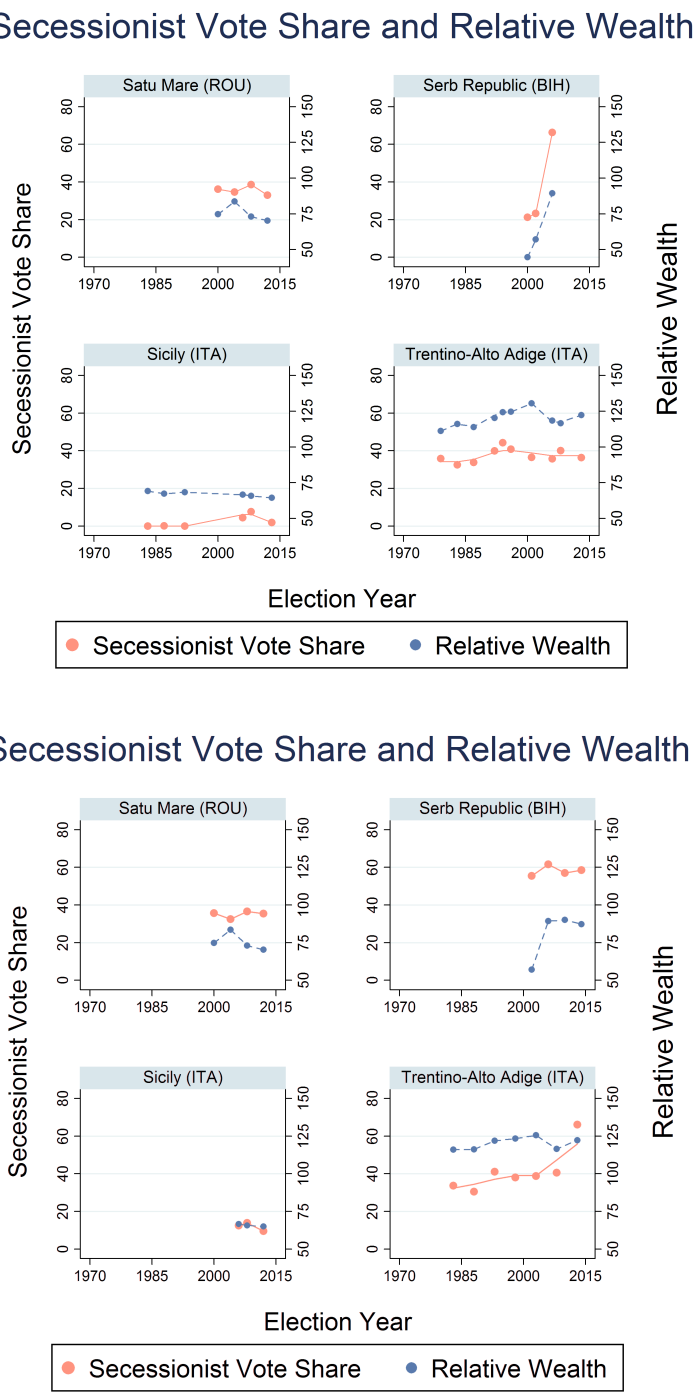


Figure 6: **Relative Wealth and Secessionist Vote Share**

The figures display *Relative wealth* in blue, and *Secessionist vote share* in light red. The upper graphs depict the national elections, and the lower graphs the regional elections. Our specifications using region fixed effects explore variations in the two variables over time. The connecting lines are created using a lowess estimation in Stata.

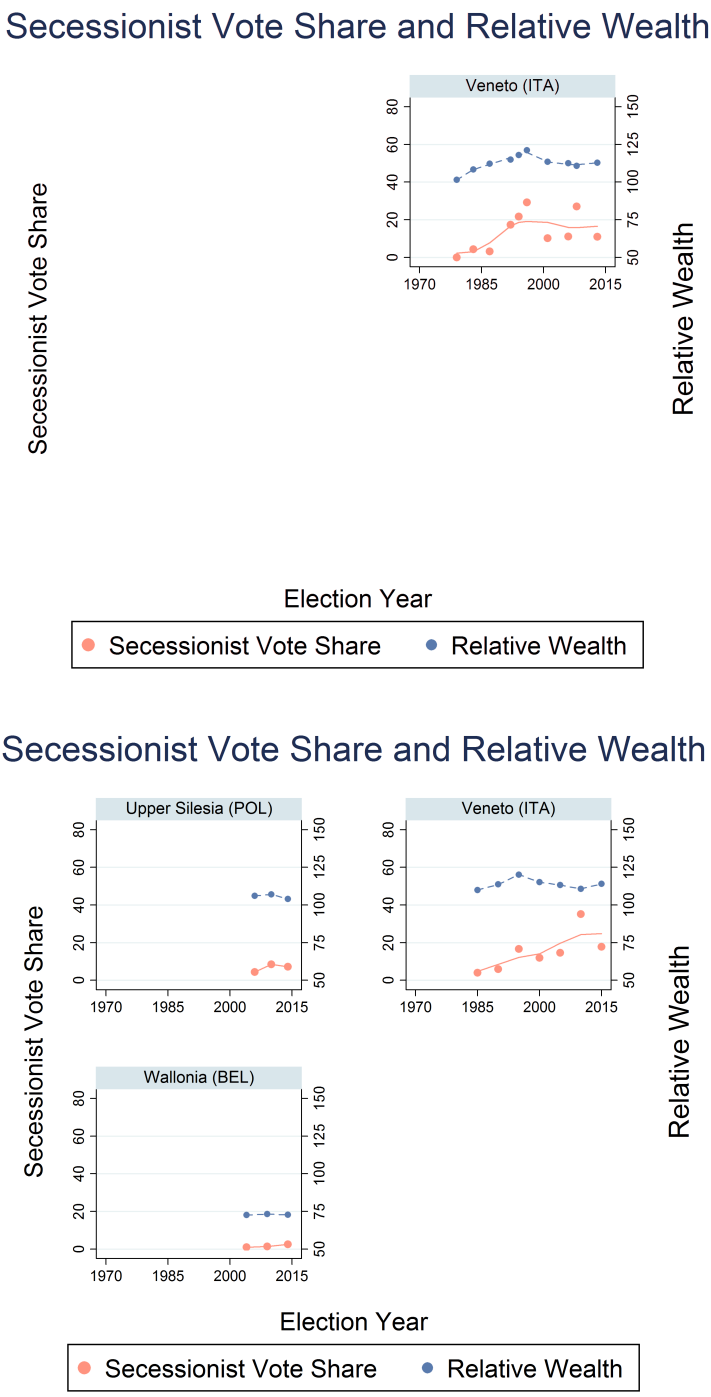


Figure 7: **Relative Wealth and Secessionist Vote Share**

The figures display *Relative wealth* in blue, and *Secessionist vote share* in light red. The upper graphs depict the national elections, and the lower graphs the regional elections. Our specifications using region fixed effects explore variations in the two variables over time. The connecting lines are created using a lowess estimation in Stata.

Multi-Country Panel Results - Alternative Clustering

Table 4: **Cross-Country Regression**

Dependent variable:	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*
Relative wealth	0.321	0.300	0.282	0.381	0.399
	[0.110]	[0.110]	[0.105]	[0.107]	[0.110]
p-value: *Relative wealth*	0.004	0.006	0.007	0.000	0.000
Time FE	*no*	*yes*	*yes*	*yes*	*yes*
Controls	*no*	*no*	*yes*	*yes*	*yes*
Time trends	*no*	*no*	*no*	*yes*	*yes*
Adj. R-squared	0.69	0.80	0.82	0.85	0.86
Number of observations	403	403	396	396	368

The table shows OLS regression results with the vote share of separatist parties in selected regions over the 1970-2016 period as the dependent variable. *Relative wealth* refers to the ratio of regional to national GDP per capita. All regressions include region-election type (regional/national) fixed effects. 'Controls' include regional population, the effective number of electoral parties (time-varying), and the population share speaking a regional language (time-invariant, interacted with time dummies). Time Trend is a region-election type-specific linear time trends. Standard errors are multiway-clustered at the year and region-election type level. Appendix A provides more details about the variables, as well as the included parties and regions.

Table 5: **Multi-Country Panel Results**

Dependent variable:	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*
Relative wealth	0.321	0.300	0.282	0.381	0.399
	[0.118]	[0.113]	[0.090]	[0.113]	[0.117]
p-value: *Relative wealth*	0.006	0.008	0.002	0.001	0.001
Time FE	*no*	*yes*	*yes*	*yes*	*yes*
Controls	*no*	*no*	*yes*	*yes*	*yes*
Time Trends	*no*	*no*	*no*	*yes*	*yes*
Adj. R-squared	0.69	0.80	0.82	0.85	0.86
Number of observations	403	403	396	396	368

The table shows OLS regression results with the vote share of separatist parties in selected regions over the 1970-2016 period as the dependent variable. *Relative wealth* refers to the ratio of regional to national GDP per capita. All regressions include region-election type (regional/national) fixed effects. 'Controls' include regional population, the effective number of electoral parties (time-varying), and the population share speaking a regional language (time-invariant, interacted with time dummies). Time trends denotes region-election type-specific linear time trends. Standard errors are multiway-clustered at the year and region-election type level. Appendix A provides more details about the variables, as well as the included parties and regions.

Table 6: **Multi-Country Panel Results – Jackknife Drop Regions**

National elections		*BAS*	*BAV*	*BIH*	*BRT*	*CAT*	*COR*	*FAR*	*FLA*	*FVG*	*GAL*	*GRL*	*LIG*	*LOM*	*NCA*
Dropped region:		*(ESP)*	*(GER)*	*(ROM)*	*(FRA)*	*(ESP)*	*(FRA)*	*(DEN)*	*(BEL)*	*(ITA)*	*(ESP)*	*(DEN)*	*(ITA)*	*(ITA)*	*(FRA)*
Relative wealth		0.407	0.385	0.385	0.381	0.402	0.392	0.308	0.369	0.455	0.385	0.339	0.385	0.412	0.372
		[0.133]	[0.129]	[0.127]	[0.125]	[0.123]	[0.126]	[0.111]	[0.132]	[0.108]	[0.126]	[0.131]	[0.126]	[0.113]	[0.133]
p-value		0.002	0.003	0.002	0.002	0.001	0.002	0.006	0.005	0.000	0.002	0.010	0.002	0.000	0.005
Observations		385	384	392	394	385	389	387	385	386	385	384	386	386	391
Regional elections	*ALB*	*BAS*	*BAV*	*BIH*	*BRT*	*CAT*	*COR*	*FAR*	*FLA*	*FVG*	*GAL*	*GRL*	*LIG*	*LOM*	*NCA*
Dropped region:	*(CAN)*	*(ESP)*	*(GER)*	*(ROM)*	*(FRA)*	*(ESP)*	*(FRA)*	*(DEN)*	*(BEL)*	*(ITA)*	*(ESP)*	*(DEN)*	*(ITA)*	*(ITA)*	*(FRA)*
Relative wealth	0.381	0.372	0.362	0.389	0.381	0.383	0.377	0.359	0.380	0.391	0.411	0.378	0.372	0.378	0.386
	[0.125]	[0.131]	[0.125]	[0.128]	[0.125]	[0.130]	[0.128]	[0.136]	[0.126]	[0.125]	[0.126]	[0.130]	[0.125]	[0.125]	[0.132]
p-value	0.002	0.004	0.004	0.002	0.002	0.003	0.003	0.008	0.003	0.002	0.001	0.004	0.003	0.003	0.003
Observations	394	385	385	392	392	385	389	387	392	389	386	385	389	389	392

National elections	*NIR*	*PMT*	*QUE*	*SRP*		*SMA*	*SCT*	*SIC*	*TAA*		*VAO*	*VEN*	*WLS*	*WAL*
Dropped region:	*(UKD)*	*(ITA)*	*(CAN)*	*(BOH)*		*(ROM)*	*(UKD)*	*(ITA)*	*(ITA)*		*(ITA)*	*(ITA)*	*(UKD)*	*(BEL)*
Relative wealth	0.372	0.393	0.357	0.370		0.386	0.379	0.372	0.369		0.368	0.359	0.389	0.381
	[0.130]	[0.121]	[0.119]	[0.125]		[0.125]	[0.126]	[0.121]	[0.121]		[0.125]	[0.131]	[0.127]	[0.125]
p-value	0.004	0.001	0.003	0.003		0.002	0.003	0.002	0.002		0.003	0.006	0.002	0.002
Observations	387	386	386	393		392	387	390	389		386	386	387	394
Regional elections	*NIR*	*PMT*	*QUE*	*SRP*	*SAS*	*SMA*	*SCT*	*SIC*	*TAA*	*USL*	*VAO*	*VEN*	*WLS*	*WAL*
Dropped region:	*(UKD)*	*(ITA)*	*(CAN)*	*(BOH)*	*(CAN)*	*(ROM)*	*(UKD)*	*(ITA)*	*(ITA)*	*(POL)*	*(ITA)*	*(ITA)*	*(UKD)*	*(BEL)*
Relative wealth	0.386	0.387	0.388	0.397	0.381	0.389	0.390	0.382	0.370	0.381	0.370	0.397	0.382	0.381
	[0.126]	[0.126]	[0.127]	[0.137]	[0.126]	[0.125]	[0.125]	[0.126]	[0.128]	[0.125]	[0.131]	[0.126]	[0.126]	[0.125]
p-value	0.002	0.002	0.002	0.004	0.003	0.002	0.002	0.002	0.004	0.002	0.005	0.002	0.002	0.002
Observations	391	389	386	392	393	392	391	393	389	394	388	389	391	393

The table shows OLS regression results with the vote share of separatist parties in selected regions over the 1970-2016 period as the dependent variable. *Relative wealth* refers to the ratio of regional to national GDP per capita. All regressions include region-election type (regional/national) fixed effects and region-election type-specific linear time trends. 'Controls' include regional population, the effective number of electoral parties (time-varying), and the population share speaking a regional language (time-invariant, interacted with time dummies). Standard errors are multiway-clustered at the year and region-election (regional/national) level. Appendix A provides more details about the variables, as well as the included parties and regions. Each column shows the result of one regression leaving out the region indicated in the column title. The stability of the coefficients shows that the relationship that we document is not driven by particular regions, which could constitute outliers. The abbreviations refer to the following regions: Alberta = ALB, Basque Country = BAS, Bavaria = BAV, Bihor = BIH, Brittany = BRT, Catalonia = CAT, Corse = COR, Faroe Islands = FAR, Flanders = FLA, Friulia-Venezia Giulia = FVG, Galicia = GAL, Greenland = GRL, Liguria = LIG, Lombardy = LOM, New Caledonia = NCA, Northern Ireland = NIR, Piedmont = PMT, Quebec = QUE, Republika Srpska = SRP, Saskatchewan = SAS, Satu Mare = SMA, Scotland = SCT, Sicily = SIC, Trentino Alto Adige = TAA, Upper Silesia = USL, Vallee Aosta = VAO, Veneto = VEN, Wales = WLS, Wallonia = WAL.

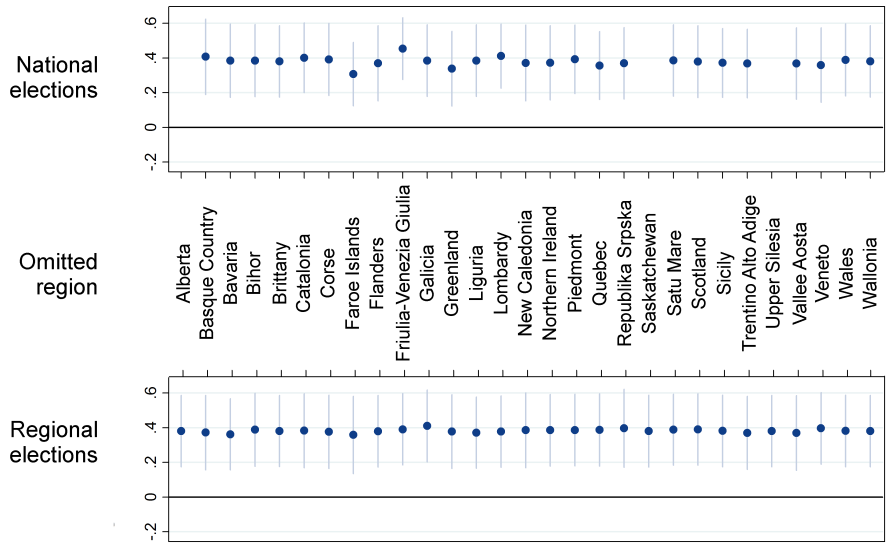


Figure 8: **Coefficient Plot – Jackknife Drop of Individual Regions**

The figure shows the regression coefficients for *Relative wealth* from 55 individual regressions. Each regression omits one national or regional election. The region that is omitted is indicated in the middle of the figure. The upper panel omits national, and the lower panel regional election results. The regression specification is equivalent to Table 1, column 4. 90% confidence intervals are based on standard errors that are multiway-clustered at the year and region-election type (regional/national) level. Missing coefficients indicate that data are not available for this election type.

