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Large-n QCA or logistic regression? A methodological experiment to explain formation of ethnic minority parties

Daniel Bochsler [bochsler@politic.unige.ch]
Tartu Ülikooli, politoloogia osakond; Université de Genève, Département de science politique

Abstract

Electoral systems have been shown to have important influences on the creation and the success of political parties. An important application of this theory is the way, how to integrate minorities in divided societies politically: Only certain electoral systems allow the creation and representation of parties of ethnic minorities. My theoretical model that I present in this paper shows necessary conditions for the creation of ethnic minority parties. However, as the ethnic structure of the countries under study varies, the same electoral systems may lead to different outcomes.

My hypotheses which electoral systems allow the creation of ethnic minority parties have the character of multiple conjunctional causations, and are mainly operationalised through dichotomous variables. This is why Qualitative Comparative Analysis (QCA) appears as the most appropriate methodology for my empirical tests. In this paper, I discuss how my large-n study (based on 106 ethnic minorities in Central and Eastern Europe, each being a single case) can be implemented in QCA.

However, quantitative methods offer as well tools to analyse multiple conjunctional causations. As an experiment, I re-analyse the model using a binary logistic regression model, and as there are few cases, connected to high multi-collinearity, I drop (similar to QCA) the considerations of statistical significance. Both methods lead to quite similar results; however for the interpretation of the results, it might be useful to apply visualisations that have been used by QCA (as Venn diagrams or necessary/sufficient conditions).

Introduction

Regarding methodology for quantitative studies, in the early 21st century the Qualitative Comparative Analysis (QCA) has been competing against the use of the old, broadly developed quantitative methods.[1] QCA starts from the criticisms on the old proposition – the quantitative school is described as being unrealistic through the assumption of additivity, linearity and single-variable influences (Ragin 2000: 95f.; Mahoney/Goertz 2004). Whereas a considerable number of publications aimed to compare strengths and shortcomings of both approaches, there are not too many studies confronting them in order to learn from each other (see for instance Schneider/Grofman 2006 or the special issue of *Political Analysis* [Summer 2006] on this subject, and therein more particularly Clark/Gilligan/ Golder 2006).

QCA puts the accent on very different aspects than classical quantitative methods in social science did: Instead of measuring the (linear) impact of single variables, the focus of the QCA approach is on variable *configurations* that lead to a certain outcomes (Ragin 1987, 2000). Those who developed QCA pretend that it corresponds better with social reality, because results in the social world often rely on a combination of influences and circumstances. Quantitative methods however have

[1] As we will not describe both methods in this paper, readers who are not familiar with might find extensive descriptions in Ragin (1987) for the QCA approach and in Greene (1993) for the regression analysis.

other assets, mainly because they allow the use of continuous variables and of elements of probability.

In this paper, I carry out a methodological experiment: I apply a QCA analysis on an exemplary model – that is particularly suited for the world of QCA. In a second time try to re-do the same analysis using a regression model. This experiment aims at two goals: First, it might help to show at an exemplary case to illustrate possible shortcomings of regression analyses – in a field where QCA is strong. Second, we may try to circumvent those shortcomings by borrowing analytical tools from the QCA approach and applying them in a regression environment, in order to combine the strengths of both "worlds".
When operating with a limited number of cases, and having complicated conjunctional effects, regression methods often fail to lead to significant results. A key question we may ask when dealing with different methods: Are those failings shortcomings of the method – or reflect they rather that our data basis is not suited to strong enough to allow us answering to certain questions?

My example from practice I shall use for this analysis regards the conditions for the formation of political parties of ethnic minorities. The question how to integrate ethnic minorities has been and will be a challenge for democracies around the world, one aspect of it is political representation. For constitutional engineering in divided societies, one important question thus is, if electoral systems allow the creation and representation of parties of ethnic minorities in national parliaments.[2]
In my study, I investigate which electoral rules allow the existence of political parties of ethnic minorities. Previous studies have shown that the integration of all relevant social groups into the political institutions is of crucial importance to the quality of democracy. However, there are conflicting opinions about which electoral systems are the most appropriate ones (Lijphart 1994b; Horowitz 1991).
My theoretical model shows that there is not a simple solution, but that there is rather a complex interaction between the population structure of ethnic minority groups and the effects of electoral systems. This is why my hypotheses lead to a model with conjunctional impacts of electoral systems with context variables as the size and structure of ethnic minority groups. Further, my model shows multiple causes (paths) that may lead to similar results.
The QCA approach is seen as particularly suited for those characteristics (multiple conjunctional causes). However, the method is usually applied for comparative studies with a small number of cases, whereas my example counts 106 cases. This is why the particularities that are linked to the application of QCA on large-N studies (contradictory cases; necessary and sufficient conditions are not identical) will have to be pointed out particularly.

This paper is structured as follows: In a first time, I compare what instruments both methods (QCA and regression) offer for the test of multiple conjunctional causations. Afterwards, I explain

[2] Other studies regarded the integration of ethnic minorities through local or cultural autonomies, through federalism, or special councils (for instance Sobotka 2001). However, still the question of political recognition might not be limited at some kind of autonomy or formal consultation through special bodies, but implies an integration into decision-making on all national questions – thus if we regard electoral systems (that are usually relevant for parliamentary elections), the integration of ethnic minorities and their parties into national legislative is in the centre of interest.

my model of electoral success of ethnic minority parties. The tests of this model are carried out in sections four (QCA) and five (regression), followed by a final discussion.

2. QCA or quantitative methods – two worlds in struggle…

In this section, I confront the basic principle of the QCA and the quantitative approach. The most important aspects are the treatment of conjunctional causes and of multiple causes with the same outcome.

In a first paragraph, I show how basic quantitative methods (linear regressions) have been criticised for being blind for both those aspects. In a second paragraph, I present the QCA approach as an alternative method that might deal better with both phenomena. And, finally, I show what possibilities quantitative methods offer to confront criticism by the QCA school.

2.1 The quantitative method how it gets criticised

Regressions are the standard model of the quantitative school used for comparative analyses. Regressions are based on a model where outcomes are a sum of several influencing variables:

$$y = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_i x_i + \varepsilon$$

Despite – or because – of its popularity and widespread use, the approach of using regression models as a standard method for explaining social phenomena has been subject to criticism. The criticism that appears as most relevant for my purposes (comparison QCA – regression) is that regression simplify in a inappropriate matter the form of influences that we find in societies:

- First, it is seldom that two variables are linked in a linear way with each other, as the basic regression model would suggest. Society is more complex than those simple linear models would suppose. Quantitatively expressed, their impacts are often multiplicative, and non-additive functions, or interactive functions with other, more complex shapes (Taagepera 2005). Many variables have an impact only in certain configurations (Ragin 2000: 21ff.).
- Second, the regression model implies that there was only one way to achieve an outcome. However, we see that different countries achieve the same results in different ways: Ragin (2000) states as an example that there are multiple causes of democracy – it might for instance either be imposed from a foreign country or be demanded from the own population. Regression models however follow the logic that results in politics and society were the consequence of linear, unique models.

As a reason why to use the QCA approach, scholars often claim that large-N studies are based on simple quantitative measures, and focussing on direct correlations. However, those methods are blind for more complex interactions (Ragin 2000: 21ff.).

2.2 Qualitative Comparative Analyisis as an alternative for small-N studies

The application of QCA is closely linked to conjunctional hypotheses and to path models (Ragin 2000: 70). Variables have to be dichotomous – either through dichotomisation of continuous

variables, or through splitting up ordinal variables into several dichotomous variables. Formalisation and central algorithms rely on the logic of Boolean algebra.[3]

QCA tests systematically for conditions (configurations of independent variables) that lead to a positive (or negative) outcome. In a first time, the cases are classified in case groups (configurations) according to their independent variables. Afterwards, the configurations are classified according to their outcomes (positive, negative, controversial). Boolean algebra helps to create simple formulas for which cases lead to a certain outcome.

While quantitative methods fail to provide statistically significant results for small numbers of cases, QCA appears attractive for such small-N studies: QCA drops the elements of probability. It follows a deterministic concept, where for every combination a specific outcome may be expected.

Necessary and sufficient conditions – instead of probability

Ideally, we may find conditions that are simultaneously *necessary* and *sufficient*. Necessary and/or sufficient conditions consisting of a single variable are not very unlikely. Many sufficient conditions are rather configurations of variables, whereas necessary conditions have often the character of a Boolean sum – thus there are different ways to reach a certain outcome (Ragin 2000: 93).

In some cases, we may find a solution that resembles both a *necessary and sufficient condition*. This is the case if the outcome for each existing configuration is clear, or, if there are no *contradictory cases* – that are configurations of independent variables that lead in some cases to positive, in other cases to negative variables. Mostly, such *necessary and sufficient conditions* are multiple conjunctional terms. In practice, they are only likely if the group contains a small number of cases: There, usually, we have only one or few cases per configuration, what makes contradictory outcomes an exception. (And, if the set contains contradictions, they might often be resolved, either through a case-by-case analysis of the reasons of those differences and addition of the relevant variables that explain them or through a modified dichotomisation of the variables.) As soon as the number of cases increases, it gets very unlikely to have such clear-cut categories without contradictions. (And it gets difficult, not to say almost impossible, to resolve contradictions through modifications of the model.) Those might be reasons why the application of QCA for large-case studies has been rare.[4]

How to deal with large N's? Reducing the number of cases vs. dealing with contradictions

Does that mean we should try to reduce large-N samples to small-N ones, in order to achieve clear-cut results? We might imagine three ways for such a reduction:

1. Either, we define a smaller range of cases, choosing *most similar cases* (cf. King et al. 1994), thus setting some constant variables as constant (for instance if having a large international

[3] Every variable is identified with a letter (or a combination of letters), capital letters (for instance "CONC") symbolise the presence of a phenomena, while lower-case letters ("conc") stand for the absence of it. If a variable has three or more classes of values, those are numerated, and indicated in brackets ("SIZE {0}"=small, "SIZE {1}"=medium-sized, and "SIZE {2}"=large). Boolean algebra uses mathematical signs for logical operations: "+" stands for the logical "or", "*" means a logical "and" (cf. Ragin 1987 for a thorough explanation).

[4] An other argument often mentioned is that QCA as "qualitative-quantitative method" requires a very thorough knowledge of the cases under study, what is unlikely for a large number of cases. However, this argument could be similarly applied on quantitative methods: For quantitative comparative research, scholars too should have solid knowledge of the cases and indicators they use – otherwise they risk to get mislead results. If there are quantitative scholars who analyse datasets they do not know carefully enough, their studies might be criticised – but not the method as such.

sample, consider only industrial democracies). This might eliminate contradictory outcomes and thus lead to clear-cut results. But this would mean that the outcome depends on those context variables – and the results generated are thus valid only for the group of cases included in our study.[5]

2. Or, we might pick just *apparently important or particularly representative cases*, however often done in a not very systematic way (we might call this *random approach*, legitimised for instance with the availability of data or because of the researcher's knowledge of the relevant languages or countries under study). This might lead to necessary and sufficient results, but in difference to the first option (where a certain context variable is hold constant), here the results are created by random, they rely on the case selection – and might only be valid for this random sample, but not generalisable. (A large-N study might thus provide more honest and reliable results, even if they are not very conclusive.)
3. Finally, one might select cases with the *most important differences* among the population, thus trying to get *maximal diversity*. Or, in the language of QCA this would mean that we drop cases with identical variable configurations in order to reduce the number of cases. If this is done carefully enough, we still have maximal variance. By definition, the contradictory outcomes will remain – and despite having now a small-N sample, our initial problem remains. It might be easier on this basis to include additional context variables that help to explain the contradiction – but we risk that after the inclusion of those variables, the case selection violates the premises of the most different cases design – and we have to re-do the case selection.

None of the mentioned options for a reduction of the number of cases to a small-N population appears to be satisfactory. Thus, it might be better to deal with the problems of large-N populations – the contradictory cases. This means that our necessary conditions will not be equal to the sufficient conditions. As a consequence, in large-N QCA studies, we have to be careful to make the distinction between those when formulating our hypotheses as when interpreting the results.

2.3 QCA versus quantitative models – how to deal with conjunctional impacts and multiple causes

In this paragraph, I shall show how crucial elements of the QCA methodology may be used and interpreted in a regression context.

In the following table, I list different typical patterns of single-variable or multiple-variable influences. They are illustrated with an example taken from Ragin (2000: 94), that identifies the causes for strikes: those may be the consequence of the introduction of new *technology* opposed by the workers and/or of stagnant *wages* in times of high inflation; however, both variables may have independent influences or interact in several ways:

1) The treatment of mono-causal relationships (example: the introduction of new technology leads to strikes) does not need long explanation: While in the QCA logic a positive coding of

[5] Actually, if through the case-selection by context variables we create a small-N sample, and for small-N samples the contradictory results vanish, this would mean that we could go back to large-N samples, include those variables, that were before used for the case selection, as additional explanatory variables, and our contradictory cases should be resolved too.

technology would imply the brake-out of a strike, in the quantitative logic, new technology (measured either as a dichotomy, as a ratio variable or as a transformation of latter) increases the possibility of strikes. The β-coefficient describes the intensity of the relationship between both variables. As technology is relevant, and wages do not any harm, the coefficient of technology will be positive (1 if both variables are dichotomised and there is a perfect correlation, according the QCA model), while both other coefficients for wages and the conjunctional term (technology * wages) are at 0 (cf. table 1, first line).

2) The second line shows a conjunctional cause, where only the simultaneous presence of two phenomena leads to an outcome, in the binary QCA logic symbolised through a multiplication of both variables. In quantitative models too, we use multiplication to integrate such effects (cf. Braumoeller 2004), and if both factors are dichotomised, the function is easily understandable: If both technology and wages are either 0 (negative case) or 1 (positive case), then only in the presence of both phenomena we have a positive code (1*1 = 1), while in all other cases, the product will be 0. In the regression output only the conjunctional term should have positive results (as long as variables are dichotomised).
3) In the case of multiple causes (several paths), QCA uses the notation of an addition, as every single of the events leads to a positive outcome. If supposing non-additivity, we should formalise this in quantitative models with a maximum function: if either technology or the wages takes a positive value, the function will be positive; if both of them are negative, the function will be negative. In many cases, a sum might be appropriate too: sometimes, a presence of both influences leads to a stronger impact (additivity).[6] In the regression table, the coefficients for both independent impacts (technology and wages) are positive. If the effects are non-cumulative (maximum function), we have a negative intercept of both variables (technology * wages), if they are cumulative there won't be such a negative intercept.

Situation	QCA (cf. Ragin 2000: 94)	Quantitative models (formula)	(Coefficients in regressions)	β
Technology leads to strikes (mono-causal case)	TECHNOLOGY → STRIKES	strikes = β* technology	technology wages technology*wages	1 0 0
Technology in combination with wages lead to strikes (conjunctional causes)	TECHNOLOGY * WAGES → STRIKES	strikes = β* technology * wages	technology wages technology*wages	0 0 1
Technology or wages lead to strikes (multiple causes)	TECHNOLOGY + WAGES → STRIKES	strikes = β* max (technology; wages) or: strikes = β_1* technology + β_2* wages	technology wages technology*wages	1 1 0/-1

Table 1: Comparing the QCA and regression tools, using an example from Ragin (2000: 94), and adding the relevant quantitative models

[6] For instance, we might suppose that in the case of the introduction of new, unpopular technology *and* the stagnation of wages, the strike will occur sooner, will be longer and more radicalised.
In other cases, this might be discussable. As often there are no cases or there is only a small number of cases with the contemporary presence of several causes; it usually makes no difference if an additive function or the maximum function is chosen. Further, in binary logistic models it may make not a big difference which function is used.

In the following paragraphs, those methods shall be used in practice. Before the QCA and the regression analyses are carried out, I introduce my practical example that is chosen because of the character of the hypotheses – including several paths, each with conjunctional effects.

3. Theoretical model for the formation of ethnic minority parties

Adequate representation of ethnic minorities in parliaments seems important for two reasons: First, it allows ethnic minorities to take part in determining the country's laws. Second, governments in the region rely on the confidence of the parliament. As a consequence, the representation in the legislative chamber may be necessary to be represented in the executive. Thus, representation in parliament is a key for ethnic minorities to get a relevant weight in national politics.

The discussion of electoral systems that allow ethnic minority parties to get represented in parliament serves as a practical example for my methodological experiment. In this section, I present the theoretical model and develop necessary conditions for the election of ethnic minority parties.