Table 7: **Multi-Country Panel Results – Jackknife Drop Years**

Omitted year	1970	1972	1974	1976	1977	1978	1979	1980	1981	1982	1983
Relative wealth	0.381	0.381	0.381	0.381	0.381	0.369	0.416	0.392	0.389	0.420	0.401
	[0.125]	[0.125]	[0.125]	[0.125]	[0.125]	[0.132]	[0.129]	[0.127]	[0.125]	[0.124]	[0.117]
p-value	0.002	0.002	0.002	0.002	0.002	0.005	0.001	0.002	0.002	0.001	0.001
Number of observations	395	395	395	395	395	393	386	393	392	390	380
Omitted year	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Relative wealth	0.398	0.390	0.364	0.380	0.334	0.390	0.379	0.379	0.409	0.379	0.265
	[0.131]	[0.125]	[0.126]	[0.122]	[0.130]	[0.128]	[0.129]	[0.125]	[0.114]	[0.125]	[0.106]
p-value	0.002	0.002	0.004	0.002	0.010	0.002	0.003	0.002	0.000	0.002	0.012
Number of observations	391	389	387	381	387	391	386	393	383	386	382
Omitted year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Relative wealth	0.389	0.393	0.367	0.369	0.373	0.355	0.399	0.353	0.395	0.439	0.378
	[0.140]	[0.121]	[0.130]	[0.142]	[0.130]	[0.129]	[0.124]	[0.128]	[0.125]	[0.125]	[0.127]
p-value	0.005	0.001	0.005	0.009	0.004	0.006	0.001	0.006	0.002	0.000	0.003
Number of observations	388	386	389	383	388	383	383	389	385	382	383
Omitted year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Relative wealth	0.339	0.369	0.355	0.388	0.394	0.365	0.393	0.372	0.408	0.359	0.391
	[0.132]	[0.127]	[0.132]	[0.129]	[0.133]	[0.119]	[0.129]	[0.125]	[0.131]	[0.130]	[0.129]
p-value	0.011	0.004	0.007	0.003	0.003	0.002	0.002	0.003	0.002	0.006	0.002
Number of observations	384	385	374	389	383	386	384	381	389	381	388

The table shows OLS regression results with the vote share of separatist parties in selected regions over the 1970-2016 period as the dependent variable. *Relative wealth* refers to the ratio of regional to national GDP per capita. All regressions include region-election type (regional/national) fixed effects and region-election type-specific linear time trends. 'Controls' include regional population, the effective number of electoral parties (time-varying), and the population share speaking a regional language (time-invariant, interacted with time dummies). Standard errors are multiway clustered at the year and region-election (regional/national) level. Appendix A provides more details about the variables, as well as the included parties and regions. Each column shows the result of one regression leaving out the year indicated in the column title. The stability of the coefficients shows that the relationship that we document is not driven by particular years, which could constitute outliers.

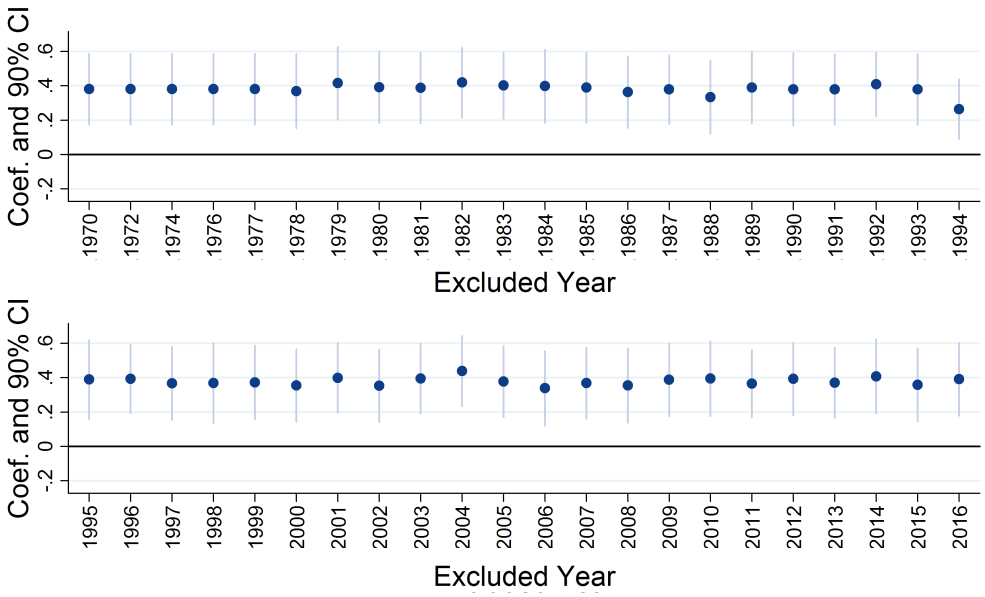


Figure 9: **Coefficient Plots for Jackknife Drop of Years (Based on Table 7)**

The figure plots the coefficients from Appendix Table 7). The left-out the year is indicated below the coefficients. The confidence intervals are at the 90% levels based on multiway-clustered standard errors at the the year and region-election (regional/national) level

Selection-on-unobservables

To asses the potential influence of omitted variables, we run a test for selection-on-unobservables (cf., Gehring & Schneider, 2018). We first apply the methods developed in Altonji *et al.* (2005) to assess how much larger the selection-bias based on unobserved factors would have to be compared to observed factors to fully explain our results. The strategy is to use selection-on-observables to assess the severity of potential selection bias for the results. We compare two regressions: one which contains only region-election type fixed effects ($\mathscr{L}$ = limited) to one with a full set of controls ($\mathscr{F}$ = full). $\mathscr{F}$ accordingly comprises all variables from Table 1, column 3 in the main paper. Actually, compared to the raw correlation, the coefficients become larger in most specifications. This would suggest that controlling for further currently unobserved factors would actually cause a larger effect. To be as conservative as possible, we thus compare column 1 and column 3, the only comparison where the coefficient is moved closer to zero by conditioning on a larger set of controls and fixed effects.

Table 8, shows the "Selection ratio" (SR), the ratio of selection-on-unobservables to observables necessary to fully explain our coefficients. In simple terms: how likely is a bias due to unobserved time-variant factors captured neither by the controls nor the fixed effects? The resulting ratios indicate that for $\{\mathscr{L}, \mathscr{F}\}$, selection-on-unobservables would have to be 7.37 times as large as selection-on-observables to fully explain the positive relationship.

In addition, Oster (2017) explains that small changes in the coefficient only help in coming closer to a causal interpretation if the added variables also explain additional variation in the dependent variable. She argues that $R_{max} \in [R_{\mathscr{F}}, 1]$ and $\delta \in [0, 1]$ are plausible boundaries for the maximum share of the variance that can be systematically explained and the relationship of selection-on-unobservables to observables. For simplicity, we use the most conservative setting with $R_{max} = 1$ and $\delta = 1$.

We then calculate the boundary of the set $\beta^* = \beta_{\mathscr{F}} - \delta \times \frac{(\beta_{\mathscr{L}} - \beta_{\mathscr{F}}) \times (R_{max} - R_{\mathscr{F}})}{(R_{\mathscr{F}} - R_{\mathscr{L}})}$ and the identified set $\Delta_s = [\beta_{\mathscr{F}}, \beta^*] \forall \beta_{\mathscr{F}} \leq \beta^* \wedge \Delta_s = [\beta^*, \beta_{\mathscr{F}}] \forall \beta_{\mathscr{F}} > \beta^*$. Our sets of identified coefficients is [0.24; 0.28]; far from including 0. Even with the most conservative choice of the suggested boundaries, our full set is precisely estimated within the confidence intervals and does not include 0.

Table 8: **Robustness to Outliers and Sensitivity to Selection-on-Unobservables**

Controls in the limited set	Controls in the full set	$\beta_{\mathscr{L}}$	$\beta_{\mathscr{F}}$	$SR = \lvert \beta_{\mathscr{F}} / (\beta_{\mathscr{L}} - \beta_{\mathscr{F}}) \rvert$	$Identified$ β-Set
Region-election-type FE	Region-election type FE, Year FE, Controls	0.32	0.28	7.37	[0.24; 0.28]

The table reports regression coefficients for *Relative wealth* and selection ratios (SR) based on the formula depicted. $\beta_{\mathscr{L}}$ refers to the coefficient of *Relative wealth* from a model that contains only region-election type fixed effects and $\beta_{\mathscr{F}}$ to the coefficient of *Relative wealth* from a model containing year FE and all control variables in addition to these fixed effects. The selection ratio indicates the extent of remaining selection bias due to unobservables relative to the observable variables in the model that would be necessary to drive the treatment effect down to 0. The full specification is identical with the specification shown in Table 1, column 3 in the paper. The beta-set is well identified if it does not include 0 (see also Oster, 2013).

B Region Profiles and Illustrative Cases

Cases and categorization (extended version of the description in the main paper)

Democratic secessionist movements fall in three broad categories. A first category consists of movements where economic arguments play no or only a very minor role. Although those cases are rather infrequent in democratic countries, it is important to remember that, also in our model, secessionism can arise for purely cultural reasons. In most cases, however, separatist movements are rather driven by "economic concerns than by cultural or ethnic criteria" (Ashbrook, 2008, p. 151).

The second category are regions where economic arguments play a major role for the separatist discourse, but the relative value of regional resources varies more between regions than over time, making clean econometric identification more difficult. Consider the formerly secessionist *Lega Nord (*now *Lega)* in Italy, whose central political goal was more autonomy for the North of Italy. Due to higher human and physical capital, the North has consistently been richer than the South since the Second World War. The movement is interesting as it "is not based in an area that has historic claims to nationhood. Instead, the *Lega* has attempted to invent an ethnicity [...] in order to justify its political claims for the protection of the economic interests of the region" (Cento Bull & Gilbert, 2001, p. 446). Despite no existing "Padanian" identity, the movement was politically successful by protesting against the redistribution of tax revenues, culminating in for instance a secession referendum in the 1990s.[1]

Other examples include *Silesia* in Poland, a region rich in coal, lignite, zinc, lead, and iron deposit, and the *Republika Srpska* in Bosnia-Herzegovina, a region rich in minerals reaching from bauxite, to marble and silica sand. Both the *Silesian Autonomy Movement* and the *Republika Srpska Movement* campaign on the unjust redistribution of revenues from those resources. Still, resources do not need to be of common natural resource type only. In the Croatian region of Istria, endowed with beautiful beaches as well a flourishing processing and shipping industry, the *Istrian Democratic Assembly* and the separatist *Istrian Democratic Forum successfully* run similar campaigns about the redistributed revenues based on those "resources".

A third category of regions features more variation in regional resource value over time and exhibits a positive correlation between secessionist success and the value of regional resources. In the former French colony New Caledonia, the success of the regionalist parties *Kanak and Socialist National Liberation Front* increases along with the rise of New Caledonia to the 5th largest nickel-producing country worldwide. As one observer puts it, "resource sovereignty in New Caledonia has come to be seen by independence leaders as a path to political independence" (Horowitz, 2004, p. 287). In Greenland's parliament, the *Inuit Ataqatigiit*

[1] Protests against these transfers were a major reason for a secession referendum in the 1990s. See, e.g., *The Economist* from 27th May 1997 at `http://www.economist.com/node/150513`, last accessed October 26, 2018.

and the *Forward Party* campaign for more autonomy or full independence from Denmark. In Greenland, the mostly fishing-based economy was stagnant for a long time period and almost half of public spending was financed by grants from Denmark, so the parties' electoral success was limited. The discovery of oil and the fact that, due to the melting of the Arctic ice, larger areas become feasible for mining (e.g., rare metals and radioactive substances), lead to a strong increase in support for the secessionist parties *Inuit Ataqatigiit* and *Forward Party*.[2] In 2008, a non-binding referendum on more self-governance won in a landslide with 21,355 to 6,663 votes.[3] However, the drastic collapse in crude oil prices since 2015 has made most Arctic oil unprofitable to exploit and led "Greenland to again put off plans to split from Denmark."[4]

Using variation over time within the same region is helpful, but ideally we want a suitable counterfactual region within the same country. The Belgian case comes closer to that ideal scenario, featuring two ethnically and culturally distinct regions. The mainly French speaking and historically politically dominant Wallonia, and the Flemish (Dutch) speaking Flanders. Up until the 1960s, Wallonia was one of the richest regions in Europe due to natural resources like coal and a comparative advantage in leading sectors at that time (such as steel production, see Mnookin & Verbeke, 2009). While Flemish independence movements campaigned on the suppression of the Flemish language and the political dominance of the smaller French part, support for secessionism never really took off until the economic situation reversed. Declining demand for coal and steel on the one side, and modernization and the increased value of possessing the important port of Antwerp on the other side made Flanders' regional resources relatively more valuable compared to those of Wallonia. This reversal of fortunes correlates with increasing vote shares for secessionist parties, until 2012, when the secessionist *New Flemish Alliance* became the largest party in the Belgian federal elections. It claims that "wealthy Flanders should not be subsidizing poorer Wallonia, whose regional government is alleged to be wasting money."[5]

[2] See *The Economist* from July 15, 2012 at http://www.economist.com/blogs/graphicdetail/2012/06/daily-chart-9 and from March 31, 2013 at http://www.economist.com/blogs/newsbook/2013/03/economist-explains-why-greenland-election-global-implications, last accessed October 26, 2018.

[3] See *The New York Times* from November 26, 2008 at http://www.nytimes.com/2008/11/27/world/europe/27greenland.html?_r=0, last accessed October 26, 2018.

[4] See *The Economist* from January 21, 2015 at http://www.economist.com/news/europe/21640224-falling-crude-prices-are-forcing-greenland-put-plans-split-denmark-independence-ice, last accessed October 26, 2018.

[5] See http://knowledge.wharton.upenn.edu/article/secession-answer-case-catalonia-flanders-scotland/, last accessed October 26, 2018.

Selected examples:

Flanders

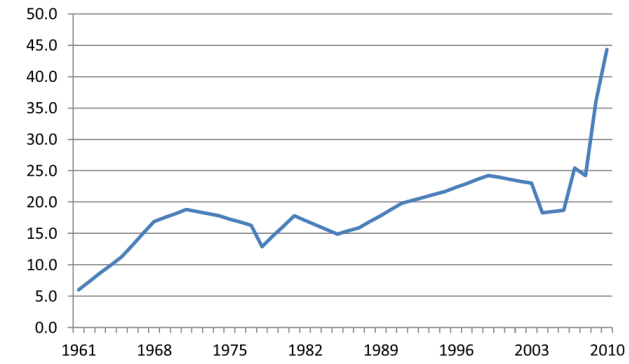
- Seeking independence from Belgium
- Political parties: *New Flemish Alliance* (secessionist), *Libertair Direct Democratisch* (secessionist), *Vlaams Belang* (secessionist), *Identity, Tradition, Sovereignty* (secessionist, defunct since 2007)

Logo of the New Flemish Alliance (Nieuw-Vlaamse Alliantie)

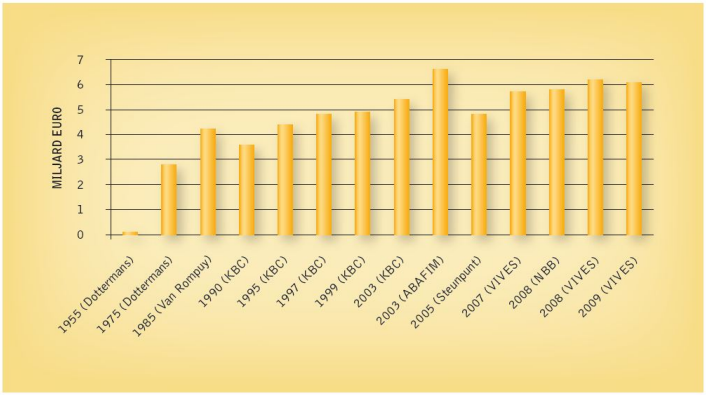
- Resources: Flanders was the poorer region in Belgium up until the Second World War, as it was the last Belgian region to industrialize, and relied strongly on the agricultural sector (1). This changed radically in the past 60 years due to Flanders' successful transformation to a knowledge-based economy with highly developed service and high-tech sectors (2). Today, supposedly 6 billion EUR per year are transferred to Wallonia and Brussels (3). Antwerp is home to the second largest European sea port by cargo volume and per capita GDP is 32,700 EUR compared to Wallonia's 26,100 EUR (2).