3.1 Electoral systems and the success of political parties

The question when ethnic minority parties are created and have success is not very different from common theories about party creation of new parties: Research pointed out the importance of a social cleavage, the permissiveness of the countries' electoral institutions, and the organisational and mobilising potential of a social group (cf. Hug 2001; Sikk 2006).[7]

Dealing with a different, but very related dependent variable, the fractionalisation of party systems, Ordeshook/Shvetsova (1994) and Amorim Neto/Cox (1997) came to similar results: The fractionalisation of party systems relies both on the number of cleavages and on the electoral laws: Cleavages are the basis of the creation of political parties (Lipset/Rokkan 1967), whereas electoral systems set restrictive conditions (Duverger 1951; Taagepera/Shugart 1989). Only if a country has many cleavages and at the same time the electoral system is not restrictive, the number of parties will be large. Methodologically, we have thus a conjunctional effect of social cleavages and electoral systems that explains party fractionalisation or in a similar way the appearance of new political parties.

Ethnic cleavages – that are in the centre of interest in this paper – are nothing else than just a special case of social cleavages: for the existence of a party of an ethnic minority, we need a sufficiently large ethnic minority, and an electoral system that allows it to form a party.

Commonly, electoral systems with small districts are classified as restrictive. Plurality or majority electoral systems with single-member districts are the most restrictive ones. They allow only the largest party to win the mandate in the electoral district, restricting the competition on both top-runner parties and leading to a two-party system (Duverger 1951; Cox 1997). Proportional representation systems are more permissive, as they allow more parties to win mandates. While smaller districts (for instance with 3-5 mandates) limit the number of competitors (imposing an "effective threshold", cf. Lijphart 1994a), large districts (with 10 or more mandates) allow even small parties

[7] Alionescu (2004: 62) writes that the problem of Roma representation was that they were not able to create strong, credible parties that were able to organise all the votes of the Roma minority and in consequence were not successful. However, this hypothesis is almost impossible to test, because the way of measuring the ability of a social group to create a strong successful party is best measured at the result – and thus the operationalisation might be tautological.

to be successful (Taagepera/Shugart 1989). Proportional systems with national legal threshold that parties have to pass in order to get parliamentary representation are often treated similar to such with small districts, both excluding small parties from competition (Lijphart 1994a).

Electoral systems and territorially concentrated voter groups

Many studies of electoral system effects end at the one-dimensional distinction between restrictive and permissive laws. Other mechanisms are considered irrelevant – or rather "complicated features" (in the words of Benoit 2002: 11), so that they are left aside. But especially for the success of ethnic minority parties, one such feature is of crucial importance: Some ethnic groups live very concentrated in a small part of the territory, other live spread throughout the country. Arithmetically speaking, geographically concentrated ethnic minorities have a considerably higher share of population in their homelands than on average nationwide. This has consequences for the support and electoral success of ethnic minority parties, as shown. If we compare two ethnically defined parties with a similar countrywide vote share: one related to a geographically concentrated ethnic group (party A); the other related to a group that is spread through the country (party B). Party A gets in some regions considerably more support than the national average, whereas party B gets in every region the same support, close to the national average.

First, consider the consequences of restrictive electoral systems *with small districts*:

- *Party A* does not mind them: Anyway it gets all its votes only in one (or few) region(s), and even if nationally weak, its regional vote share is high in its strongholds. No matter the national vote share, it gets represented where the minority lives.
- For *party B* however, small districts are fatal. If the effective thresholds are above the average national vote share, the party fails in every single district. Due to its dispersed support, party B has no particular strongholds where it gets an above average vote share – and where it could meet the effective threshold (Bochsler 2006a).

Second, consider the impact of proportional representation systems with *national legal thresholds*: Not any more the district result counts, but based the national vote share is relevant to determine if a party gets represented or no. Consequently, there is no more difference between parties with a concentrated electorship and such with nationally spread electors. For both parties A and B, only their overall support is relevant for success.

	Ethnic minority dispersed throughout the country	**Ethnic minority geographically concentrated in one or several regions.**
Plurality or majority elections in single-member districts.	In every district the ethnic minority parties count for only a minority of the votes. They are not able to get a plurality or majority of votes in any district. **-**	The ethnic group wins all the seats, as it holds the majority of votes in the region where it resides (and is majoritarian). +

Proportional representation (with districts).	As ethnic minority parties count for only a (small) minority of votes in each district, they are likely to fall short the threshold in every single district. Only large minorities may succeed. **-**	In the region(s) where the ethnic minority lives, it is likely to fulfill the district threshold. In the other regions, the district threshold does not matter, as there are no votes for the ethnic minority parties in any case. **+**
Proportional representation with a (considerable) national legal threshold.	The ethnic minority parties fall short the threshold, unless the ethnic minority is larger than required by the relative threshold on the national level. **-** **-**	
Special electoral rules	Allow the formation of ethnic minority parties for those ethnic minorities that are affected by the special rules. **+** **+**	
Bans on ethnic minority parties	No ethnic minority parties allowed. Unless they take officially the form of a non-ethnic party, they may not exist. **-** **-**	

Table 2: Expected effects of electoral rules, dependent on the territorial structure of ethnic groups.
Expected outcomes (for middle-sized ethnic minorities): + represented; - not represented.

Special electoral rules for ethnic minority parties: Affirmative acts versus prohibition

In contrast, some countries provide particular electoral rules for their ethnic minorities. Either, they may cast their votes in their own, special districts. Each ethnic minority elects its deputies in a special, non-territorial district. Or, some proportional electoral laws provide a minimal number of guaranteed seats for ethnic minority parties. This allows ethnic minority parties to compete in the same districts as non-ethnic (or ethnic majority) parties, but a number of seats are reserved to ensure that ethnic minority parties do not fail the threshold.[8] Further, in some cases ethnic minority parties are spared from legal thresholds in electoral laws. Hence, if a political party belongs to an ethnic minority, it is allowed seat allocation even if not meeting the legal threshold.

Still, two countries in Central and Eastern Europe select the opposite way: By law, parties that rely on ethnic grounds are forbidden, namely in Albania and in Bulgaria (Cesid 2002). It may be trivial to include such laws as explanatory variable in order to explain the non-existence of ethnic minority parties in those countries. Still, there is no doubt that Albania and Bulgaria with this solution apply the most restrictive electoral laws that are imaginable to ethnic minority parties, and that

[8] Both kinds of institutions are used to provide some kind of positive discrimination to ethnic minority groups. In some cases where special ethnic minority districts exist, ethnic minority voters may cast two votes – one in the ordinary general elections, and a second one for surplus ethnic minority representatives. However, laws that require a distinction between ethnic minority voters and non-ethnic minority voters may be seen as problematic because the definition of ethnicity is often all but clear and because such rules might lead to ethnic segregation.
The second kind of solution is chosen in Romania. While all voters are treated in the same way, there is a positive discrimination of ethnic minority parties – they do not have to reach a threshold: Parties of 18 ethnic minorities profit from guaranteed seats, attributed to the largest party of each ethnic minority. Voters however are not differentiated; there is no registration of ethnic minority voters. The solution however has several problems: First, it does not allow several parties for ethnic minorities – thus, in the case of the 8,5% Hungarian minority only a umbrella organisation passes the 5% threshold, and the special minority treatment does not apply as they are already represented by the Hungarian party. Second, while very small ethnic minorities with as little as 0,1% of the votes get (over-)represented with one out of 332 mandates in parliament (0,3%), but other minorities – as Roma (estimated 6,4% of the population) or Germans (0,9%) get as well as little as one mandate. Third, the regulation opens a door for abuse: as ethnic minorities get affirmative action, but there are virtually no barriers to get such a treatment, ethnic Romanian voters apparently in some cases voted for ethnic minority parties (where the ratio of votes and seats won is much lower than for Romanian parties, thus the vote weights more) and even reported ethnic Romanian candidates stand for elections for alleged ethnic minority parties – in some cases for (almost) non-existing minorities and with fake minority organisations (evidence for several such cases of abuse is reported by Alionescu 2004).

those laws are the reason why many of the ethnic minorities in those countries are not represented by own parties – except two cases where those laws are just not applied.[9]

3.2 Electoral systems and context variables

When considering the opportunities that electoral systems offer for ethnic minority parties, we should not limit our considerations on the classical dimension of the permissiveness (effective threshold). Rather, special regulations for ethnic minorities play an important role, and the impact that is exerted by electoral systems relies very much on context variables: In our case, both the size (relative population share) of ethnic minority groups and the degree of geographic concentration might have important impacts on the electoral success of their parties:

- *Size:* For large ethnic minorities, thresholds imposed by electoral systems do not matter: Their parties might win enough votes to pass national legal thresholds, or to pass the effective threshold imposed by small districts. There is only one case where even large ethnic minorities have no chances of winning seats in parliament: If the minority lives spread throughout the country, and plurality or majority voting systems with single-member districts are applied. Then, only the largest party in each district wins the seat; and as the minority has no strongholds (no regional concentration), it fails in each district. As seen, the second context variable – geographic concentration – is particularly important.
- *Geographic concentration:* If ethnic minorities are concentrated in one region of the country, their parties might have better chances in electoral systems that are based on small districts – even if the ethnic minority group is small. In small proportional representation districts, ethnic minority parties get easily elected, if they get locally a considerable vote share; in single-member districts (plurality / majority voting systems), parties might win seats if the ethnic minorities they rely are locally a majority. Where however national legal thresholds are applied, the geographic concentration does not matter.

3.3 Hypotheses to be tested

Based on the electoral systems and the structure of the ethnic minority groups, we may formulate conditions under which ethnic minority parties may be successful (thus gain seats in the national parliament).[10]

[9] The famous exception regards the Movement for Rights and Freedom in Bulgaria. In fact, although competing under this seemingly non-ethnic name, the party is linked to the important Turkish minority. As such, it was not only eligible, but as well included in all the government coalitions. At the same time, all other ethnic minority parties were forbidden. Only in 2005, the European Court for Human Rights decided against Bulgaria that the prohibition of a Macedonian minority party violated the freedom of association, and earlier this year, the party hold its inaugural meeting. (European Court of Human Rights, United Macedonian Organisation Ilinden and Ivanov v. Bulgaria (application no 44079/98) and United Macedonian Organisation Ilinden – PIRIN and Others v. Bulgaria (no. 59489/00), decision of 20 October 2005; and Macedonian Information and Liaison Service, 26 June 2006, "Macedonian Party in Bulgaria Holds its Inaugural Meeting".)
Similar to the Bulgarian Turks, in the Albanian case the Unity for Human Rights Party has been tolerated for years, is competing elections and winning mandates, although being the unofficial party of the Greeks in Albania.

[10] Certainly, my model only focussing on the existence of a social group (of ethnic minorities) and on the restricting institutions (electoral system) is only a partial one: Further, the development of ethnic minority parties very much relies on the character of the ethnic division, or more precisely the question how much it is politicised. However, this aspect appears to be not testable, because the politicisation of an ethnic division is very much related to the question if actors (for instance political parties) exist that politicise the division, yet they might be even a fruitful indicator for this aspect. At this point, the operationalisation of the politicisation of an ethnic division as a independent variable – with the existence of ethnic minority parties as dependent variable – gets problematic and risks to be tautological. Because of this, I have to exclude this aspect from my model to be tested.

Four alternative conditions (multiple paths), each of them allows a representation of ethnic minority parties:

a) In single-member district systems (majority / plurality voting systems), only parties of ethnic minority groups that live geographically concentrated may be represented.
b) In proportional representation systems with electoral districts, but without national threshold, either parties of large ethnic minorities or of such that live in a concentrated area may be represented.
c) If the electoral law is based on proportional representation with a national legal threshold , then only parties of large ethnic minority groups may be represented.
d) If the electoral law provides special districts for an ethnic minority, then its parties may be represented no regards of the structure of the minority.

Further, there is an additional *necessary condition* to be fulfilled:

Electoral systems with a ban on ethnic minority parties do not allow the representation of such.

3.4 Why the QCA approach is particularly suited for the test of those hypotheses

According to my model, there are several causes, each of which allows the existence of ethnic minority parties. Each of those paths consists of configurations, which are measured with binary variables; hence a typical example of "multiple conjunctional causality" (Ragin 1987). The method, which Ragin proposes for the identification of those paths, is a systematic investigation of the causal paths and a simplification of the multiple causal explanations, using Boolean algebra. By the means of this method ("Qualitative Comparative Analysis", short QCA), one or several conditions or combinations of conditions may be identified, which explain the outcome for the investigated cases.

The conjunctional terms in the hypotheses that I want to test in my study count up to three or four variables. In addition, some independent variables in the conjunctional terms are theoretically and empirically interdependent on each other, implying high levels of multicollinearity and making analyses by quantitative methods problematic.

4. Empirical analysis, using QCA – operationalisation and tests

4.1 Cases and dependent variable (outcome)

My study includes the new democracies in Central and Eastern Europe. Each ethnic minority in those countries is treated as one case, resulting in overall 106 ethnic minorities (cases). Both Russia and Ukraine were excluded from the analysis, because both parliaments count a very large number of independent candidates whose ethnic affiliation is not identifiable. Data on electoral success of parties are based on the results from the most recent national elections, as of 2005, and population data on the most recent census data or alternative sources (for a description of my database and of the sources, see Bochsler 2006b). The dependent variable is operationalised through a binary variable "PARTY", which measures whether a political party, which represents an ethnic minority, exists in parliament and whether it competed with an own electoral list.[11]

[11] Some ethnic minority parties compete in electoral alliances with ethnic majority or mixed-ethnic parties. Serbia is a model case where minority parties form electoral coalitions with non-ethnic parties – because they can not pass the 5% national

4.2 Explaining variables

I explain the outcome through two sets of independent variables, regarding the ethnic minority population and features of electoral system (cf table 3).

Name	Description and importance	Categories
Variables regarding the ***electoral law***		
PR	Distinguishes countries with proportional electoral systems from such with mixed electoral systems. In mixed systems, one stage of the parliamentary seats is accorded through proportional elections and a second stage through SMD elections. (Pure SMD systems no longer exist for the election of first national legislative chambers in the region.)	PR systems are coded 1; countries with mixed electoral systems are coded 0 (Albania, Hungary, Lithuania, Russia, Ukraine).
NAT_CONST	Some electoral laws provide national electoral thresholds ("nationalisation constraints").	Countries where a threshold of at least 3% of the nationwide votes is applied for PR elections are coded 1. (In mixed electoral systems, these thresholds apply only for the proportional part of the elections.) Some countries do not apply these thresholds to ethnic minority parties (as Romania). In those cases, the variable is coded 0.
SPECIAL	A number of countries in the region know some electoral districts that are not territorially, but ethnically based. Members of ethnic minorities, elect their parliamentary representatives in special districts.	Coded 1 for those ethnic minorities that vote in special ethic districts, namely for minorities in Croatia, Kosovo and Slovenia. Where several ethic minorities compete for the same parliamentary mandate, the variable is coded 1 only for the largest ethnic group in each constituency.
BAN	Two countries (Albania, Bulgaria) do not allow parties from ethnic minorities. Few parties are tolerated despite their ethnic character.	For ethnic minorities that are not allowed to form parties by national law, the variable "BAN" is coded 1.
Variables regarding the ***ethnic minority population*** *(context variables)*		
SIZE	Share of an ethnic minority as part of the overall country population. Data is taken from censuses or other sources (see appendix); most recent data found.	Less than 0,4% of the countries population are *small*; such with a share of 0,4%-8% are *middle-sized*, and those with more than 8% are *large*.
CONC	Regional concentration of the population group. (My hypotheses suggest that for SMD electoral systems it is crucial if a national ethnic minority is a local majority in at least one electoral district. For PR district systems on the other hand, it is important that most of the ethnic minority popula-	The variable CONC is coded positively if an overwhelming majority of the ethnic minority group lives in a small part of the country. Exact basic data is missing for most of the countries, this is why no exact indicators could be used. Existing databases on ethnic minorities contain information only on a

threshold from their own force. However, such coalitions imply that the ethnic minority parties lose gradually their autonomy. They do not have the control over the replacement of retired members of parliament, but are dependent on the goodwill of their coalition partners (as was the case when the Bosniak "Lista za Sandžak" wanted to switch from opposition to government in 2005, but almost failed because there were problems as its members of parliament should have been awarded with government functions and be replaced by other deputees – what was blocked by the formerly allied electoral partner. Further, not only elections, but also the chances of re-election are a crucial element for the good functioning of democracies. Again, a party that may only pass the threshold on a coalition list depends on its partners, and thus is restricted in its autonomy during the legislature. Again, Serbia provides an excellent example, where some ethnic minority parties that were part of the democratic umbrella coalition in 2000 could not reach any more an election agreement in 2003 – and consequently failed to pass the threshold (cf. Alionescu 2004: 62).

	tion is concentrated in one or few districts (but no majority is necessary)).	small part of my cases, cf. Gurr et al. 2005).