  Electoral success and party strategies: The secessionist *New Flemish Alliance* presents the high regional transfers to Wallonia and Brussels as a key argument for independence, devoting an entire brochure titled "Vlaanderen betaalt de Belgische factuur" ("Flanders pays the Belgian bill") to the topic. Moreover, the support for regionalist and separatist parties steadily increased from only 5 percent in 1961 to almost 45 percent in 2010, correlating with Flanders' economic rise and a steady increase in regional transfers, despite the granting of equal linguistic rights in the 1950s (4). In particular, the abrupt increase from 7.3 to 7.9 billion EUR following the 2008 financial crisis goes hand in hand with a sharp upsurge in support for regionalist and secessionist parties (see figures below).

FIGURE 1
THE AGGREGATED SCORE OF REGIONALIST AND SEPARATIST PARTIES IN FLANDERS SINCE 1961



Source: Deschouwer (2013, p, 349)



Source: "Flanders Pays the Belgian Bill", New Flemish Alliance at https://www.n-va.be/sites/default/files/generated/files/brochure-attachment/brochure_vlaanderen_betaalt_de_belgische_factuur.pdf (p. 12), last accessed on April 9, 2018

Sources:

(1) See the Financial Times from November 3, 2015 at https://www.ft.com/content/c45dfbd4-7349-11e5-bdb1-e6e4767162cc, last accessed on April 9, 2018

(2) See Knowledge@Wharton from December 2, 2013 at http://knowledge.wharton.upenn.edu/article/secession-answer-case-catalonia-flanders-scotland/, last accessed on April 9, 2018

(3) See Hermans (2015)

- Quotes:

  "The most dramatic example [of economic contrast] is in Belgium, where the growing gap between

Flanders and French-speaking Wallonia has exacerbated political and cultural tensions. The NVA party, which rules Flanders, believes that wealthy Flanders should not be subsidizing poorer Wallonia, whose regional government is alleged to be wasting money. Flemish nationalists feel strongly that their region is not receiving its fair share of the revenues that it contributes to the national economy."
(Knowledge@Wharton from December 2, 2013 at http://knowledge.wharton.upenn.edu/article/secession-answer-case-catalonia-flanders-scotland/, last accessed on April 9, 2018)

"Wallonia was among the first regions in northern Europe to industrialise in the 19th century, with industries such as glass making and coal mining. By contrast, the largely agrarian Flanders fell behind. But Flanders boomed in the postwar era, attracting much foreign investment."
(Financial Times from November 3, 2015 at https://www.ft.com/content/c45dfbd4-7349-11e5-bdb1-e6e4767162cc, last accessed on April 9, 2018)

"To this strong Flemish identity, an economic component has also been added over the course of recent decades. During the nineteenth and the first half of the twentieth century, Wallonia was the economically stronger region. That changed after the Second World War as a result of industrial decline in the south and the development of new economic activities in the north. Today, Flanders is the stronger region. However, the relative wealth of Flanders, combined with the operation of the welfare state put into place after the Second World War, has meant that a system of social redistribution has effectively become a system of territorial redistribution. When one aggregates per region the amount of money paid into the system and the amount of money received from the system, Flanders is a net contributor and Wallonia (and increasingly also Brussels) is a net recipient" (Deschouwer, 2013).

"Billions of euros in transfers are going to from Flanders to Wallonia and Brussels. And yet ordinary people in Wallonia and Brussels are not better off because of them. And the worse it gets for them, the higher the transfers are. Policymakers are therefore not at all encouraged to even change their actions. Achieving improvement inevitably means: less transfers, less money."
("Flanders Pays the Belgian Bill", New Flemish Alliance at https://www.n-va.be/sites/default/files/generated/files/brochure-attachment/brochure_vlaanderen_betaalt_de_belgische_factuur.pdf, last accessed on April 9, 2018)

Wallonia

- Seeking independence from Belgium
- Political parties: *Rassemblement Wallonie France* (formerly federalist, secessionist since 1985)

Logo of the Rassemblement Wallonie France (Rally Wallonia France)

- Resources: Wallonia was the the first Belgian region to industrialize in the 19th century (1), rendering it the richer part of Belgium up to the 1960s due to comparative advantages in steel production and coal mining (2). The steel crises of the 1970s and the general decline of the heavy industries in Europe caused Wallonia to experience strong economic decline(2). Today, Wallonia is the significantly poorer region with a per capita GDP of only 26,100 EUR compared to Flanders' 32,700 EUR and receives high transfers from Flanders (3).

  Electoral success and party strategies: The first Walloon independence movements emerged in the 19th century, coinciding with the region's industrialization. However, unlike the Flemish nationalist parties, pro-independence parties in Wallonia never gained significant traction. One possible explanation in line with our theory is that although Wallonia was the significantly richer region up to the 1960s, there never was a perceived economic benefit of secession for Walloons. This is due to the fact that "[n]either in the nineteenth, nor in the twentieth century did a Walloon tax surplus flow to Flanders", as the Flemish historian Prof. em. Juul Hannes postulates (4), which can be explained by the absence of a welfare state prior to the Second World War. The construction of the welfare state in the post-war area in effect imposed a system of regional redistribution, with a Flemish tax surplus of approximately 150 million EUR flowing to Wallonia as early as 1955 (4). Accordingly, the *Rassemblement wallon* (RW), the main pro-autonomy party in the 20th century, received only 7 percent of the vote at its peek in the 1970s. Today, the *Walloon Rally* usually stays below the 2 percent mark in federal elections (5).
  Sources:
  (1) See the Financial Times from November 3, 2015 at https://www.ft.com/content/c45dfbd4-7349-11e5-bdb1-e6e4767162cc, last accessed on April 9, 2018

(2) See, e.g., Reid & Musyck (2000) and Witte (1992)

(3) See Knowledge@Wharton from December 2,2013 at http://knowledge.wharton.upenn.edu/article/secession-answer-case-catalonia-flanders-scotland/, last accessed on April 9, 2018

(4) "Flanders Pays the Belgian Bill", New Flemish Alliance at https://www.n-va.be/sites/default/files/generated/files/brochure-attachment/brochure_vlaanderen_betaalt_de_belgische_factuur.pdf, last accessed on April 9, 2018

(5) Duerr (2016, p. 12)

- Quotes:

"In the century and a half up to the 1960s, the Walloon economy was one of the most prosperous in Europe. [...] At the time of the first industrial revolution, Wallonia was equipped with numerous comparative advantages in the leading sectors of the epoch: coal mining, steel making and their spin-off activities. Natural resources, a highly skilled workforce and the dynamism of its engineers were the foundations on which Wallonia built its prosperity." (Reid & Musyck, 2000, p. 183)

"Wallonia was among the first regions in northern Europe to industrialise in the 19th century, with industries such as glass making and coal mining. By contrast, the largely agrarian Flanders fell behind. But Flanders boomed in the postwar era, attracting much foreign investment. The Walloon economy, meanwhile, collapsed as the region's main heavy industries faltered. Between 1980 and 2010, the number of jobs in manufacturing halved from one in four to just one in 10."
(Financial Times from November 3, 2015 at https://www.ft.com/content/c45dfbd4-7349-11e5-bdb1-e6e4767162cc, last accessed on April 9, 2018)

"The region's economic numbers are dire. Wallonia's share of GDP is small and heading in the wrong direction. The region counts for a third of Belgium's 11m population but less than a quarter of its GDP – and this number is falling."
(Financial Tomes from November 6, 2014 https://www.ft.com/content/7ee4c346-52e1-11e4-9221-00144feab7de, last accessed on April 9, 2018)

"The unequal economic situation is one of the most striking aspects of this. Wallonia still has to face up to the problems of restructuring its old branches of industry and the Walloon economy has done relatively little towards setting up 'high-tech' sectors"(Witte, 1992, p. 109).

Catalonia

- Seeking independence from Spain
- Political parties: *Republican Left of Catalonia* (secessionist), *Democratic Convergence of Catalonia* (secessionist), *Popular Unity Candidacy* (secessionist)

Logo of the Esquerra Republicana de Catalunya (Republican Left of Catalonia)

- Resources: Historically, Catalonia was among the first Spanish regions to industrialize and featured a strong industrial as early as the beginning of the 19th century. Today, the region sets itself apart from the rest of Spain as the richest and most successful exporting region. Exports generate 28.1 percent of the regional GDP, compared with just 12 percent in Madrid. A new record was reached in 2012, with exports amounting to 58.2 billion EUR which is 15.4 percent higher than before the economic crisis (1).

  Electoral success and party strategies: The economic crisis has strengthened resentment towards the Spanish system of regional redistribution which annually transfers 8 percent to 9 percent of Catalonia's GDP to less prosperous Spanish regions (1, 3). Secessionist parties like *Esquerra (Republican Left of Catalonia)* argue that Catalonia would benefit from complete fiscal autonomy, as part of Catalonia's debt can be blamed on the "wasteful central state" (4).

  Sources:

  (1) See Knowledge@Wharton from December 2, 2013 at http://knowledge.wharton.upenn.edu/article/secession-answer-case-catalonia-flanders-scotland/, last accessed on April 9, 2018

  (2) See Instituto Nacional de Estadística at http://www.ine.es/en/daco/daco42/cre00/b2010/homog/dacocre_base2010h_en.htm, last accessed on April 9, 2018

  (3) See the Financial Times from September 26, 2012 at https://www.ft.com/content/bad90798-07f4-11e2-9df2-00144feabdc0, last accessed on April 9, 2018

  (4) See Election Manifesto 2016, Republican Left of Catalonia (p. 4) at http://www.esquerra.cat/partit/programes/e2016-programa.pdf, last accessed on April 9, 2018

- Quotes:

  "We suffer from the effects of a wasteful central state that, in addition to a 16,000 million annual fiscal deficit, throws out our resources for the AVE [high-speed rail in Spain] without passengers, airports without airplanes and military spending. We want a welfare state for ourselves, managing our resources and to ensure the construction of the infrastructure, because we need to go forward."
  (Election Manifesto 2016, Republican Left of Catalonia (p. 4) at http://www.esquerra.cat/partit/programes/e2016-programa.pdf, last accessed on April 9, 2018)

  "A majority of Catalans feels Madrid takes too much of local income to redistribute elsewhere. The clamour for independence has become mainstream."
  (Financial Times from September 26, 2012 at https://www.ft.com/content/bad90798-07f4-11e2-9df2-00144feabdc0, last accessed on April 9, 2018)

  "The perception that an independent Catalonia would perform better economically, based on the idea that the current fiscal relationship is detrimental to Catalonia's interests, partly explains current support for independence." (?, p. 316)

Greenland

- Seeking independence from Denmark
- Political parties: *Inuit Ataqatigiit* (separatist), *Siumut* (separatist), *Inuit Party* (separatist)

Logo of the Inuit Ataqatigiit (Community of the People) and of Siumut (Forward)

- Resources: The sparsely populated island (56,648 inhabitants) still strongly relies on the historic fish industry as the largest income earner (1), which does not generate enough revenue to finance Greenland's public expenditures, wherefore a Danish grant of 3.6 billion kroner ($604m) accounts for over half of Greenland's revenues (2). The development of mining (rare metals and radioactive substances since 2013 (3)) and oil industries (discoveries by Carin Energy in 2010 (4)) spurred independence movements (3), but falling crude prices rendered independence less financially viable, with recent studies estimating that Greenland will depend on Danish grants for at least another 25 years (2).

  Electoral success and party strategies: The recent oil discoveries instilled hopes for financial independence in separatist leaders, with the former prime minister Aleqa Hammond claiming that independence is possible "within her lifetime". But falling crude prices have made the new prime minister unequivocally less optimistic, and studies estimate that Greenland will remain financially dependent on Denmark for at least another 25 years (2).

  Sources:

  (1) Government of Greenland, Economy and Industry in Greenland at http://naalakkersuisut.gl/en/About-government-of-greenland/About-Greenland/Economy-and-Industry-in-Greenland, last accessed on April 9, 2018

  (2) See The Economist from January 21, 2015 at http://www.economist.com/news/europe/21640224-falling-crude-prices-are-forcing-greenland-put-plans-split-denmark-independence-ice, last accessed on April 9, 2018

  (3) The Economist from March 31, 2013 http://www.economist.com/blogs/newsbook/2013/03/economist-explains-why-greenland-election-global-implications, last accessed on

April 9, 2018

(4) See The Economist from August 26, 2010 at http://www.economist.com/node/16889623, last accessed on April 9, 2018

- Quotes:

"When Cairn Energy, a British petrochemicals company, discovered traces of oil beneath Greenland's territorial waters in 2010, it seemed the secessionists' prayers had been answered. Oil and other minerals including aluminum and gold, it was hoped, would give the territory of just 56,200 inhabitants the financial clout to go it alone"

(The Economist from January 21, 2015 at http://www.economist.com/news/europe/21640224-falling-crude-prices-are-forcing-greenland-put-plans-split-denmark-independence-ice, last accessed on April 9, 2018)

"Greenland's politicians were emboldened by the prospect of petrodollars. Aleqa Hammond, who served as her country's first female prime minister between April 2013 and September 2014 (when a corruption scandal drove her from office), said independence was possible "within her lifetime". [...] One year later, the political rhetoric has dropped a few tones. At a press conference on January 9th in Copenhagen, the new prime minister, Kim Kielsen, said the "light of independence burned within" but he was unsure if it would be realised in his lifetime. Mr Kielsen is 48, suggesting that the timeline has been pushed back a few decades."

(The Economist from January 21, 2015 at http://www.economist.com/news/europe/21640224-falling-crude-prices-are-forcing-greenland-put-plans-split-denmark-independence-ice, last accessed on April 9, 2018)

"The world may not often be very interested in Greenland but it is fascinated by what lies beneath it. As the country's ice cap melts, hidden mineral wealth is coming tantalisingly within reach. The country's riches include "rare earth" metals that are essential in the production of many electronic devices, from electric-car batteries to television screens. Metals such as cerium (used in glass manufacturing) and yttrium (which goes into electronic displays) are among those that are hidden under the ice."

(See The Economist from March 31, 2013 http://www.economist.com/blogs/newsbook/2013/03/economist-explains-why-greenland-election-global-implications, last accessed on April 9, 2018)

New Caledonia

- Seeking independence from France
- Political parties: *Kanak and Socialist National Liberation Front* (*Caledonian Union*, *Party of Kanak Liberation*, separatist), *Kanak Socialist Liberation* (separatist)

Logo of the Kanak and Socialist National Liberation Front (Front de Libération Nationale Kanak et Socialiste)

- Resources: As a French colony since 1853, New Caledonia still strongly relies on financial assistance from mainland France (1). This is hoped to be gradually alleviated through further expansions of the New Caledonian nickel industry, as the island is believed to hold roughly a quarter of the world's nickel resources and currently ranks 5th among the top nickel-producing countries (2). The Koniambo Project, a nickel mine in which Xstrata (merged with Glencore in 2013) invested $6 billion, is the largest recent expansion of the Caledonian nickel industry (4, 5).

  Electoral success/party strategies: Independence activists hope that achieving economic independence in the near future will lay the foundation for complete political independence. The Koniambo Project has further instilled hopes for independence in independence leaders, which emphasize the opportunity for a largely Kanak organization (Société minière du Sud Pacifique) to work with a non-French company (Xstrata, now Glencore Xstrata), further reducing New Caledonia's economic dependence on mainland France. The fact that Société minière du Sud Pacifique, the involved local mining company, is owned by Kanak from the largely pro-independence Nothern Province is viewed as an additional benefit (3).

- Sources:

  (1) See The Economist from May 25, 2013 at http://www.economist.com/news/asia/21578438-pressures-independence-are-alive-not-always-kicking-ends-empire, last accessed on April 9, 2018

(2) See, e.g. BBC News from June 16, 2016 at http://www.bbc.com/news/world-asia-pacific-16740838, last accessed on April 9, 2018

(3) See Horowitz (2004)

(4) See Financial Times from June 7, 2007 at http://www.ft.com/cms/s/0/b5d6b672-1494-11dc-88cb-000b5df10621.html?ft_site=falcon&desktop=true#axzz4LXUJ59MK, last accessed on April 9, 2017

(5) Bloomberg from August 2, 2011 at http://www.bloomberg.com/news/articles/2011-08-02/xstrata-first-half-profit-rises-27-as-commodity-prices-climb, last accessed on April 9, 2018

- Quotes:

"In New Caledonia, pro-independence leaders perceive economic autonomy as a prerequisite for political independence. The Koniambo Project, a joint venture between a Canadian multinational and a local mining company, is seen by many Kanak as an opportunity to loosen economic ties to metropolitan France" (Horowitz, 2004, p. 318)

"For half-century pioneers developed the idea that the Caledonians had the right to decide what to do with their mineral resources. From there on, this concern was central to the commitment to independence of the FLNKS Front: to have control. To have control over our natural resources, to have control over industrial tools, to have the control over mining and metallurgical annuity."
(Statement on Nickel Mining, Caledonian Union at http://unioncaledonienne.com/wp-content/uploads/2015/10/D%C3%A9claration-liminaire-UC-FLNKS-14-10-15.pdf, last accessed on April 9, 2018)

"The Pacific territory with the most realistic chance of decolonization is nickel-rich New Caledonia, a French colony since 1853."
(The Economist from May 25, 2013 at http://www.economist.com/news/asia/21578438-pressures-independence-are-alive-not-always-kicking-ends-empire, last accessed on April 9, 2018)

Upper Silesia

- Seeking independence from Poland
- Political parties: *Silesian Autonomy Movement* (separatist)

Logo of the Silesian Autonomy Movement (Ruch Autonomii Śląska)

- Resources: The region possesses extensive lignite and brown coal deposits, with the state-owned Kompania Weglowa (KW) being the largest coal-mining company in Europe (1) and 100,000 people employed in mines. In addition, the region features a flourishing car manufacturing industry, large chemical works and leading scientific research institutions, together make Upper Silesia the second richest of Poland's 16 voivodships (2).
- Electoral success and party strategies: In 2010 the *Silesian Autonomy Movement* election slogan was "Silesian Money for Silesian People", very reminiscent of the SNP's "It's Scotland's Oil!" campaign. The election campaign was centered on Poland's system of regional redistribution, which separatist leaders argue takes too much from Upper Silesia's tax money to distribute elsewhere. At the election for the district parliament in 2010 the Silesian Autonomy Movement received 8.5 percent of the votes (3).

- Sources:

  (1) See The Economist from June 28, 2014 at http://www.economist.com/news/special-report/21604686-traditional-industries-are-declining-outsourcing-offshoring-and-subcontracting-are, last accessed on April 9, 2018

  (2) See The Guardian from April 8, 2011 at https://www.theguardian.com/world/2011/apr/08/upper-silesia-flags-up-independence, last accessed on April 9, 2018

  (3) See Bundeszentrale für politische Bildung http://www.bpb.de/internationales/europa/polen/202995/tabellen-und-grafiken-zum-text-wahlergebnisse-in-der-woiwodschaft-schlesien, last accessed on April 9, 2018

- Quotes:

  “But whereas Scotland has drilled down into the North Sea to make the money it resents being made to channel via Westminster, Upper Silesia’s riches come from under solid ground. It still employs 100,000 people in coalmines, and thousands more in the many steelworks. Plus, it boasts a booming car manufacturing industry – Opel has a plant in Gliwice and Fiats are made in Tychy and Bielsko-Biala – and big chemical works at Kedzierzyn Kozle and Zdzieszowice, and has a great track record for scientific research, particularly in clean coal technology, soil detoxification and renewable energy.
  "We are officially the second richest of 16 voivodships in Poland, after Warsaw and Masovia, and provide 14 percent of the GDP," said Gorzelik [leader of the RAS], "and we feel we don’t get enough back from the national government." The RAS’s election slogan last year was "Silesian Money for Silesian People", arguing that Upper Silesia should receive more money back from Warsaw, and be given the autonomy to spend it as it wishes.”

  “The money, which will develop the people of our region, will remain at our disposal. The inhabitants of the land will decide on the distribution of these funds. The Silesian mining law will be discussed by local experts from the mining industry, not the MPs from Szczecin.”
  (FAQ Section, Silesian Autonomy Movement at http://autonomia.pl/faq/, last accessed on April 9, 2018)

Northern Italy

- Seeking Independence from Italy
- Political parties: *Lega Nord per l'Indipendenza della Padania* (formerly secessionist, separatist since 2006)

Logo of the Lega Nord per l'Indipendenza della Padania (North League)

- Resources: Northern and Southern Italy are regularly referenced as a particularly salient example of regional economic divide, owing partially to its longevity. Northern Italy was the first part of Italy to industrialize in the 19th century, and remains the most developed and productive area of Italy to the present day. For instance, unemployment in 2014 was 21.7 percent in Southern Italy, compared with only 13.6 percent in the whole of Italy, indicating not only a much weaker economic performance, but also a lack of human capital in comparison to Northern Italy (1).
- Electoral success and party strategies: Unlike most other regionalist parties, the *Lega Nord* could not rely on a historic nation-state as an argument for independence, but instead proclaimed it's own hypothetical state called "Padania". In the *Lega Nord*'s Padanian Declaration of Independence from 1996, the economic strength of the region is put forward as a key argument for independence, while the Italian central state is accused of economically exploiting "Padania". The results of the *Lega Nord* in the Chamber of deputies after the introduction of the new electoral system in 2005 fluctuated. They held 26 of the 617 seats after the 2006 Election and even increased its share to 60 seats in 2008. It has decreased significantly in 2013, when *Lega Nord* lost a total of 42 seats (2).

- Sources:
  (1) See The Economist from May 16, 2015 at http://www.economist.com/news/finance-and-economics/21651261-north-limps-ahead-south-swoons-tale-two-economies, last accessed on April 9, 2018
  (2) See Election Resources at http://www.electionresources.org/it/, last accessed April 9, 2018

- Quotes:

  "In contrast, the history of the Italian State has become the history of colonial oppression, of economic exploitation, and of moral violence; The Italian State has, over time, systematically occupied Padania's economic and social system through its parasitic bureaucratic apparatus."
  (Padanian Declaration of Independence 1996 at https://web.archive.org/web/20001207094000/http://www.leganord.org/frames/english.htm, last accessed on April 9, 2018)

  "The key difference between the LN's political project and the majority of other regionalist political parties is the fact that it is not based in an area that has historic claims to nationhood. Instead, the LN has attempted to invent an ethnicity for the North of Italy in order to justify its political claims for the protection of the economic interests of the region." (Giordano, 2000, p. 446)

C Oil Discoveries

Name	Year Discovered	Start of Production	Reserves
Alba	1984	Jan. 1994	400 MMstb.
Alwyn North	1971	Nov. 1987	309 MMstb.
Andrew	1974	Jun. 1996	150 MMstb.
Arbroath	1969	Apr. 1990	97.9 MMstb.
Balmoral	1975	Nov. 1986	100 MMstb.
Beatrice	1979	Sep. 1981	495 MMstb.
Bentley	1977	Jul. 1905	880.9 MMstb.
Beryl	1972	Jun. 1976	2100 MMstb.
Brae-North and South	1975	Jun. 1905	70 MMstb.
Brent	1971	Nov. 1976	3500 MMstb.
Bressay	1978	Jul. 1905	200 MMstb.
Buchan	1974	May 1981	120 MMstb.
Buzzard	2001	Jan. 2007	1500 MMstb.
Captain	1977	Mar. 1997	700 MMstb.
Clair	1977	Feb. 2005	5000 MMstb.
Claymore	1974	Nov. 1977	662 MMstb.
Cormorant North	1972	Feb. 1982	90 MMstb.
Crawford	1975	Apr. 1989	130 MMstb.
Donan	1987	Jan. 2007	60.3 MMstb.
Douglas (Wales)	1990	Jan. 1996	225 MMstb.
Dunbar (Alwyn S. S. A.)	1972	Dec. 1994	850 MMstb.
Dunlin	1973	Aug. 1978	363 MMstb.
Eider	1976	Nov. 1988	85 MMstb.
Elgin-Franklin Fields	1985	Jun. 1905	365 MMstb.
ETAP	1995	Nov. 1998	490 MMstb.
Foinaven	1990	Nov. 1997	600 MMstb.
Forties	1970	Sep. 1975	5000 MMstb.
Fulmar	1975	Feb. 1982	73 MMstb.
Gannet (A,C,D,E,F,G)	1973	Nov. 1993	214 MMstb.
Golden Eagle	2001	Nov. 2014	140 MMstb.

Name	Year Discovered	Start of Production	Reserves
Gryphon	1987	Oct. 1993	207 MMstb.
Harding	1987	Apr. 1996	322 MMstb.
Heather	1973	Oct. 1978	464 MMstb.
Hutton	1973	Aug. 1984	265 MMstb.
Ivanhoe	1975	Jul. 1989	100 MMstb.
Janice	1990	Feb. 1999	70 MMstb.
Kittiwake	1981	Sep. 1990	70 MMstb.
Kraken	1985	Jul. 1905	137 MMstb.
Leadon	1989	Jun. 1905	120 MMstb.
Macculloch	1990	Aug. 1997	58 MMstb.
Magnus	1974	Aug. 1983	1540 MMstb.
Mariner Oilfield	1981	Jul. 1905	250 MMstb.
Maureen	1973	Sep. 1983	210 MMstb.
Miller	1983	Jun. 1992	345 MMstb.
Montrose	1971	Jun. 1976	93.6 MMstb.
Murchison (UK)	1975	Sep. 1980	400 MMstb.
Nelson	1988	Feb. 1994	790 MMstb.
Ninian	1974	Dec. 1978	2920 MMstb.
Northwest Hutton	1975	Jun. 1905	265 MMstb.
Osprey	1974	Jun. 1905	158 MMstb.
Pierce	1975	Feb. 1999	100 MMstb.
Piper	1973	Dec. 1976	618 MMstb.
Ross	1981	Apr. 1999	100 MMstb.
Saltire	1988	May 1993	224 MMstb.
Schiehallion	1993	Jun. 1905	450-600 MMstb.
Scott	1983	Sep. 1993	440 MMstb.
South Cormorant	1972	Dec. 1979	90 MMstb.
Tartan	1974	Jan. 1981	116 MMstb.
T-Block	1976	Nov. 1993	100 MMstb.
Tern	1975	Jun. 1989	175 MMstb.
Thistle	1972	Feb. 1978	824 MMstb.

A main data source was https://www.gov.uk/guidance/oil-and-gas-uk-field-dataZuk-oil-and-gas-reserves-and-resources, last accessed on July 15, 2017. The site is apparently constantly updated, but the main link https://www.ogauthority.co.uk/data-centre/ should remain intact, last accessed on April 10, 2018.

Each individual discovery, its discovery date, and size were verified using various sources. These were: Casey *et al.* (1993); Coward *et al.* (1991); Eneyok *et al.* (2003); EnQuest (2013, n.d.); E.ON (2013); Favero *et al.* (1994); Fee & O'Dea (2005); Glennie & Armstrong (1991); Guscott *et al.* (2003); Jayasekera *et al.* (1999); Kavanagh (2013); Kay (2003); Kunka *et al.* (2003); Nexen/CNOOC (2013); Pye & Brown (2002); Ritchie (2003); Talisman Energy (2006a,b, 2007); The Maersk Group (2014); Tonkin & Fraser (1991); United Kingdom Government (2013); Van Vessem & Gan (1991); Walker (1994).

D Party Leaders of the SNP and Plaid Cymru

Table 9: **List of Party Leaders**

SNP	Term begin	Term end
Bruce Watson	1945	1947
Robert McIntyre	1947	1956
James Halliday	1956	1960
Arthur Donaldson	1960	1969
William Wolfe	1969	1979
Gordon Wilson	1979	1990
Alex Salmond	1990	2000
John Swinney	2000	2004
Plaid Cymru	Term begin	Term end
Gwynfor Evans	1945	1981
Dafydd Wigley	1981	1984
Dafydd Elis-Thomas	1984	1991
Dafydd Wigley	1991	2000
Ieuan Wyn Jones	2000	2012

The leaders' terms were cross-verified using the following sources (all last accessed on August 10, 2017):

- http://aberdeensnp.org/node/9
- https://www.britannica.com/biography/Richard-Gwynfor-Evans
- http://www.parliament.uk/biographies/lords/lord-wigley/547
- http://www.parliament.uk/biographies/lords/lord-elis-thomas/2816
- http://www.bbc.co.uk/news/uk-wales-22944836

E Regional Identity Survey Questions

Table 10 shows that almost a decade after the first discoveries, regional identity was still stronger in Wales. Compared to Scotland, a larger share of people consider themselves to be Welsh, and the share of people stating a regional instead of British identity is also higher in Wales. The data can be accessed through https://discover.ukdataservice.ac.uk/catalogue/.

Table 10: **Regional Versus National Identity**

	Percentage share of regional identity 1979	Percentage share of national identity 1979	Ratio of regional/ national identity 1979
Scotland	23%	15%	1.47
Wales	56%	32%	1.75

Based on the Scottish and Welsh election study in 1979. The exact survey question we use was: "Do you consider yourself to be British or Scottish or English or Irish or something else? [If you had to choose one, which would you say you were?]". In the case of Scotland (Wales), we coded the people answering "Scottish" ("Welsh") and set them in relation to those answering "British".

F Different Event Windows for Discoveries (Based on Table 3)

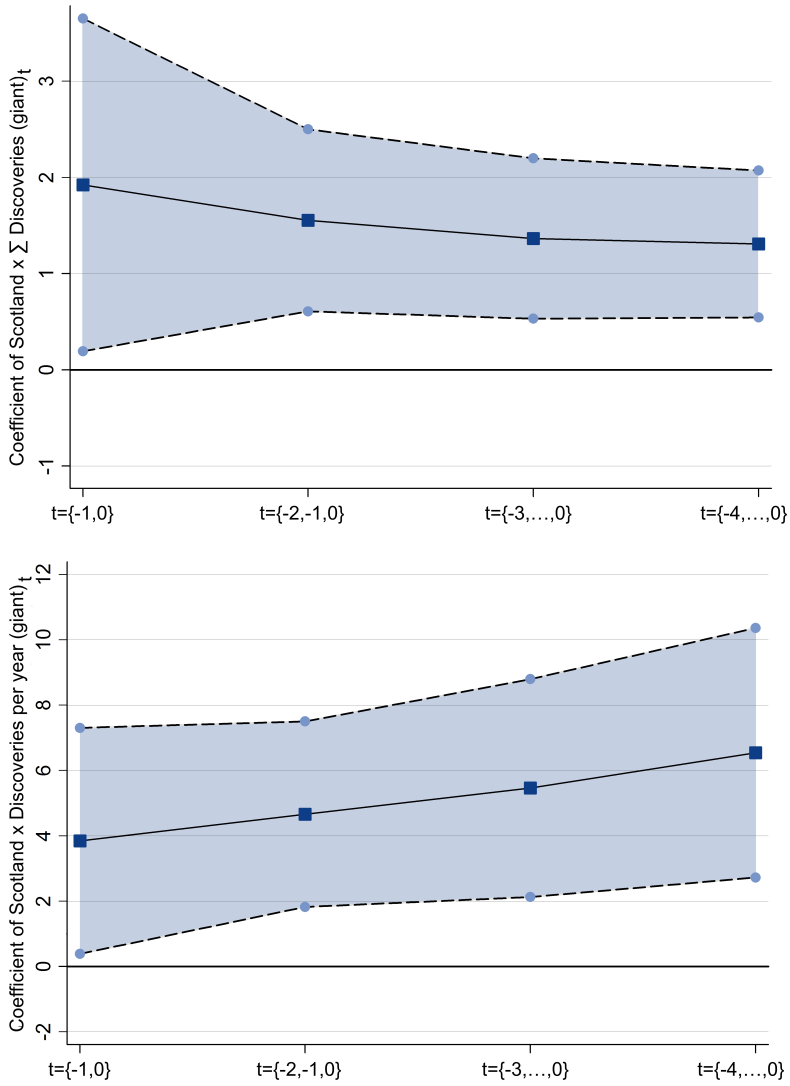


Figure 10: **Effect of the Sum of Giant Discoveries and Giant Discoveries per Year**

The upper graph shows the estimated coefficients and the respective 95-percent confidence interval from the first row in Table 4. The lower graph displays the estimates from the second row reported in Table 4.

G Calculation of Constituency Results

To compute the election results for the individual constituencies based on the 2001 boundaries, we applied the following procedure. First, we superimposed historical electoral maps with a graphical software to detect whether constituency boundaries have changed. For each period, we calculated how the 2001-constituencies consist of the historical constituencies used in previous GEs. As there exists no better estimate for the population distribution within a constituency, we assume a uniform distribution. To describe the overlapping

area of the historical constituencies and the 2001-constituencies, we use fifths gradations. Election results of constituencies included in the panel are then extrapolated based on the following formula. First, assume the historical constituencies 1, 2,.., n from the GE in t overlap with the 2001-constituency j. The extrapolation for this constituency is given by: $Y_{j,t} = \frac{\sum_{i=1}^{n} x_{i,t} \times Y_{i,t}}{\sum_{i=1}^{n} x_{i,t}}$, $x_{i,t} \in \{0, \frac{1}{5}, \frac{2}{5}, \frac{3}{5}, \frac{4}{5}, 1\}$, with $Y_{i,t}$ being the election result of an original constituency in year t, $Y_{j,t}$ being the projected result of a 2001-constituency in t, and $x_{i,t}$ representing the shares of the n original constituencies i overlapping with the 2001-constituency j. By this pattern, the results from historical constituencies are included in a weighted form in the extrapolated result based on the boundaries of 2001-constituencies. If only one historical constituency accounts for a 2001-constituency, the result is adopted without further computation. For transparency reasons, we provide the entire weightings for all constituencies in all time periods on the following pages.