Table 3: Variables and dichotomisation.

4.3 Formalisation of my hypotheses

Based on these variables, I may formalise my hypothesis in the following equation.
Altogether, there are four different paths by which ethnic minority parties may exist. The lack of a ban on ethnic minority parties is a common condition for all of them; hence it is necessary in general.

```
PARTY = ban *  ( SPECIAL
                + SIZE {2} * PR
                + SIZE {1;2} * CONC * nat_const * PR
                + CONC * pr )
```

4.4 Tests and results

As a first step, the empirical cases analysed are classified according to the independent variables. Altogether, I count 26 groups of cases that each represents a combination of my independent variables. 8 of these groups of cases are coded positively, they lead to a positive outcome for all the investigated cases (existence of an ethnic minority party); 13 groups are coded negatively (no ethnic minority parties). The remaining 5 groups lead to contradictory results: ethnic minority parties exist only in some of the cases, in other cases, they do not (table 2). However, this fits with the tested hypothesis: In my study, I try to explain which electoral systems allow ethnic minority parties to exist – and which do not. Hence, as the first step, I include all the positive groups of cases with positive or contradictory outcome (cf. Ragin 1987).

In order to get more understandable results, I simplify the terms, building groups of categories where the representation of ethnic minority parties is possible. My analysis with the use of Boolean algebra and including so-called "logical cases" identifies four "paths" which describe configurations where ethnic minorities may get parliamentary representation.[12]

```
PARTY =   SPECIAL                                              (formula 2)
          + SIZE {2} * PR
          + ban * CONC * nat_const * SIZE {1}
          + ban * CONC * pr * SIZE {0;1}
```

[12] The analysis is carried out with the QCA software Tosmana. This software allows finding parsimonious terms. I merge both positive and contradictory outcomes as both indicate that there is a possibility for ethnic minorities to be represented with own parties, even if this opportunity is not used in all the investigated cases. Further, so-called "logical cases" are included in the simplification (cf. Ragin/Sonnett 2004).

	Independent variables Ethnic group		Electoral law				*Dependent* Outcome	Cases
	Size	Concentrated	Ban	type	Nat' Constraints	Special districts	**ethnic parties**	
1	>8%	yes	no	PR	no	yes	**yes**	*RO-HU*
2	>8%	no	no	PR	no	no	**yes**	*BiH-SE,BiH-BO*
3	0.4%-8%	yes	no	PR	no	yes	**yes**	*CG-AL,SLO-HU,KO-TU,KO-BO,KO-SE,RO-UK,RO-GE*
4	0.4%-8%	yes	no	PR	yes	yes	**yes**	*HR-HU,HR-SE*
5	0.4%-8%	yes	no	mixed	no	no	**yes**	*AL-GR*
6	0.4%-8%	no	no	PR	no	yes	**yes**	*KO-RO,RO-RO*
7	0.4%-8%	no	no	PR	yes	yes	**yes**	*HR-MU*
8	<0.4%	yes	no	PR	no	yes	**yes**	*SLO-IT,KO-GO,RO-TU,RO-TA,RO-SK,RO-SE*
9	>8%	yes	no	PR	no	no	**C**	*BiH-HR*,ES-RU,*MA-AL*
10	>8%	yes	no	PR	yes	no	**C**	*SK-HU*,CZ-MO
11	>8%	no	no	PR	yes	no	**C**	CG-SE,*LV-RU*,MD-UK,MD-RU,*BG-TU*
12	0.4%-8%	yes	no	PR	no	no	**C**	SLO-YU,SLO-BO,SLO-SE,*PL-GE*
13	0.4%-8%	yes	no	mixed	yes	no	**C**	LI-UK,LI-BE,*LI-PO*,HU-SLA,HU-JE,HU-RO
14	>8%	yes	no	mixed	yes	no	**no**	LI-RU
15	0.4%-8%	yes	yes	PR	yes	no	**no**	BG-MA
16	0.4%-8%	yes	yes	mixed	no	no	**no**	AL-SLA,AL-MA
17	0.4%-8%	yes	no	PR	yes	no	**no**	CG-HR,CG-MU,CG-BO,LV-UK,LV-BE,MD-BG,MD-GA,SK-RT,CZ-SI,CZ-PO,CZ-SK,SE-RM,SE-VL,SE-SK,SE-AL,SE-HR,SE-BO*,SE-HU
18	0.4%-8%	no	yes	PR	yes	no	**no**	BG-SLA,BG-RO,BG-VL
19	0.4%-8%	no	yes	mixed	no	no	**no**	AL-VL,AL-RO
20	0.4%-8%	no	no	PR	yes	no	**no**	CG-RO,LV-LI,LV-PO,SK-CZ,SK-RO,HR-SLO,CZ-GE,SE-CG,SE-YU,SE-RO
21	0.4%-8%	no	no	PR	no	no	**no**	SLO-HR,ES-FI,ES-BE,ES-UK,MA-SE,MA-RO,MA-TU
22	0.4%-8%	no	no	mixed	yes	no	**no**	HU-SK,HU-GE
23	<0.4%	yes	no	PR	yes	no	**no**	SE-CZ,SE-GO,SE-UK,SE-RT,SE-MO,SE-BG,SE-BC
24	<0.4%	yes	no	PR	no	no	**no**	PL-BE
25	<0.4%	no	no	PR	yes	no	**no**	SK-PO,SK-GE,HR-RO,CZ-RO,SE-RU,SE-GE,SE-SLO,SE-MA
26	<0.4%	no	no	PR	no	no	**no**	SLO-RO,PL-UK

Outcome: *yes = existence of a parliamentary ethnic party (cases in italic)*; no = non-existance; C = contradictory cases

Table 4: QCA "Truth Table", variables determining the electoral success of ethnic minority parties ("Outcome"). 106 ethnic minority groups are arranged in 26 groups according the independent variables. (Abbreviations of the cases, see appendix.

Differences from my hypotheses and contradictory configurations

This formula almost corresponds with my formulated hypothesis. Indeed, I observe the four paths that I predicted in the outcomes. However, for some of the paths there are tiny differences. Most of those may be explained though the absence of appropriate cases in the sample, in combination with the analysis method.[13] Actually, there is only one case configuration for which I predicted a positive outcome but which appears negative: the Russian minority in Lithuania (group 14 in table

[13] Some missing categories are coded as positive, in order to make the formula more parsimonious, however in theory they would be negative; especially for some missing categories with ethnic minority party prohibition the model leads to positive outcome. We know from a theoretical point of view that such a combination of characteristics (for instance "BAN * SPECIAL") is not plausible: if a national legislation provides special constituencies for ethnic minority in order to protect it, is very unlikely that the same legislation bans ethnic minority parties. And there is apparently a strong negative empirical collinearity of proportional representation in combination with large ethnic groups and bans on ethnic minority parties.
Further, empirical cases with large ethnic minorities (SIZE {2}) are rare in the sample. The special case of the Russian minority in Lithuania and the absence of any cases with the configuration *"ban * CONC * nat_const * SIZE {2}"* may have lead to the result that SIZE {2} cases are excluded in the third and fourth part – contradicting the hypotheses; cf. hypotheses test.

4). With their 8,2% of the population (according to Alesina et al. 2003; according to census data 6,3%), the Russians could meet the electoral threshold of 5% in the PR part of the election. (There is no information available to the author if ethnic Russians hold an absolute population majority in one of the 71 single-member districts). However, similar to Estonia, Russians are rather represented through a mixed-ethnic party[14].

Particular attention should be given to the contradictory cases (groups 9-13).

- Group 9: While Croats in Bosnia and Albanians in Macedonia are represented in their own parties, Russian parties in Estonia are not represented in parliament. This is the consequence of Russians voting for a mixed-ethnic party and a split of the vote of the remaining ethnically Russian voters on several smaller parties (cf. Mikkel 2006).
- Group 10: The Hungarian minority in Slovakia formed its own party. This is not the case for the Moravians in the Czech Republic, as the ethnic issue is not heavily politicised there.
- Group 11: The example of Bulgarian Turks and Latvian Russians shows that indeed it is possible to form ethnic minority parties in the given circumstances. In Montenegro, the main political cleavage (separatism versus Yugoslav) unifies the Serbian minority and a minority of ethnic Montenegrin voters, so that they vote for a mixed-ethnic coalition. Similarly, the Russian and Ukrainian minority cultural policy interests in Moldavia are represented through the governing, mixed-ethnic party (cf. Lunestad 2001: 8).
- Group 12: While the German minority in Poland formed own parliamentary parties, there was no such attempt from several ethnic minorities in Slovenia, even if the conditions are similar.[15]
- Group 13: Under mixed electoral systems with nationalisation constraints in the PR stage, representation is possible for concentrated ethnic minority groups, but difficult. The ethnic group has to have local majorities in the electoral districts and is still likely to be underrepresented in parliament. This may be a reason why out of the six cases in this case group, only the Polish minority in Lithuania formed its own party. Further, the quality of the data used does not allow us to decide if the investigated ethnic minorities are concentrated enough to succeed in single-member district elections.

In line with the Lithuanian case, the contradictory configurations correspond with the character of my hypotheses. There are many reasons to justify why not every ethnic minority group forms an ethnically defined party. Some ethnic minorities are well integrated and the ethnic issue is not important in politics; ethnic minority interests may be represented by governing mixed-ethnic

[14] The Russian-led (but mixed-ethnic) Labour party had success in the 2004 parliamentary elections, and in former elections, Russian parties formed coalitions with non-ethnically defined parties (cf. Fitzmaurice 2003; Jurkynas 2005: 775f.). Similar as in Estonia, where amongst the citizens there are 13% Russians, there is not a lot of space to form Russian minority parties besides the mixed-ethnic party that attract a large share of the Russian vote (Lithuania: Labour Party; Estonia: Centre Party), and that is why smaller minority parties do not meet the threshold. In the third Baltic State, Latvia, the share of ethnically Russian voters is with 18% reasonably higher, and the Russian minority has its own party in parliament.

[ü] As one main difference to the Poles in Germany, those are minorities that migrated over the last decades, and thus some do not consider them to be an autochthon minority (what is the reason why the Slovenian electoral law does not accord them positive discrimination as it is the case for ethnic Hungarians and Italians). However, the electoral system would actually allow those minorities to win parliamentary seats in the ordinary districts (Alesina 2004: 62).

Further, the Polish parliament is with its 460 seats (effective threshold about 0,2% of the population) much larger than the Slovenian parliament with 90 seats (effective threshold 1,1%), and thus it is much easier to win a Polish "seat" than a Slovenian seat, considering that the ex-Yugoslav minorities in Slovenia each count only 1-2% of the population. Besides that, Germans in Poland might have a very high discipline in voting for the German parties.

parties (Moldova) or be an important issue to large mixed-ethnic parties (Estonia, Lithuania), or ethnic minorities might split their vote on too many parties.

4.5 Discussion of the results: When may ethnic minority parties exist?

The results suggest that the existence of ethnic minority parties depends on both the size and territorial structure of an ethnic minority and electoral laws. While in some countries tiny minorities of just tenths of percents hold parliamentary seats, other electoral laws hinder large ethnic minorities – in some cases almost 10% of the total population (like for instance the Russian minority of Lithuania) – of being represented in parliament.

Which electoral system is appropriate depends on the size of ethnic minorities:

- Large ethnic minorities may be represented through every kind of proportional representation, through special districts, or – if they live concentrated – through mixed electoral systems (however there are no empirical cases which confirm this last configuration).
- Medium-sized ethnic minorities do best with PR without nationalisation constraints or with systems with special districts. If the minorities live concentrated, they may be represented through a mixed electoral system as well.
- Small ethnic minorities only get representation in parliament through electoral systems with special districts or through mixed electoral systems if they are very concentrated (however there is no empirical evidence for the last configuration).

Especially for geographically non-concentrated minorities, representation in parliament is often difficult to achieve or even impossible. Either they have to be large, or they need special electoral districts. Throughout Central and Eastern Europe, this is an important reason for the non-representation of Roma and Ashkali in parliament. While previous research stated that those ethnic groups lacked of political mobilisation and organisation (Sobotka 2001; Alionescu 2004: 62) to get represented, my results show that most electoral laws in most of the investigated countries de facto do not allow the parliamentary representation of this group, and not the organisational reasons are the main problem. Indeed, Roma or Ashkali parties only succeed in Kosovo and Romania. Both countries apply special electoral rules for ethnic minorities, either special PR constituencies (Kosovo) or exceptions from the national threshold and reserved ethnic minority seats (Romania).

Further, the results show that national thresholds, when applied without special rules for ethnic minorities or with mixed electoral systems, are a means to exclude their parties from parliament.

However, the electoral rules alone are not enough to explain entirely the formation of ethnic minority parties – they may rather be seen as a necessary condition. They rather create more or less favourable circumstances for ethnic party creation.

5. Re-test of the data, with a regression analysis

In the previous section, I tested my model on representation of ethnic minority parties. The characteristics of my hypothesis (multiple conjunctional causes with binary variables and binary outcome) appear as exactly having the characteristics of models that are suited for QCA.

Now, the test should be repeated with quantitative methods. The most appropriate method is binary logistic regressions, as my dependent variable has binary character. Interaction terms (technically: multiplication of independent variables) allow us to operationalise conjunctional causes. First, I shall test exactly the same hypotheses as tested with QCA; in a further step the model shall be slightly changed in order to profit from the additional opportunities that regressions offer. I tested my hypotheses with the same 106 cases as before.

5.1 First test: No changes with regards to the QCA model

My first analysis has the aim to replicate a QCA analysis more or less exactly with a regression model. I include my conjunctional hypotheses that have been developed for the QCA analysis, with my independent variables coded binary (0 or 1) (for a description of the independent variables, see previous section). The inclusion of conjunctional terms with many interactive variables leads to a very high number of independent variables in the model, as we have to include control variables for each of the interactive terms (consisting of all possible partial combinations of the term). This increases multi-collinearity drastically.[16] As there are only quite few cases and multiple paths (several possibilities to reach a positive outcome), statistical significance may not be achieved. This means, that from a point of view that is usually applied in quantitative research, the results are of little or no value. However, if we work with a QCA logic, this is exactly the same as we do in QCA.

In order to make the model slightly more appropriate for a regression analysis, I made a minor change: the variable BAN is taken out of the conjunctional terms, and only included as a variable with mono-causal influence, in order to reduce the complexity of the model and the number of variables to include.

Independent variables	**1** (Size as binary variable)	
Constant	-37.635	
BAN	-38.661	
SPECIAL	37.768	
SIZE {1; 2}	16.432	
SIZE {2}	-19.593	
SIZE {2} * PR	23.888	
PR	16.432	
CONC	19.465	
PR * CONC	-19.465	
nat_const	36.743	
PR * nat_const	-36.743	
CONC * nat_const	3.140	
SIZE {1;2} * CONC * nat_const * PR	18.386	
SIZE {1;2} * CONC * nat_const	-21.111	
SIZE {1;2} * CONC	.129	
SIZE {1;2} * nat_const	1.919	
R^2 (Nagelkerke)	0.87	

Table 5: Results of the binary logit regressions; included variables: conjunctional hypotheses. N=106.

[16] For non-binary variables, there is the possibility of standardising the variables before the multiplication, what holds multi-collinearity at reasonable amounts (Braumoeller 2004). However, this procedure does not appear as suited for binary variables.

My first specification explains quite precisely the data, with an R^2 of 0.87. However, taking the large number of independent variables into account, with a limited number of cases and immensely high multi-collinearity, such a "good" explanatory force is no wonder. If there were not any contradictory cases (same independent variables, but different outcomes), it might be even higher, but at a lack of any statistical significance.