The map shows the Scottish 2001-constituences to which the older election results are projected. It provides an example of the GIS maps, which we used to build the dataset analysed. Source: http://www.bcomm-scotland.independent.gov.uk/maps/datafiles/.

Sources: Boundary Commission for Scotland (http://www.bcomm-scotland.independent.gov.uk/maps/datafiles/), David Boothroyd (http://www.election.demon.co.uk/), UK Data Service (https://census.edina.ac.uk/easy_download.html); all last accessed on August 19, 2015.

	Base: 1997-2004	1945-1949	1950-1954	1955-1973	1974-1982	1983-1996
Wales	Aberavon	Aberavon	Aberavon	Aberavon	Aberavon	Aberavon
Scotland	Aberdeen Central	Aberdeen North + 2/5 Aberdeen South	Aberdeen North	Aberdeen North	Aberdeen North	Aberdeen North
Scotland	Aberdeen North	Central Aberdeenshire	West Aberdeenshire	West Aberdeenshire	West Aberdeenshire	Aberdeen North
Scotland	Aberdeen South	Aberdeen South	Aberdeen South	Aberdeen South	Aberdeen South	Aberdeen South
Scotland	Aberdeenshire West and Kincardine	Kincardine and West Aberdeenshire	3/5 West Aberdeenshire + 3/5 North Angus and Mearns	3/5 West Aberdeenshire + 3/5 North Angus and Mearns	3/5 West Aberdeenshire + 3/5 North Angus and Mearns	Kincardeene and Deeside + 2/5 Gordon
Scotland	Airdrie and Shotts	North Lanarkshire	North Lanarkshire	North Lanarkshire	North Lanarkshire	Monklandes East + 3/5 Motherwell North
Wales	Alyn and Deeside	Flint	East Flint	East Flint	East Flint	Alyn and Deeside
Scotland	Angus	2/5 Forfar +2/5 Montrose District of Burghs	2/5 South Angus + 1/5 North Angus and Mearns	2/5 South Angus + 1/5 North Angus and Mearns	2/5 South Angus + 1/5 North Angus and Mearns	Angus East
Scotland	Anniesland (Glasgow)	2/5 Hillhead + 2/5 Pattrick	3/5 Hillhead + 4/5 Scotstoun	3/5 Hillhead + 4/5 Scotstoun	3/5 Hillhead + Garscadden	1/5 Hillhead + Garscadden
Scotland	Argyll and Bute	Argyll	Argyll	Argyll	Argyll	Argyll and Bute
Scotland	Ayr	2/5 Ayr District of Burghs + 1/5 Kilmarnock	4/5 Ayr + 1/5 Central Ayrshire	4/5 Ayr + 1/5 Central Ayrshire	Ayr	Ayr
Scotland	Baillieston (Glasgow)	Bothwell	3/5 Camlachie + 1/5 Bothwell	3/5 Provan +1/5 Bothwell	3/5 Provan + 1/5 Ruhterglen	3/5 Provan + 3/5 Shettleston
Scotland	Banff and Buchan	3/5 East Aberdeenshire + 2/5 Banff	3/5 East Aberdeenshire + 2/5 Banff	3/5 East Aberdeenshire + 2/5 Banff	3/5 East Aberdeenshire + 2/5 Banff	Banff and Buchan
Wales	Blaenau Gwent	Ebbw Vale +2/5 Abertillerie	Ebbw Vale +2/5 Abertillerie	Ebbw Vale +2/5 Abertillerie	Ebbw Vale +2/5 Abertillerie	Blaenau Gwent
Wales	Brecon and Radnor	Brecon and Rednor	Brecon and Rednor	Brecon and Rednor	Brecon and Rednor	Brecon and Rednor
Wales	Bridgend	1/5 Aberavon + 2/5 Ogmore	1/5 Aberavon + 2/5 Ogmore	1/5 Aberavon + 2/5 Ogmore	1/5 Aberavon + 2/5 Ogmore	Bridgend
Wales	Caernarvon	Caernarvonshire + 2/5 Caernarvon District	Caernarvon	Caernarvon	Caernarvon	Caernarvon
Wales	Caerphilly	Caerphilly	Caerphilly	Caerphilly	Caerphilly	Caerphilly
Scotland	Caithness, Sutherland and Easter Ross	Caithness and Sutherland	Caithness and Sutherland	Caithness and Sutherland	Caithness and Sutherland	Caithness and Sutherland
Wales	Cardiff Central	Cardiff Central	Cardiff North	Cardiff North	Cardiff North	Cardiff Central

	Base: 1997-2004	1945-1949	1950-1954	1955-1973	1974-1982	1983-1996
Wales	Cardiff North	Cardiff North + 1/5 Llandaff and Barry	Cardiff North + 1/5 Barry	Cardiff North + 1/5 Barry	Cardiff North West	Cardiff North
Wales	Cardiff South and Penarth	Cardiff South + Cardiff East	Cardiff South East	Cardiff South East	Cardiff South East	Cardiff South and Penarth
Wales	Cardiff West	Llandaff and Barry	Cardiff West	Cardiff West	Cardiff West	Cardiff West
Wales	Carmarthen East and Dinefwr	Carmarthen	Carmarthen	Carmarthen	Carmarthen	Carmarthen
Wales	Carmarthen West and Pembrokeshire South	1/5 Camarthen + 2/5 Pembroke	1/5 Camarthen + 2/5 Pembroke	1/5 Camarthen + 2/5 Pembroke	1/5 Camarthen + 2/5 Pembroke	1/5 Camarthen + 2/5 Pembroke
Scotland	Carrick, Cumnock and Doon Valley	South Ayrshire	South Ayrshire	South Ayrshire	South Ayrshire	Carrick, Cunnock and Doon Valley
Scotland	Cathcart (Glasgow)	1/5 Rutherglen + Cathcart	Cathcart	Cathcart	Cathcart + 1/5 Pollok	Cathcart
Wales	Ceredigion Gogledd Penfro	Cardigan	Cardigan	Cardigan	Cardigan	Ceredigion and Pembroke North
Wales	Clwyd South	3/5 Wrexham + 2/5 Denbigh	3/5 Wrexham + 2/5 Denbigh	3/5 Wrexham + 2/5 Denbigh	3/5 Wrexham + 2/5 Denbigh	3/5 Wrexham + 2/5 Clwyd South West
Wales	Clwyd West	Denbigh	Denbigh	Denbigh	Denbigh	2/5 Clwyd South West + 2/5 Clwyd North West
Scotland	Clydebank and Milngavie	Dunbartonshire + 2/5 Dumbarton District of Burghs	1/5 East Dunbartonshire + 3/5 Central Dunbartonshire	1/5 East Dunbartonshire + 3/5 Central Dunbartonshire	Central Dunbartonshire	Clydebank and Milngavie
Scotland	Clydesdale	Lanark	Lanark	Lanark	Lanark	Clydesdale
Scotland	Coatbridge and Chryston	1/5 North Lanarkshire + 3/5 Coath-bridge+ 1/5 Bothwell	1/5 North Lanarkshire + 3/5 Coatbridge and Airdrie	1/5 North Lanarkshire + 3/5 Coatbridge and Airdrie	1/5 North Lanarkshire + 3/5 Coatbridge and Airdrie	Monklands West
Wales	Conway	Caernarvonshire + 3/5 Caernarvon District	Conway	Conway	Conway	Conway
Scotland	Cumbernauld and Kilsyth	East Dunbartonshire	Dunbartonshire	Dunbartonshire	East Dunbartonshire	Cumbernauld und Kilsyth
Scotland	Cunninghame North	Bute and North Ayrshire	Bute and North Ayrshire	Bute and North Ayrshire	Bute and North Ayrshire	Cunninghame North
Scotland	Cunninghame South	1/5 Ayr District of Burghs + 1/5 Bute and North Ayrshire	Central Ayrshire	Central Ayrshire	Central Ayrshire	Cunninghame South
Wales	Cynon Valley	Aberdare + 1/5 Merthyr	Aberdare	Aberdare	Aberdare	Cynon Valley
Wales	Delyn	Flint	4/5 Flint West + 2/5 Flint East	4/5 Flint West + 2/5 Flint East	4/5 Flint West + 2/5 Flint East	Delyn

	Base: 1997-2004	1945-1949	1950-1954	1955-1973	1974-1982	1983-1996
Scotland	Dumbarton	4/5 Dunbartonshire + Dumbarton District of Burghs	West Dunbartonshire	West Dunbartonshire	West Dunbartonshire	Dumbarton
Scotland	Dumfries	Dumfriesshire	Dumfries	Dumfries	Dumfries	Dumfries
Scotland	Dundee East	Dundee	Dundee East	Dundee East	Dundee East	Dundee East
Scotland	Dundee West	Dundee	Dundee West	Dundee West	Dundee West	Dundee West
Scotland	Dunfermline East	West Fife	West Fife	West Fife	3/5 Central Fife + 2/5 Dunfermline	Dunfermline East + 1/5 Dunfermline West
Scotland	Dunfermline West	2/5 West Fife + Dunfermline District of Burghs	2/5 West Fife + Dunfermline Burghs	2/5 West Fife + Dunfermline Burghs	Dunfermline	Dunfermline West
Scotland	East Kilbride	Lanark	Lanark	Lanark	East Kilbride	East Kilbride
Scotland	East Lothian	Berwick and Haddingon	Berwick and East Lothian	Berwick and East Lothian	Berwick and East Lothian	East Lothian
Scotland	Eastwood	East Renfrewshire	East Renfrewshire	East Renfrewshire	East Renfrewshire	Eastwood
Scotland	Edinburgh Central	Edinburgh West + Edinburgh Central	Edinburgh Central	Edinburgh Central	Edinburgh Central + 1/5 Edinburgh North + 1/5 Edinburgh West	Edinburgh Central + 1/5 Edinburgh West
Scotland	Edinburgh East and Musselburgh	Edinburgh East	Edinburgh East	Edinburgh East	Edinburgh East	Edinburgh East
Scotland	Edinburgh North and Leith	Leith + Edinburgh North + 1/5 Edinburgh West	Edinburgh Leith + Edinburgh North	Edinburgh Leith + 3/5 Edinburgh North	Edinburgh Leith + 3/5 Edinburgh North	Edinburgh Leith
Scotland	Edinburgh South	Edinburgh South	Edinburgh South	Edinburgh South	Edinburgh South	Edinburgh South
Scotland	Edinburgh West	1/5 North Midlothian + 1/5 Linlithgowshire	Edinburgh West + 1/5 West Lothian	Edinburgh West +1/5 West Lothian	Edinburgh West +1/5 West Lothian	Edinburgh West + 1/5 Livingston + 1/5 Linlithgow
Scotland	Falkirk East	2/5 Clackmannan and East Stirling +1/5 Linlithgowshire	3/5 Stirling and Falkirk Grangemouth + 1/5 West Lothian + 3/5 Clackmannan and East Stirling	3/5 Stirling and Falkirk Grangemouth + 1/5 West Lothian + 3/5 Clackmannan and East Stirling	3/5 Stirling and Falkirk Grangemouth + 1/5 West Lothian + 3/5 Clackmannan and East Stirling	Falkirk East + 1/5 Clackmannan
Scotland	Falkirk West	1/5 Clackmannan and West Stirlingshire + 1/5 Stirling Districts of Burghs	Stirling and Falkirk Grangemouth	Stirling and Falkirk Grangemouth	Stirling and Falkirk Grangemouth	Falkirk West
Scotland	Fife Central	3/5 West Fife	West Fife	West Fife	Central Fife	Central Fife

	Base: 1997-2004	1945-1949	1950-1954	1955-1973	1974-1982	1983-1996
Scotland	Fife North East	Fife East	Fife East	Fife East	Fife East	Fife North East
Scotland	Galloway and Upper Nithsdale	Galloway + 2/5 Dumfries	Galloway + 2/5 Dumfries	Galloway + 2/5 Dumfries	Galloway + 2/5 Dumfries	Galloway and Unpper Nithsdale
Scotland	Gordon	4/5 Central Aberdeenshire + 1/5 Banff + 1/5 East Aberdeenshire	1/5 West Aberdeenshire + 1/5 Banff + 3/5 East Aberdeenshire	1/5 West Aberdeenshire + 1/5 Banff + 2/5 East Aberdeenshire	1/5 West Aberdeenshire + 1/5 Banff + 2/5 East Aberdeenshire	1/5 Banff und Buchan + 3/5 Gordon +1/5 Moray
Scotland	Govan (Glasgow)	4/5 Pollok + Govan + Tradeston	1/5 Pollok + 2/5 Govan + Tradeston	Govan + 2/5 Pollak	Govan + 1/5 Pollak	2/5 Govan + 1/5 Pollak + 1/5 Central
Wales	Gower	Gower	Gower	Gower	Gower	Gower
Scotland	Greenock and Inverclyde	Greenock + 1/5 West Renfrewshire	Greenock + 1/5 West Renfrewshire	Greenock + 1/5 West Renfrewshire	3/5 Greenock + 1/5 West Renfrewshire	1/5 Renfrew West and Inverclyde + 3/5 Greenock and Port Glasgow
Scotland	Hamilton North and Bellshill	4/5 Bothwell + 1/5 Hamilton	4/5 Bothwell + 1/5 Hamilton	4/5 Bothwell + 1/5 Hamilton	3/5 Motherwell North + 2/5 Hamilton	2/5 Motherwell North + 1/5 Hamilton
Scotland	Hamilton South	3/5 Hamilton + 1/5 Rutherglen	Hamilton	Hamilton	1/5 East Kilbride + 3/5 Hamilton	Hamilton
Scotland	Inverness East, Nairn and Lochaber	3/5 Inverness + 1/5 Argyll + 2/5 Moray and Nairn	3/5 Inverness + 1/5 Argyll + 2/5 Moray and Nairn	3/5 Inverness + 1/5 Argyll + 2/5 Moray and Nairn	3/5 Inverness + 1/5 Argyll + 2/5 Moray and Nairn	Inverness, Nairn und Lochaber
Wales	Islwyn	Bedwellty	Bedwellty + 2/5 Abertillery	Bedwellty + 2/5 Abertillery	Bedwellty + 2/5 Abertillery	Islwyn
Scotland	Kelvin (Glasgow)	2/5 Patrick +4/5 Central +Kelvingrove + 2/5 Hillhead	2/5 Hillhead + 2/5 Scoutstoun + Kelvin + 4/5 Central	Kelvingrove + 2/5 Central+ 2/5 Woodside+ 2/5 Hillhead	2/5 Hillhead + 3/5 Kelvingrove + 2/5 Central	4/5 Hillhead +1/5 Central
Scotland	Kilmarnock and Loudoun	3/5 Kilmarnock + 1/5 Bute and North Ayrshire	Kilmarnock + 1/5 Central Ayrshire	Kilmarnock + 1/5 Central Ayrshire	Kilmarnock	Kilmarnock and Loudon
Scotland	Kirkcaldy	1/5 West Fife + 2/5 Kirkcaldy District of Burghs	1/5 West Fife + 3/5 Kirkcaldy Burghs	1/5 West Fife + 3/5 Kirkcaldy Burghs	Kirkcaldy	Kirkcaldy
Scotland	Linlithgow	Linlithgowshire	West Lothian	West Lothian	West Lothian	Linlithgow
Scotland	Livingston	2/5 North Midlothian + 1/5 Linlithgowshire	West Lothian	1/5 Midlothian + 1/5 Westlothian	1/5 Midlothian + 1/5 Westlothian	Livingston
Wales	Llanelly	Llanelly	Llanelly	Llanelly	Llanelly	Llanelly
Scotland	Maryhill (Glasgow)	2/5 Glasgow St. Rollox + Maryhill	3/5 Woodside+ Maryhill	1/5 Woodside+ Maryhill	1/5 Kelvingrove+ Maryhill	1/5 Springburn+ Maryhill