Not very surprisingly, we see clear effects for both variables that have not been included in interaction effects, BAN and SPECIAL. In countries where ethnic minority parties are forbidden, there are no such (negative effect). On the contrary, where ethnic minorities vote in special electoral districts, they get represented by own parties (positive effect).

Some of the interaction variables show very clear-cut results: If adding both terms CONC and PR * CONC, we see that in mixed electoral systems, territorial concentration of ethnic groups is a factor with big importance (positive effect for CONC). In PR systems however, the effect of territorial concentration (CONC) is neutralised by the term PR*CONC with the same – but negative – coefficient.

Worth to mention is further the positive effect of the PR systems without nationalisation constraints, but only in combination with mid-sized or large and territorially concentrated ethnic minorities (SIZE {1;2} * CONC * nat_const * PR), whereas large ethnic group profit generally from PR systems (SIZE {2} * PR).

Those results precisely support my four paths hypothesised. Furthermore the negative influence of bans on ethnic parties has been confirmed.

However, we have to be careful with some interpretations: Because of perfect multi-collinearity, some of the interactive term dropped out of the model. Consequently, some of the hypotheses are not precisely testable against possible alternative hypotheses. – Those "black holes" are comparable to logical cases in QCA, configurations we lack empirical cases and that thus limit the precision of the model.

Presentation of the regression results by cases (Venn diagram)

Besides the way, how the hypotheses are tested, it appears important to present the results of the algorithms in an understandable format. A straightforward interpretation of the interaction terms gets very demanding if the number of variables included in the interaction is rising: For a more profound interpretation of the results, one has to calculate equations with many summands, or has to graph the result – what restricts the number of variables included in the graphs.

This is why I show the results in a Venn diagram (a way to present conjunctional results borrowed from QCA, cf. Schneider/Grofman 2006: 25). The regression coefficients were used to calculate the expected outcome (probability of ethnic minority party success) for each of the 96 theoretically possible case configurations (5 binary variables and one variable with 3 values, gives 96 configurations); some of the results are shown in figures 1-3 (those with banned ethic parties or with special districts have been excluded for the visualisation, as a matter of space and as they are less interesting).[17]

[17] The calculation may be easily made in an Excel sheet, using two matrices, one for the 96 configurations and the other for all the independent variables in the model.

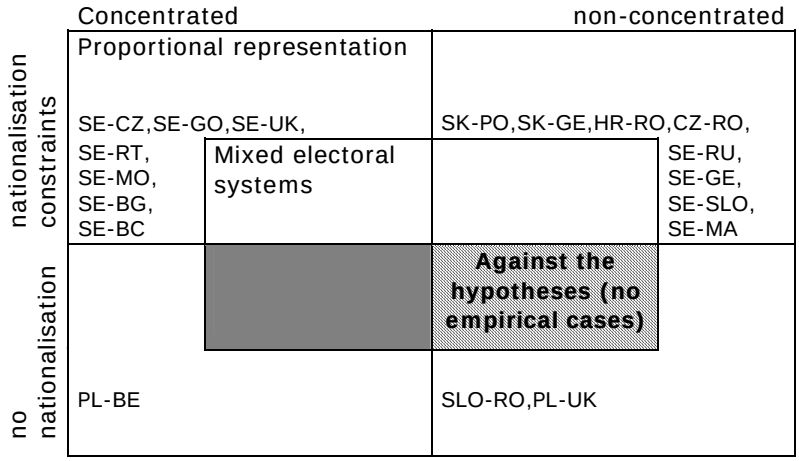

Figure 1: Venn diagram, small minorities, no ethnic minority party ban, no special rules. Configurations with a positive outcome according to the regression model are marked grey ; such with 10%-90% probability for a positive outcome (QCA = contradictory cases) are shaded.

In a first Venn diagram (figure 1), I graph the configurations for small ethnic minorities (excluding configurations where ethnic minority parties are banned or where ethnic minorities vote in special districts, in order to reduce the variables to three). The results are similar to the QCA analysis in the previous section: Only parties from concentrated minorities get elected, and this only under mixed electoral systems without nationalisation constraints. The only case that was wrongly included into the positive outcome group regards non-concentrated minorities in mixed electoral systems without nationalisation constraints. However, there are no empirical cases that would correspond to this configuration.

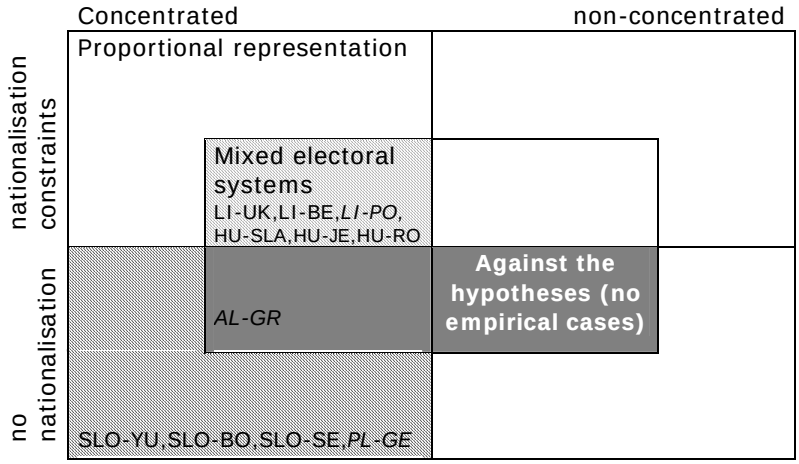

Figure 2: Venn diagram, mid-size minorities, no ethnic minority party ban, no special rules. Configurations with a positive outcome according to the regression model are marked grey; such with 10%-90% probability for a positive outcome (QCA = contradictory cases) are shaded. *Positive empirical cases in italic.*

The second Venn diagram (figure 2) regards the mid-sized minorities (0,4%-8% of the population). Such ethnic groups have more opportunities to win seats compared to small ethnic groups, either in PR systems without threshold or in mixed electoral systems. Although, they have only chances if they live concentrated. Again, one cell contradicts our hypotheses, however without containing real empirical data.

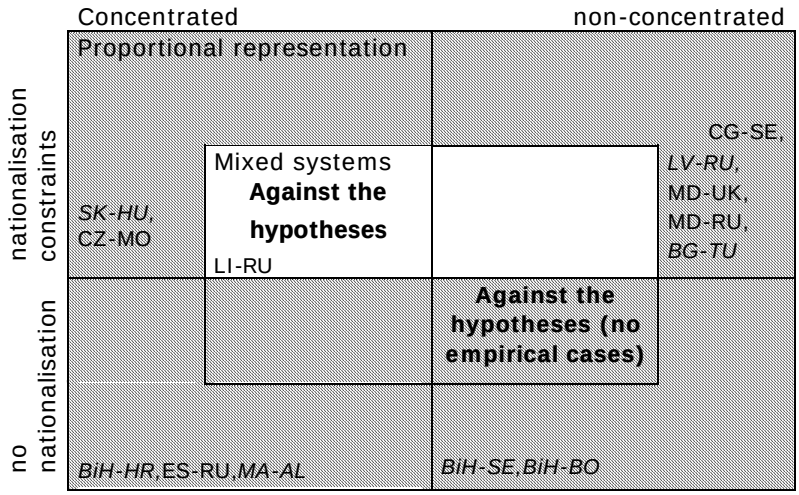

Figure 3: Venn diagram, large minorities, no ethnic minority party ban, no special rules. Configurations with a positive outcome according to the regression model are marked grey; such with 10%-90% probability for a positive outcome (QCA = contradictory cases) are shaded. *Positive empirical cases in italic.*

And finally, the Venn diagram (figure 3) shows that large ethnic minority groups have much better chances to get represented. In all kind of PR systems, large ethnic groups might get represented. We have only two white cells for mixed electoral systems: in one case (Lithuania, cf. above) a single negative outcome determines the outcome for the whole configuration, against my hypotheses; in the other case (non-concentrated minorities, nationalisation constraints) indeed we would expect that as a lack of concentration those minorities do not get represented – although there are no such empirical cases. As in both previous Venn diagrams, the same cell (conc*nat_const*pr) contradicts the hypotheses. However, here too there are no empirical examples.

Conclusions for the unmodified test specification

As seen, quantitative models offer instruments that allow getting very similar results as QCA. However, if using them with long interaction terms (3 or more conjunctional impacts), they require either a huge number of cases or the absence of multi-collinearity to provide any statistically significant results. Otherwise, we may run regression analyses, but the outcome – in statistical terms – might be as in the presented calculation pure coincidence.