	Base: 1997-2004	1945-1949	1950-1954	1955-1973	1974-1982	1983-1996
Wales	Meirionnydd Nant Conwy	4/5 Merionethshire (Merioneth) + 1/5 Caernarvonshire + 2/5 Caernarvon District	4/5 Merionethshire (Merioneth) + 3/5 Conway	4/5 Merionethshire (Merioneth) + 3/5 Conway	4/5 Merionethshire (Merioneth) + 3/5 Conway	Meirionnydd Nant Conwy
Wales	Merthyr Tydfil and Rhymney	Merthyr +1/5 Caerphilly	Merthyr +1/5 Caerphilly	Merthyr +1/5 Caerphilly	Merthyr +1/5 Caerphilly	Merthyr Tydfil and Rhymney
Scotland	Midlothian	Peebles and South Midlothian	Midlothian and Peebles	Midlothian	Midlothian	Midlothian
Wales	Monmouth	Monmouth	Monmouth	Monmouth	Monmouth	Monmouth
Wales	Montgomeryshire	Montgomery	Montgomery	Montgomery	Montgomery	Montgomery
Scotland	Moray	3/5 Moray and Nairn +3/5 Banff	3/5 Moray and Nairn +3/5 Banff	3/5 Moray and Nairn +3/5 Banff	3/5 Moray and Nairn +3/5 Banff	Moray
Scotland	Motherwell and Wishaw	Motherwell	Motherwell	Motherwell	Motherwell and Wishaw	Motherwell South
Wales	Neath	Neath	4/5 Neath + 1/5 Gower	4/5 Neath + 1/5 Gower	4/5 Neath + 1/5 Gower	Neath
Wales	Newport East	2/5 Newport + 1/5 Monmouth	2/5 Newport + 3/5 Monmouth	2/5 Newport + 3/5 Monmouth	2/5 Newport + 3/5 Monmouth	Newport East
Wales	Newport West	2/5 Newport	2/5 Newport	2/5 Newport	2/5 Newport	Newport West
Scotland	Ochil	1/5 Kinross and Westperthshire + 4/5 Clackmann and East Stirlingshire	1/5 Kinross and Westperthshire + 4/5 Clackmann and East Stirlingshire	1/5 Kinross and Westperthshire + 4/5 Clackmann and East Stirlingshire	1/5 Kinross and Westperthshire + 4/5 Clackmann and East Stirlingshire	4/5 Clackmannan + 1/5 Perth and Kinross
Wales	Ogmore	3/5 Ogmore + 1/5 Pontypridd + 1/5 Aberavon	3/5 Ogmore + 1/5 Pontypridd + 1/5 Aberavon	3/5 Ogmore + 1/5 Pontypridd + 1/5 Aberavon	3/5 Ogmore + 1/5 Pontypridd + 1/5 Aberavon	Ogmore
Scotland	Orkney and Shetland	Orkney and Zetland	Orkney and Zetland	Orkney and Zetland	Orkney and Zetland	Orkney and Shetland
Scotland	Paisley North	3/5 Paisley + 1/5 East Renfrewshire	Paisley	Paisley	Paisley	3/5 Paisley North
Scotland	Paisley South	1/5 East Renfrewshire + 1/5 Paisley	Paisley	Paisley	Paisley	Paisley South
Scotland	Pentlands (Edinburgh)	North Midlothian	Pentlands	Pentlands	Pentlands	Pentlands
Scotland	Perth	1/5 Kinross and West... + 3/5 Perth and East Perthshire	1/5 Kinross and Westperthshire + 3/5 Perth and East Perthshire	1/5 Kinross and Westperthshire + 3/5 Perth and East Perthshire	1/5 Kinross and Westperthshire + 3/5 Perth and East Perthshire	Perth and Kinross

	Base: 1997-2004	1945-1949	1950-1954	1955-1973	1974-1982	1983-1996
Scotland	Pollok (Glasgow)	1/5 Pollok + 1/5 East Renfrewshire	2/5 Pollok + 2/5 Govan	2/5 Pollok + Craigton	2/5 Pollok + Craigton	Pollok + 2/5 Govan
Wales	Pontypridd	Pontypridd	Pontypridd	Pontypridd	Pontypridd	Pontypridd
Wales	Preseli Pembrokeshire	Pembroke	Pembroke	Pembroke	Pembroke	1/5 Ceredigion and Pembroke North + 3/5 Pembroke
Scotland	Renfrewshire West	West Renfrewshire	West Renfrewshire	West Renfrewshire	Renfrew West and Inverclyde	
Wales	Rhondda	Rhondda East + Rhondda West	Rhondda East + Rhondda West	Rhondda East + Rhondda West	Rhondda	Rhondda
Scotland	Ross, Skye and Inverness West	2/5 Inverness + 3/5 Ross und Cromarty	2/5 Inverness + 3/5 Ross und Cromarty	2/5 Inverness + 3/5 Ross und Cromarty	2/5 Inverness + 3/5 Ross und Cromarty	Ross, Skye and Inverness
Scotland	Roxburgh and Berwickshire	2/5 Berwick and Haddington + 2/5 Roxburgh and Selkirk	2/5 Berwick and East Lothian + 2/5 Roxburgh and Selkirk	2/5 Berwick and East Lothian + 2/5 Roxburgh, Selkirk and Peebles	2/5 Berwick and East Lothian + 2/5 Roxburgh, Selkirk and Peebles	Roxburgh and Berwickshire
Scotland	Rutherglen (Glasgow)	Rutherglen	Rutherglen	Rutherglen	Rutherglen	Rutherglen
Scotland	Shettleston (Glasgow)	Gorbals + Bridgeton + Shettleston	Gorbals + Bridgeton + Shettleston	4/5 Gorbals + Bridgeton + Shettleston	3/5 Queen's Park + 3/5 Central +Shettleston	3/5 Central + 2/5 Shetteston
Scotland	Springburn (Glasgow)	Springburn	1/5 Camlachie	Springburn + 2/5 Provan	Springburn +1/5 Provan	4/5 Springburn + 1/5 Provan
Scotland	Stirling	4/5 West Stirlingshire + 2/5 Kinross and West Perthshire	4/5 West Stirlingshire + 2/5 Kinross and West Perthshire	4/5 West Stirlingshire + 2/5 Kinross and West Perthshire	4/5 West Stirlingshire + 2/5 Kinross and West Perthshire	Stirling
Scotland	Strathkelvin and Bearsden	1/5 West Stirlingshire + 1/5 Dunbartonshire	1/5 West Stirlingshire + 1/5 Dunbartonshire	1/5 West Stirlingshire + 1/5 Dunbartonshire	1/5 West Stirlingshire + 1/5 Dunbartonshire	Strathkelvin and Bearsden + 2/5 Monklands West
Wales	Swansea East	Swansea East	Swansea East	Swansea East	Swansea East	Swansea East
Wales	Swansea West	Swansea West	Swansea West	Swansea West	Swansea West	Swansea West
Scotland	Tayside North	3/5 Kinross and West Perthshire + 4/5 Perth +3/5 Forfar	2/5 Kinross and West Perthshire + 3/5 Perth an East P.+ 3/5 South Angus + 1/5 Noth Angus and Mearns	2/5 Kinross and West Perthshire + 3/5 Perth an East P.+ 3/5 South Angus + 1/5 Noth Angus and Mearns	2/5 Kinross and West Perthshire + 3/5 Perth an East P.+ 3/5 South Angus + 1/5 Noth Angus and Mearns	North Tayside + 2/5 Angus East

	Base: 1997-2004	1945-1949	1950-1954	1955-1973	1974-1982	1983-1996
Wales	Torfaen	Pontypool + 1/5 Monmouth	Pontypool	Pontypool	Pontypool	Torfaen
Scotland	Tweeddale, Ettrick and Lauderdale	3/5 Peebles and South Midlothian +2/5 Roxburgh and Selkirk	3/5 Peebles and South Midlothian +2/5 Roxburgh and Selkirk	3/5 Roxburgh, Selkirk and Peebles + 1/5 Midlothian + 1/5 Berwick and East Lothian	3/5 Roxburgh, Selkirk and Peebles + 1/5 Midlothian	Tewwdale, Ettrick and Lauderdale
Wales	Vale of Clwyd	1/5 Denbigh + 2/5 Flint West	1/5 Denbigh + 2/5 Flint West	1/5 Denbigh + 2/5 Flint West	3/5 Denbigh + 2/5 Flint West	3/5 Clwyd North West + 1/5 Clwyd South West
Wales	Vale of Glamorgan	3/5 Llandaff and Barry + 3/5 Pontypridd	3/5 Barry + 3/5 Pontypridd	3/5 Barry + 3/5 Pontypridd	3/5 Barry + 3/5 Pontypridd	Vale of Glamorgan
Scotland	Western Isles	Western Isles	Western Isles	Western Isles	Western Isles	Western Isles
Wales	Wrexham	Wrexham	Wrexham	Wrexham	Wrexham	Wrexham
Wales	Ynys Mon	Anglesey	Anglesey	Anglesey	Ynys Mon	Ynys Mon

H Variables Description

Secessionist vote share	Share of votes received by *SNP/Plaid Cymru* in UK Parliament elections in a single constituency (in percent).
Discoveries (giant)	Number of giant oil discoveries in year t and $t-1$. An oil field classified as 'giant' contains ultimate recoverable reserves of 500 million barrels or more before the extraction starts.
Discoveries (all)	Number of oil discoveries in year t and $t-1$. All oil fields with 50 million barrels or more are captured.
Amount of new reserves	Reserves of discovered oil fields in year t and $t-1$ in 1000 million barrels of oil (MMstb.).
Scotland	Binary variable indicating Scottish constituencies (1 if the constituency is Scottish, 0 otherwise).
Oil price[a]	Real price of Brent crude oil (year average). The unit is constant 2001 US$.
GDP per capita	Relative regional per capita gross domestic product for Scotland and Wales (in percent of UK average).
Unemployment rate	Regional rate of registered unemployed (Claimant count) for Scotland and Wales (in percent).
Near border (50)[b]	Binary indicator for constituencies that are less than 50 km of the English border (1 if the constituency is within this distance, 0 otherwise).
Near border (75)[b]	Binary indicator for constituencies that are less than 75 km of the English border (1 if the constituency is within this distance, 0 otherwise).
Near border (100)[b]	Binary indicator for constituencies that are less than 100 km of the English border (1 if the constituency is within this distance, 0 otherwise).
Coastal access[b]	Binary indicator for constituencies with coastal access (1 if the constituency has sea access, 0 otherwise).
Distance to Aberdeen[b]	Distance from a constituency to Aberdeen (in km).

Avg. soil suitability[c]	Average soil suitability for production of potatoes, barley, and wheat. (medium input intensity and irrigation).
Ruggedness index[d]	Index of variance of elevation in each constituency.

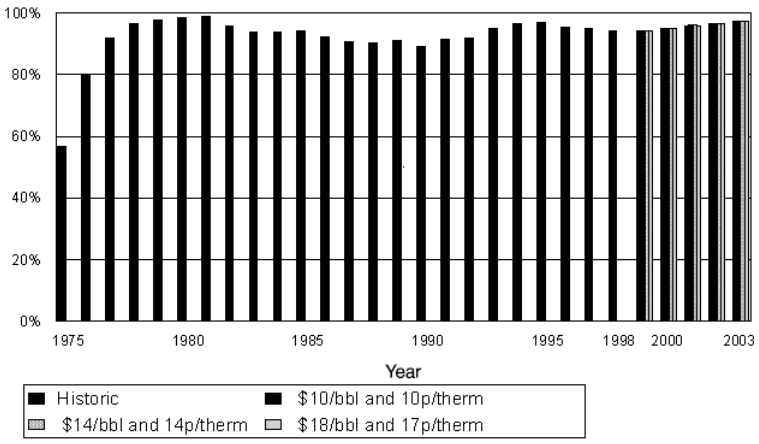
[a] To calculate the real oil price, we used US inflation data from the Bureau of Labor Statistics (see the data at http://www.usinflationcalculator.com/, last accessed on August 19, 2015). The Brent price prior to 1957 is approximately projected using data for the sort WTI.

[b] Variables are calculated using ArcGIS. Data are taken from http://www.gadm.org, Boundary Commission for Scotland (http://www.bcomm-scotland.independent.gov.uk/maps/datafiles/), David Boothroyd (http://www.election.demon.co.uk/), UK Data Service (https://census.edina.ac.uk/easy_download.html); all last accessed on August 19, 2015.

[c] Data are taken from the Global Elevation Data Set (http://diegopuga.org/data/rugged/).

[d] Data are taken from http://www.fao.org/nr/gaez/en/.

I Estimated Scottish Shares



Scottish Shares of Total UK Oil Production

Source: (Kemp & Stephen, 2000)

The estimations by (Kemp & Stephen, 2000) are based on the assumption of the equidistance line as the maritime border; that is, "a dividing line on which all points are the same distance from the Scottish and rest of the UK coastline" (Brocklehurst, 2013). Another possible border would be the 55'50' latitude, established for juristical reasons in 1968 (Brocklehurst, 2013; Lee, 1976). Alexander G. Kemp remarks that "from the economic point of view, it does not make much difference because there are just a handful of fields, and not very important ones now, between the median line and the line north of Berwick" (Brocklehurst, 2013). In addition to that: "[t]hese considerations aside, there is no doubt that most of the oil lies in the northern North Sea. However, two-thirds of known reserves are 100 miles east of the Shetland Islands and can morally be claimed by their inhabitants" (Lee, 1976, 310).

J Calculation: Relative vs. Absolute Change in Resource Value

In the following, we explain the underlying calculation for Figure 6 in the main paper. The calculation is based on the following population numbers: Scottish population = 5140935.484; overall UK population (including England, Scotland, Wales, Northern Ireland) = 57057067.74.[6]

Per capita benefits from $1 additional oil for all regions in the UK at the status quo: $B_1 = \frac{1}{Population\ UK}$.

Additional p.c. benefits for Scotland from $1 oil if Scotland becomes an independent nation:

$B_2 = \frac{1}{Pop.\ Scotland} - \frac{1}{Pop.\ UK}$.

If Scotland became an independent nation, Scottish voters' per capita benefits from North Sea oil would increase by B_2 and Welsh voters would loose B_1 because of the end of transfers from Scotland. The ratio of the Scots' p.c. win to the Welsh' p.c. loss is $B_2/B_1 = 10.099$. An additional dollar of oil increases per capita benefits for an independent Scotland by ten times more than it would cost Welsh voters. We compute three scenarios:

i.) Assuming that Welsh voters react equally strong to a change in per capita benefits.

ii.) How much stronger would the reaction of Welsh voters (ψ) have to be to make the coefficient only borderline significant at the 10-percent level.

iii.) How much stronger would the reaction of Welsh voters have to be to push the coefficient to zero.

Note that, in all likelihood, Scottish voters should be expected to react more strongly, as it is plausible that the issue of regional resource redistribution is most salient in the area possessing the resources. The formula to compute the critical beta (ii.) is:

$\beta_{crit.} = \beta - \psi \times (\frac{1}{B_2/B_1}) \times \beta$,

where β is the estimated coefficient from the regressions. $\beta_{crit.}$ denotes the coefficient size necessary (assuming a constant standard error), to reach a certain level of statistical significance. Inserting 1.654 for the 10-percent confidence level yields a coefficient size of 1.455, and would require Welsh voters to react about 2.456 times as strong as Scottish voters. Obviously, there are no realistic reasons to assume such a disproportionate reaction. Under the already conservative assumption that the Welsh react as strong as Scottish voters, the coefficient is still 1.733 and statistically significant. Results:

$\beta_{crit.}$	t-value	ψ
1.923	2.18	0
1.733	1.96	1
1.455	1.65	2.456
0	0	10.099

[6] Source: Office for National Statistics, averages from 1971-2001; see https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatestimeseriesdataset, last accessed October 26, 2018.

K Responses from Surveys in Scotland and Wales

Scotland and Wales: Satisfaction with Government (1969)

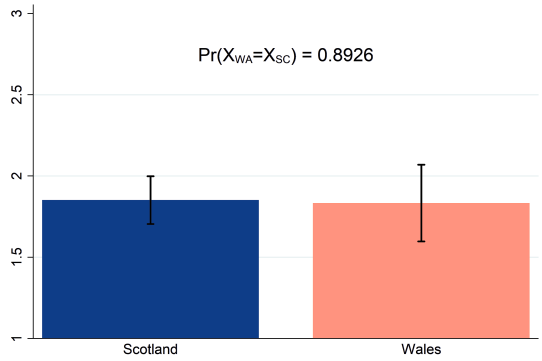


Figure 11: **Comparison of Government Satisfaction**

The figure displays the satisfaction of Scottish and Welsh voters with the national Labour Government. The variable on the y-axis is an index from 1 - 3. The higher the value, the more positive the respondent's view on the government. Black lines depict the 95%-confidence intervals. Note that the United Kingdom had a Labour Government from 1964 to 1970. It is obvious that prior to oil discoveries there were no significant differences between the two regions. Moreover, the figure also shows the result of a t-test about the equality of the two means, confirming this observation.
Source: The data is from the British Election Study (1969), provided by the UK Data Archive Data Dictionary. The specific question in the 1969 survey is to be found in the document "Political Change in Britain, 1969/1970" provided by D. Butler and D. Stokes via the Inter-university Consortium for Political and Social Research. It reads: *"Did the Labour Government make you better or worse off, or didn't it make much difference?"*

Scotland and Wales: Trust in Government (1974)

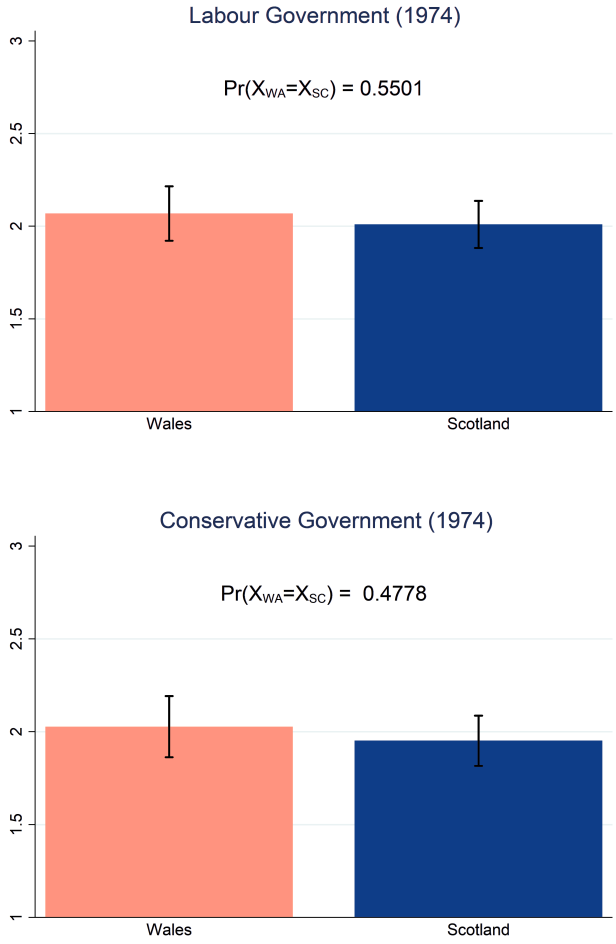


Figure 12: **Comparison of Trust in Government**

The figures display trust in the national government in Scotland and Wales. The variable on the y-axis is in both cases an index from 1 - 3. The higher the value, the more positive the respondent's view on the government. Black lines depict the 95%-confidence intervals. Differences in trust could moderate the impact of changes in relative regional resource value. If regions had higher trust in the central government and the way it uses revenues from regional resources, the effect of changes in regional resources might be smaller or even zero. For instance, if trust corresponds to the underlying support for the union of regions in our model, and is sufficiently high, moderate changes in regional resources might not affect secessionist party support in a measurable way.
We are not focusing on this moderating role of trust, as changes in trust would also be endogenous to changes in our treatment variable. This "bad control" problem makes such an analysis difficult to conduct. What the figures show is that in 1974, there were no existing differences in trust in the treatment and control region. Moreover, the figures also show the results of t-tests about the equality of the two means, confirming this observation.
Source: The data is from the British Election Study (February 1974), provided by the UK Data Archive Data Dictionary. The specific questions in the 1974 survey were: *"Now, think about all the things a government has to do. When the Conservative Party is in power, how far do you feel you can rely on the Government to do what is right – usually, some of the time, or only rarely?"* and *"And when the Labour Party is in power, how much of the time do you feel you can rely on the Government to do what is right – usually, some of the time, or only rarely?"* Note that the United Kingdom had a Conservative Government from 1970 to 1974 and a Labour Government between 1974 and 1979.

North Sea Oil and the Scottish National Party

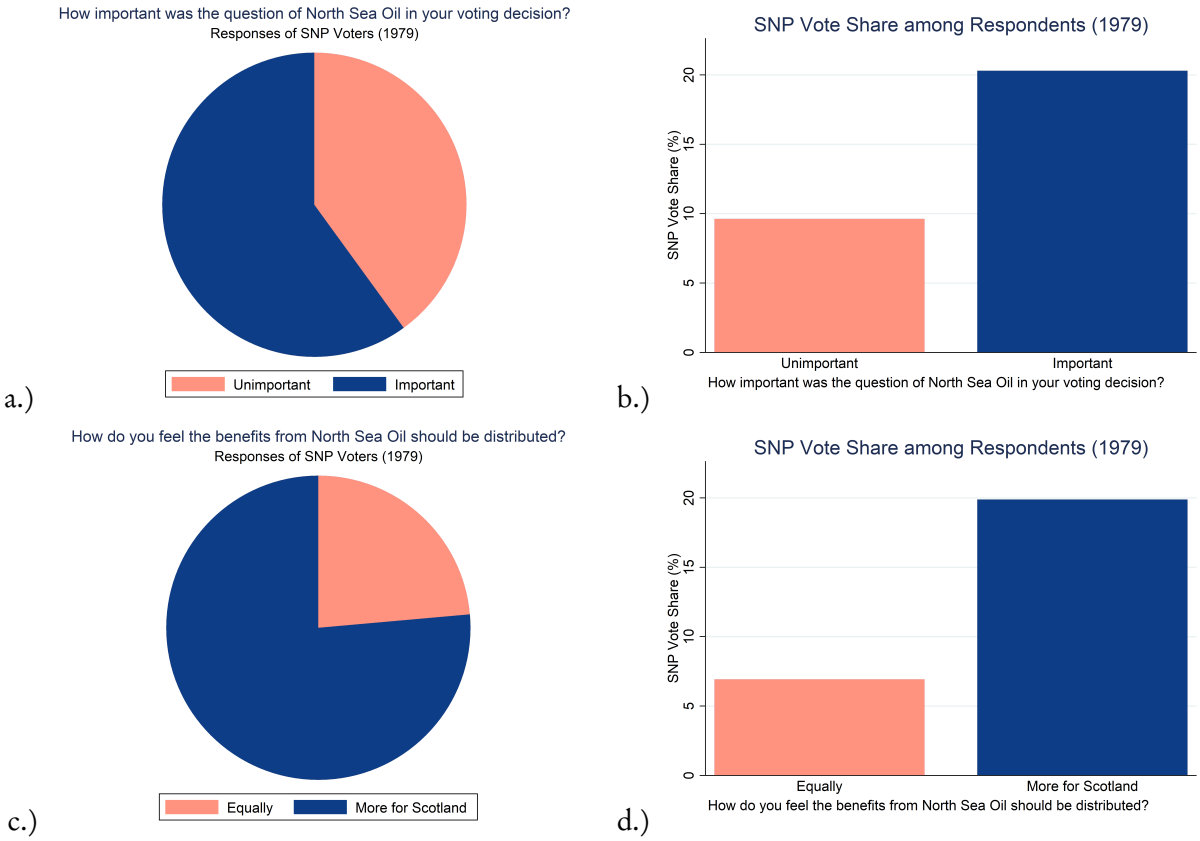


Figure 13: **Opinion on North Sea Oil among SNP Voters**

Figure a.) displays the importance of the distribution of North Sea Oil for SNP voters in their voting decision. A clear majority considers the distribution of North Sea oil as an important factor to vote for the SNP.
Figure b.) shows that the vote share of the SNP in the overall sample was nearly twice as high among respondents who considered the distribution of North Sea Oil an important issue.
Figure c.) shows that among SNP voters, more than 75% think that Scotland deserves a higher share of the oil revenues.
Figure d.) shows that the vote share of the SNP in the overall sample was more than three times as high among respondents who think that Scotland deserves a higher share of the oil revenues.
Source: Scottish and Welsh Election Studies 1979, provided by the UK Data Archive Data Dictionary. The questions are depicted in the respective sub-figure.

L Spatial Distribution of SNP Average Vote Gain after First Oil Discoveries

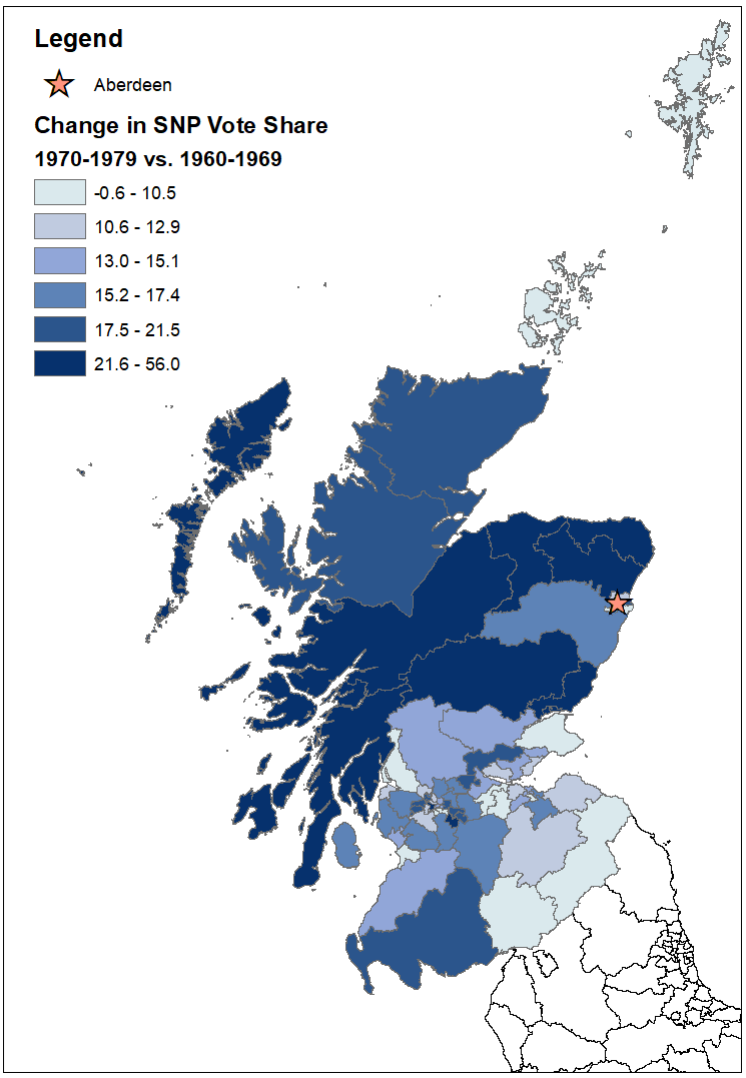


Figure 14: **Spatial Distribution of Average Change in SNP Vote Share after First Oil Discoveries**

The map is based on our data, depicting the overall change in SNP vote shares between the 1960s (pre-oil discoveries) and the 1970s (post- oil discoveries). We analyze and explain the heterogeneities in the distribution of the gains in Table 6.

M Alternative Clustering of Standard Errors

Our main estimations clusters standard errors on the constituency and time level, but other choices could also plausibly be argued for, which can be critical in a DiD framework (Bertrand *et al.*, 2004). This is why we test for the robustness of the main results in Table 3 to alternative assumptions about the structure of the error terms. The two potential issues in the DiD framework are serial correlation in the outcome and in the treatment variable. Our setup contains two regions and the treatment is region-year-specific and affects all Scottish constituencies at the same time. Based on the argumentation in Arezki *et al.* (2017) and Lei & Michaels (2014), serial correlation in the oil discoveries should be a minor concern, at least for the plausibly exogenous giant discoveries.

This leaves us with serial correlation in the outcome as the main remaining potential issue. The logic behind our initial choice was that clustering at the constituency level allows for such serial correlation given that the voting results are constituency-specific. Clustering at the time level in addition allows for outcomes to be also correlated across all constituencies due to time-specific common shocks. Nevertheless, secessionist party success could also be correlated within a whole region for each election. If, for instance, a regionalist party runs a particularly successful campaign, this might affect all constituencies in the respective region. Clustering on the region × time level allows for this possibility. Another possibility is that error terms are correlated not only within the region at a specific point in time, but also over time within the region. Not taking this into account could lead to an underestimation of standard errors. There is no consistent estimator for standard errors with only two clusters, hence we are facing a trade-off between better properties of the estimator for more clusters and allowing for more correlation within the cluster over a longer time period. Accordingly, we also categorize our sample period in five time categories and cluster on the region × time-category level. This allows error terms to be correlated within the whole region and over approximately one decade, which leaves us with ten clusters. It is similar to assuming that there is region-wide serial correlation but that the correlation diminishes over time and does not extend beyond one decade. To account for potential problems related to relatively few clusters, we also apply a wild-cluster bootstrap procedure with 10,000 repetitions, using the two most conservative specifications. Simulation evidence indicates that this yields consistent estimates for these numbers of clusters (Cameron & Miller, 2015). For completeness and transparency reasons, we also run specifications that cluster solely on the constituency or time level, and we use panel-corrected standard errors which model auto-correlation more specifically. In all specifications, the null hypothesis of the coefficient of the variable of interest being zero is rejected with p-values of at least 0.05 or less and with p-values between 0.066 and 0.100 for the wild-cluster simulations (see Tables 11-16 below).

Table 11: **Regression Results – Alternative Clustering (Table 3)**

Dependent variable	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*
Scotland × Discoveries (giant)	-	3.261	2.862	1.923	1.926
		[0.304]	[0.290]	[0.332]	[0.335]
Scotland	-	2.263	−3.500	-	-
		[1.129]	[0.508]		
Discoveries (giant)	4.494	-	-	-	-
	[0.253]				
p-value: *Scotland × Disc. (giant)*	-	0.000	0.000	0.000	0.000
Biannual fixed effects	*no*	*yes*	*yes*	*yes*	*yes*
Constituency-fixed effects	*yes*	*no*	*no*	*yes*	*yes*
Linear time trend Scotland	*no*	*no*	*yes*	*yes*	*no*
Constituency-specific time trends	*no*	*no*	*no*	*no*	*yes*
Adj. R-squared	0.58	0.50	0.52	0.74	0.83
Number of observations	1216	1883	1883	1883	1883

The table displays regression coefficients with standard errors in brackets. It corresponds to Table 3 in the paper, but standard errors are clustered on the constituency level using the *ivreg2* command in Stata. *Discoveries (giant)* denotes the number of giant oil fields discovered in $t = 0$ and $t = -1$. The unit of analysis is the constituency-half-year and the sample covers the 1945-2001 period.

Table 12: **Regression Results – Alternative Clustering (Table 3)**

Dependent variable	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*
Scotland × Discoveries (giant)	-	3.261	2.862	1.923	1.926
		[0.823]	[0.781]	[0.870]	[0.868]
Scotland	-	2.263	−3.500	-	-
		[1.429]	[1.434]		
Discoveries (giant)	4.494	-	-	-	-
	[1.124]				
p-value: *Scotland × Disc. (giant)*	-	0.000	0.000	0.027	0.027
Biannual fixed effects	*no*	*yes*	*yes*	*yes*	*yes*
Constituency-fixed effects	*yes*	*no*	*no*	*yes*	*yes*
Linear time trend Scotland	*no*	*no*	*yes*	*yes*	*no*
Constituency-specific time trends	*no*	*no*	*no*	*no*	*yes*
Adj. R-squared	0.58	0.50	0.52	0.74	0.83
Number of observations	1216	1883	1883	1883	1883

The table displays regression coefficients with standard errors in brackets. It corresponds to Table 3 in the paper, but standard errors are clustered on the biannual level using the *ivreg2* command in Stata. *Discoveries (giant)* denotes the number of giant oil fields discovered in $t = 0$ and $t = -1$. The unit of analysis is the constituency-half-year and the sample covers the 1945-2001 period.

Table 13: **Regression Results – Alternative Clustering (Table 3)**

Dependent variable	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*
Scotland × Discoveries (giant)	-	3.261	2.862	1.923	1.926
		[0.605]	[0.574]	[0.640]	[0.638]
Scotland	-	2.263	−3.500	-	-
		[1.051]	[1.055]		
Discoveries (giant)	4.494	-	-	-	-
	[1.124]				
p-value: *Scotland × Disc. (giant)*	-	0.000	0.000	0.003	0.003
Biannual fixed effects	*no*	*yes*	*yes*	*yes*	*yes*
Constituency-fixed effects	*yes*	*no*	*no*	*yes*	*yes*
Linear time trend Scotland	*no*	*no*	*yes*	*yes*	*no*
Constituency-specific time trends	*no*	*no*	*no*	*no*	*yes*
Adj. R-squared	0.58	0.50	0.52	0.74	0.83
Number of observations	1216	1883	1883	1883	1883

The table displays regression coefficients with standard errors in brackets. It corresponds to Table 3 in the paper but standard errors are clustered on the country × time level using the *ivreg2* command in Stata. *Discoveries (giant)* denotes the number of giant oil fields discovered in $t = 0$ and $t = -1$. The unit of analysis is the constituency-half-year and the sample covers the 1945-2001 period.

Table 14: **Regression Results – Alternative Clustering (Table 3)**

Dependent variable	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*
Scotland × Discoveries (giant)	-	3.261	2.862	1.923	1.926
		[0.605]	[0.574]	[0.140]	[0.132]
Scotland	-	2.263	−3.500	-	-
		[1.051]	[1.055]		
Discoveries (giant)	4.494	-	-	-	-
	[1.422]				
p-value: *Scotland × Disc. (giant)*	-	0.000	0.000	0.000	0.000
Biannual fixed effects	*no*	*yes*	*yes*	*yes*	*yes*
Constituency-fixed effects	*yes*	*no*	*no*	*yes*	*yes*
Linear time trend Scotland	*no*	*no*	*yes*	*yes*	*no*
Constituency-specific time trends	*no*	*no*	*no*	*no*	*yes*
Adj. R-squared	0.58	0.50	0.52	0.74	0.83
Number of observations	1216	1883	1883	1883	1883

The table displays regression coefficients with standard errors in brackets. It corresponds to Table 3 in the paper but standard errors are clustered on the country × time-category level using the *ivreg2* command in Stata with 5 successive time-categories. *Discoveries (giant)* denotes the number of giant oil fields discovered in $t = 0$ and $t = -1$. The unit of analysis is the constituency-half-year and the sample covers the 1945-2001 period.

Table 15: **Regression Results – Alternative Clustering (Table 3)**

Dependent variable	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*
Scotland × Discoveries (giant)	-	3.174	2.705	1.864	1.865
		[1.189]	[0.862]	[0.826]	[0.817]
Scotland	-	2.317	−3.461	11.479	−3.173
		[1.436]	[1.794]	[4.565]	[2.805]
Discoveries (giant)	4.495	−1.450	2.157	10.83	−15.673
	[1.096]	[3.149]	[3.721]	[4.001]	[9.341]
p-value: *Scotland × Disc. (giant)*	-	0.008	0.002	0.025	0.022
Biannual fixed effects	*no*	*yes*	*yes*	*yes*	*yes*
Constituency-fixed effects	*yes*	*no*	*no*	*yes*	*yes*
Linear time trend Scotland	*no*	*no*	*yes*	*yes*	*no*
Constituency-specific time trends	*no*	*no*	*no*	*no*	*yes*
Number of observations	1152	1883	1883	1883	1883

The table displays regression coefficients with standard errors in brackets. It corresponds to Table 3 in the paper but the estimation uses panel-corrected standard errors with panel-specific auto-correlation. *Discoveries (giant)* denotes the number of giant oil fields discovered in $t = 0$ and $t = -1$. The unit of analysis is the constituency-half-year and the sample covers the 1945-2001 period.

Table 16: **Regression Results – Alternative Clustering (Table 3) - Bootstrap**

Dependent variable	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*
Scotland × Discoveries (giant)	1.923	1.926	1.923	1.926
	[0.640]	[0.638]	[0.140]	[0.132]
Bootstrap p-value (2-point): *Scotland × Disc. (giant)*	0.100	0.086	0.068	0.066
Biannual fixed effects	*yes*	*yes*	*yes*	*yes*
Constituency-fixed effects	*yes*	*yes*	*yes*	*yes*
Linear time trend Scotland	*yes*	*no*	*yes*	*no*
Constituency-specific time trends	*no*	*yes*	*no*	*yes*
Adj. R-squared	0.74	0.83	0.74	0.83
Number of observations	1883	1883	1883	1883

The table displays regression coefficients with standard errors in brackets. Estimations correspond to the two last columns in Table 3 in the paper. Standard errors are clustered on the country × time level (in the left two columns) and the country × time-category level (in the right two columns) using the *ivreg2* command in Stata. Bootstrap p-value refers to p-values estimated with two wild-cluster bootstrap procedures (using a 2-point distribution) with 10,000 repetitions. *Discoveries (giant)* denotes the number of giant oil fields discovered in $t = 0$ and $t = -1$. The unit of analysis is the constituency-half-year and the sample covers the 1945-2001 period.

N Additional Regressions

Table 17: **Regression Results – Without By-Elections (Table 3)**

Dependent variable	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*
Scotland × *Discoveries (giant)*	-	3.211	2.849	2.053	2.053
		[0.805]	[0.748]	[0.893]	[0.911]
Scotland	-	2.406	−3.158	-	-
		[1.794]	[1.424]		
Discoveries (giant)	4.520	-	-	-	-
	[0.246]				
p-value: *Scotland* × *Disc. (giant)*	-	0.000	0.000	0.022	0.024
Biannual fixed effects	*no*	*yes*	*yes*	*yes*	*yes*
Constituency-fixed effects	*yes*	*no*	*no*	*yes*	*yes*
Linear time trend Scotland	*no*	*no*	*yes*	*yes*	*no*
Constituency-specific time trends	*no*	*no*	*no*	*no*	*yes*
Adj. R-squared	0.60	0.49	0.51	0.75	0.84
Number of observations	1152	1792	1792	1792	1792

The table displays regression coefficients with standard errors in brackets. It corresponds to Table 3 in the paper but election results from by-elections are excluded. *Discoveries (giant)* denotes the number of giant oil fields discovered in $t = 0$ and $t = -1$. The unit of analysis is the constituency-half-year and the sample covers the 1945-2001 period.

Our main results include by-elections as our approach was to include all informative and available information for identification. The table above demonstrates that excluding by-elections does not affect our main results.

Table 18: **Regression Results – Oil Price Interacted with Different Oil Proxies**

Dependent variable: *Secessionist vote share*	*Discoveries (all)*	*Discoveries (giant)*	*Amount of new reserves*	*Amount of new reserves (giant)*
Scotland × *Oil price*	−0.051	0.049	0.034	0.063
	[0.038]	[0.025]	[0.031]	[0.031]
X × *Scotland*	−2.860	−6.373	−1.057	−0.792
	[0.861]	[2.905]	[0.348]	[0.252]
X × *Scotland* × *Oil price*	0.078	0.174	0.045	0.047
	[0.021]	[0.064]	[0.013]	[0.014]

This is the complete version of Table 8 in the paper, displaying all constituent terms of the interactions. The table displays coefficients with standard errors in brackets. All estimations include constituency-fixed effects, biannual time-fixed effects, a linear time trend for Scotland as well as the control variables *GDP per capita* and *Unemployment rate* (as in Table 3, column 4). All other main effects are captured by the fixed effects. Standard errors are twoway-clustered on the constituency level and biannual level using the *ivreg2* command in Stata. $t = \{-x, 0\}$ denotes the number of discoveries and the amount of discovered oil reserves between t and the x years prior to t. The sample covers the 1945-2001 period and the number of observations is 1883 at the constituency-half-year level.

Table 19: **Regression Results – Triple Differences Design with Oil Price**

Dependent Variable: *Secessionist vote share*	*t={-1,0}*	*t={-2,-1,0}*	*t={-3,...,0}*	*t={-4,...,0}*
$\sum$ *Amount of new reserves*$_t$ × *Scotland* × *Oil price*	0.090	0.072	0.097	0.088
	[0.026]	[0.034]	[0.032]	[0.038]
Amount of new reserves per year$_t$ × *Scotland* × *Oil price*	0.045	0.024	0.024	0.018
	[0.013]	[0.011]	[0.008]	[0.008]

The table displays coefficients of 8 individual regressions with standard errors in brackets. All estimations include constituency-fixed effects, biannual time-fixed effects, a linear time trend for Scotland as well as the control variables *GDP per capita* and *Unemployment rate* (as in Table 3, column 4). All other main effects are included, but not displayed here. Standard errors are twoway-clustered on the constituency level and biannual level using the *ivreg2* command in Stata. $t = \{-x, 0\}$ denotes the sum/average amount of new discovered oil reserves in t and the x years prior to t. The sample covers the 1945-2001 period and the number of observations is 1883 at the constituency-half-year level.

The tables above extend the triple-differences results in the main paper and show specifications using the alternative lag-structures, as well as an interaction with other proxies of oil discoveries or the amount of existing oil in the region. The upper table shows the full set of main effects and interaction terms that are not captured by the included fixed effects. It shows the triple-interaction interacted with the number of discoveries, as well as interacted with the amount of reserves. The interaction term is positive and highly significant in all specifications, further supporting the causal nature of the relationship we discover. The bottom table focuses on different lag-structures, similar to what we do for the DiD-specification in the paper. As for the main results using a DiD-design in the paper, all results are robust to using these alternative specifications.

Table 20: **Regression Results – Only Within-Decade Variation**

Dependent Variable	*Secessionist vote Share*	*Secessionist vote share*	*Secessionist vote share*	*Secessionist vote share*
Scotland × *Discoveries (giant)*	2.629	2.751	1.922	1.716
	[1.335]	[1.163]	[0.887]	[0.835]
Scotland × *Decade (1940-1949)*	−5.200	3.571	–	–
	[4.604]	[11.036]		
Scotland × *Decade (1950-1959)*	−6.675	−0.403	–	–
	[4.686]	[8.791]		
Scotland × *Decade (1960-1969)*	−5.375	−2.408	–	–
	[4.698]	[5.406]		
Scotland × *Decade (1980-1989)*	0.315	−2.551	–	–
	[4.557]	[4.251]		
Scotland × *Decade (1990-1999)*	6.953	1.294	–	–
	[4.527]	[6.541]		
Scotland × *Decade (2000-2010)*	−1.601	−9.295	–	–
	[3.420]	[8.408]		
Scotland × *Thatcher in office*	–	–	0.603	–
			[1.776]	
p-value: *Scotland* × *Discoveries (giant)*	0.049	0.018	0.030	0.040
Biannual fixed effects	yes	yes	yes	yes
Constituency fixed effects	yes	yes	yes	yes
Linear time trend Scotland	no	yes	yes	yes
Number of observations	1883	1883	1883	1654

All estimations include constituency-fixed effects, biannual time-fixed effects, as well as the control variables *GDP per capita* and *Unemployment rate* (as in Table 3, column 4). All other main effects are included, but not displayed here. Standard errors are twoway-clustered on the constituency level and biannual level using the *ivreg2* command in Stata. The sample covers the 1945-2001 period. The decade 1970-1979 is the reference category in the first two columns. Decade indicators are formed so that one decades ends in 1969, directly before the first oil discovery. Accordingly, the specification captures changes in party leadership to a large degree and identifies the treatment effect only from variation within a decade. The last column excludes years after 1997, the year where Scotland gained additional administrative and institutional competences.

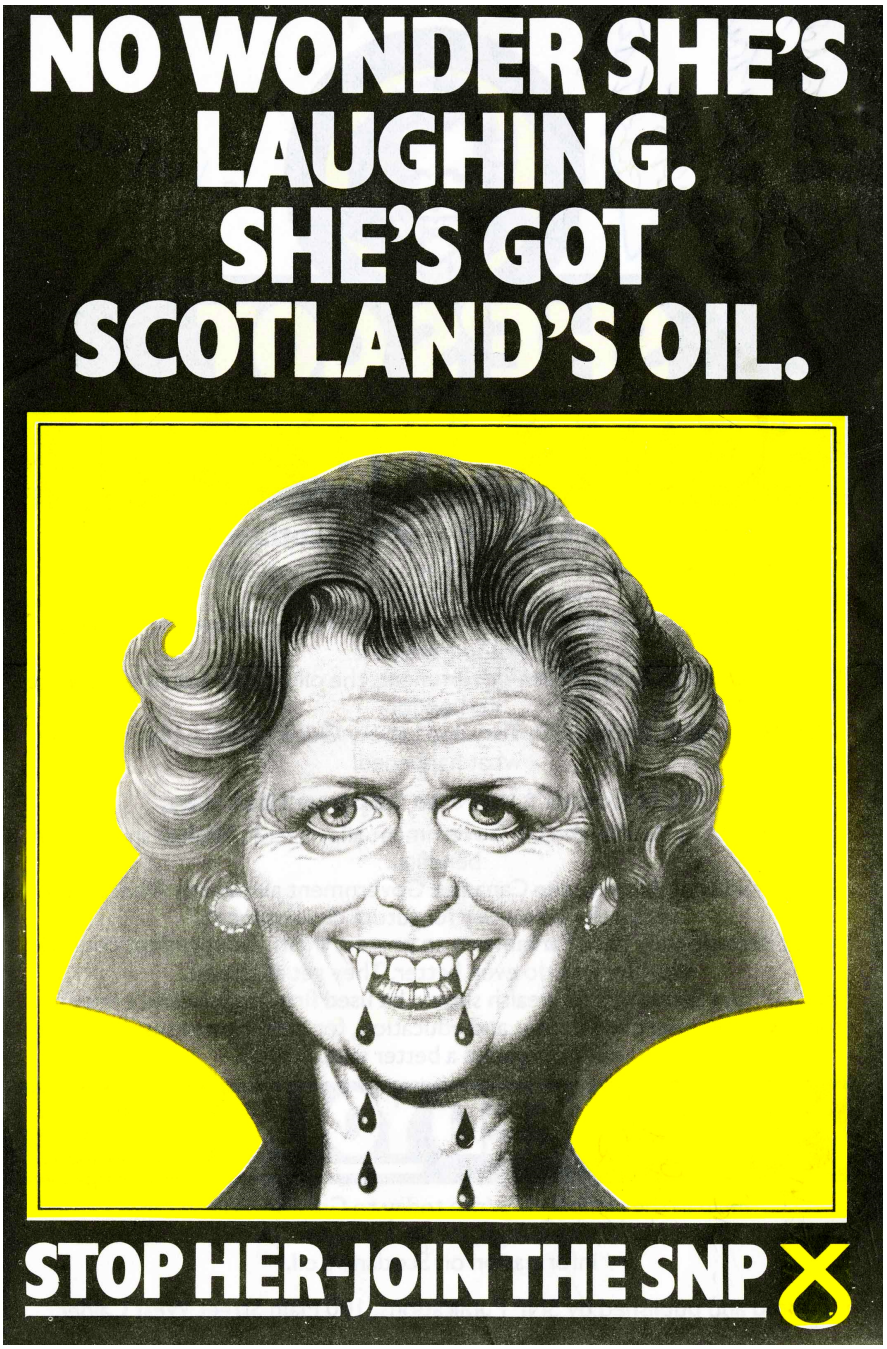
Table 21: **Regression Results – Simple DiD and Lead-Variable**

Dependent variable	*Nationalist vote share*	*Nationalist vote share*	*Nationalist vote share*	*Nationalist vote share*	*Nationalist vote share*
Scotland × *Post-1970 Indicator*	10.524	–	–	–	–
	[2.309]				
Scotland × $\sum$ *Discoveries (giant)*$_{t=\{-1,0\}}$	–	3.222	–	–	–
		[0.798]			
Scotland × $\sum$ *Disc. (giant)*$_{t=\{+1,+2\}}$ *(1-yr. lead)*	–	−1.521	–	–	–
		[1.359]			
Scotland × $\sum$ *Discoveries (giant)*$_{t=\{-2,\ldots,0\}}$	–	–	2.123	–	–
			[0.449]		
Scotland × $\sum$ *Disc. (giant)*$_{t=\{+1,\ldots,+3\}}$ *(2-yr. lead)*	–	–	−0.171	–	–
			[0.525]		
Scotland × $\sum$ *Discoveries (giant)*$_{t=\{-3,\ldots,0\}}$	–	–	–	1.857	–
				[0.399]	
Scotland × $\sum$ *Disc. (giant)*$_{t=\{+1,\ldots,+4\}}$ *(3-yr. lead)*	–	–	–	−0.057	–
				[0.476]	
Scotland × $\sum$ *Discoveries (giant)*$_{t=\{-4,\ldots,0\}}$	–	–	–	–	1.970
					[0.333]
Scotland × $\sum$ *Disc. (giant)*$_{t=\{+1,\ldots,+5\}}$ *(4-yr. lead)*	–	–	–	–	−0.331
					[0.137]
Number of observations	1883	1680	1680	1680	1680

These specifications include only the necessary components of a DiD-regression. All regressions include a binary indicator for Scottish observations and time fixed effects, in addition to the variables shown in the table. Column 1 demonstrates that our results are not depending on particular choices or control variables and hold when using a simple before-and-after specification. Standard errors are twoway-clustered on the constituency level and biannual level using the *ivreg2* command in Stata. The sample covers the 1945-2001 period. The number of observations is lower in the right columns due to including lead-variables and the exclusion of by-elections.

The table above displays five specifications. The first column shows a simple before-and-after DiD-specification. Instead of relying on individual (giant) oil discoveries, we only distinguish the sample-period into a pre-and a post-treatment period. This is less precise, but interesting as it avoids the problem of discoveries at a later point of time potentially being correlated to the amount of discoveries before. We can see that even in this simple specification, there is a strong and highly significant treatment effect. It suggests that all oil discoveries taken together have lifted the vote share of the SNP by more than 10 percentage points. The second to fifth column show results using discoveries over periods from one to four years. To further support the fact that giant oil discoveries cannot be predicted, and that voters did not anticipate them, they also include lead-variable each capturing future discoveries for four different lag structures. As we expect, the point estimates of our treatment effect remain positive and highly significant when including the lead-variables.

O It's Scotland's Oil!



Poster from the SNP's "It's Scotland's Oil" campaign in the 1970s

P Additional References

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