The empirical grounds for the results in the regression analysis and in QCA are identical – just in one case they are regarded as accepted – and in the other case not. This shows different basic philosophies of the qualitative and the quantitative school; one that stresses more the aspect of case selection and the other of probabilistic consideration. As my experiment suggests, for a given sample (that according the qualitative logic is carefully enough selected, so that we do not need any more probabilistic "decoration") the regression analysis and QCA's Boolean algebra lead us to similar (maybe even identical) results.

However, usually both methods are used to analyse different aspects: QCA puts the accent on the visualisation of similar case groups, multiple causes and necessary and/or sufficient conditions; regression analyses are rather focussing on testing of hypotheses and causation.

5.2 Simplification of the variables and renunciation of the dichotomy

In a second time, I put the regression terms slightly simpler, not at least to reduce the problem of multi-collinearity, and further put the *size of the ethnic minority* variable back into a continuous form.

Independent variables	**2**	**3**	**4**		
Constant	-1.253	-3.759	-21.396		
BAN	-19.168	-19.322	-18.189		
SPECIAL	25.129	23.581	38.822		
SIZE {2}	-19.950				
SIZE (continuous)		.504	.193		
PR	-2.773	-.282	18.313		
PR * SIZE {2}	24.312				
PR * SIZE (continuous)		-.342	-.100		
CONC		-.052	16.869		
CONC * SIZE (cont.)			.369		
PR * CONC			-19.779		
nat_const		.172	18.382		
nat_const * SIZE (cont.)			-.193		
CONC * nat_const * PR			51.839		
CONC * nat_const * PR * SIZE (cont.)			-9.855		
CONC * nat_const		2.408	-27.248		
CONC * nat_const * SIZE (cont.)			8.280		
nat_const * PR			-38.743		
nat_const * PR * SIZE (continuous)			1.468		
R^2 (Nagelkerke)	0.82	0.84	0.87		

Table 6: Results of the binary logit regressions, specifications 2-4. N=106.

In the second specification, I start with a small number of conditions and paths, showing that actually already a couple of explanatory variables (ban on ethnic parties, special electoral districts or proportional representation at the presence of large ethnic minorities) explain in large parts the variation of the dependent variable. Many of the conclusions we get from the more complete (and complicated) models, we might see from this specification already: As soon as there is a ban on ethnic minority parties for instance, there is no way to get a positive outcome (values above 0, and even not close to 0). Only in cases where there is a ban on ethnic minority parties, but nevertheless special electoral districts, the outcome seems to be positive, but this is an (almost) impossible combination of variables. Further, the condition SPECIAL at the absence of BAN seems to be sufficient, with a quite high positive y-value – what means that the outcome is positive with a probability of almost 100%. For the configuration of proportional representation and large ethnic minorities the result seems to be controversial, with a y-value only little above 0, indicating that a positive outcome is a little bit more probable than a negative one.

In the third specification, I included an additional cause (CONC*nat_const), which appears to contribute slightly to a positive outcome, but with a relatively small β-coefficient. This indicates that the outcome for (CONC*nat_const) is controversial and relies on other variables. Further, I

changed the population size variable into a continuous form, indicating how many percents of the whole population the ethnic minority counts.[18]

After the inclusion of the full conjunctional term (PR*CONC*nat_const), some results get better understandable (specification 4):[19] Concentrated minorities appear to have good chances of getting elected in mixed electoral systems (CONC*pr), what may be seen from the positive β for CONC, while CONC*PR shows a negative β. Under PR, concentrated minorities need a further condition to get represented, namely the absence of nationalisation constraints (CONC*PR*nat_const) – a highly positive term in the regression outcome.

Other coefficients are much more difficult to understand: For instance, the negative direction of CONC*nat_const*PR*SIZE is only understandable in combination with the terms nat_const; nat_const*SIZE; CONC*nat_const*SIZE and nat_const*PR*SIZE. The negative term may result because not all the effects are additive.

In order to make results more readable, we should transform them into necessary and sufficient conditions (cf. appendix), provide an analysis by case configurations (Venn diagram, see above) or check if the hypotheses – formulated as multiple conjunctional terms – work. The regression output by itself is informative only for some aspects.

6. Conclusion

QCA and quantitative analyses are two methods that rely on different assumptions and models, and with different aspects that are analysed.
Compared to the regression analysis, the younger QCA method brings along a number of innovations, regarding

- a new way of classification and visualisation of the cases and their structure, according to their independent and dependent variables. Thus, it brings a powerful descriptive tool for case groups and configuration. This better visualisation is a good mean to help researchers to detect problems and contradictions and increase in an iterative way the precision of their model;
- a new effective instrument to detect conjunctional configuration of variables: QCA tests without initial suspect (or hypotheses) on such conjunctional effects, and if they exist, they may be theorised ex-post. This however does not mean (as sometimes might be supposed if reading criticisms of regression analyses) that quantitative methods are blind for those effects.[20] In regression analyses too, we can operationalise such conjunctional impacts, but they impose limits in the number of configurations to test simultaneously. Due to the limits

[18] This leads to changes of direction for both SIZE variables compared to the second specification, what is actually caused amongst others by correlation of the variable size with the newly included path (CONC*nat_const) and further with differences in between middle-sized and large minorities.
[19] Although, regarding the R2, no additional information is included compared to specification 3.
[20] After having seen the instruments that regression analyses offer us, many of the critics on this approach might be read as a parody on the very basic OLS regression model, negating the self-imposed limits of this basic models, and the numerous improvements and refinements that are available for quantitative tools (for instance Mahoney/Goertz 2006: 229). The target of the critics of quantitative methods should be less the tool box they offer us, but rather the way how they are often applied: the methods are statistically so complex that it gets difficult for academics to cope with. And, easy availability and user-friendly developments of software allow researchers quite easily to use those widespread basic regression models, and thus they try to fit (and modify) their theoretic model into the standard calculation models, instead of fitting the methods to what they would like to test.

of multi-collinearity, the conjunctional effects have to be predicted theoretically and then tested for.

If however we want to make conclusions on the dependencies of the variables, both models have similar patterns: With regression models we get similar results as with QCA, even in cases with dichotomised variables and conjunctional influences. If we include same number of variables and conjunctional effects as we do in the QCA method, we get a "perfect solution".

The goal of this paper was to if it was possible to re-analyse a QCA model in a quantitative analysis. Although the experiment based on a "school book example" that perfectly suits with the instruments QCA – and much less with those of regression analyses, the experiment worked: Very similar results were reproduced by the regression analysis. As both analyses in QCA and by a regression model are based on the same number of cases, and as in both we have (as typical in empirical example in social science) to deal with the problem of limited diversity (theoretical categories without empirical cases, cf. Ragin/Sonnett 2004), results remain statistically imprecise. Furthermore, we are not able to get any empirical information for some configurations and thus for some possible questions.

The debate about appropriate methods is not only about the opportunities they give us, but as well one about the way how they are used and how the results are understood. If focussing on this point, the most important achievement of QCA is not detecting conjunctional impacts, different paths, necessary and sufficient conditions (this is possible with regression methods as well). The most important feature of QCA is rather of giving priority to them, make them visible and better understandable, and thus helping social sciences to get a more appropriate view of social processes.
My experimental example showed that for multiple conjunctional causations, QCA provides over much more powerful instruments to visualise the results found. The way, how the results of conjunctional variables are displayed in regression analyses, may get very difficult to understand – particularly if the conjunctional terms include more than two variables. If those conjunctional terms rely on binary variables (or exceptionally such with many few values), then the categorisation of case groups and Venn diagrams may help readers to understand the structure of the data and the causes of outcomes.

However, those elements may be transferred from the QCA environment into the world of quantitative methods.

What are the advantages of regression models over QCA? While we may do similar operations as in QCA, the opportunities of the regression models go much further, with regards to two aspects

- First, regressions introduce a probabilistic element that allows treating properly contradictive cases, even if they are not theorised. And, the probabilistic element is helpful to where we want to make more general conclusions based on correlations, going beyond a description of the cases we have. This however requires a large basis of cases; probabilistic consi-

derations are difficult if the number of cases is not much larger than the number of variables included.

- Second, QCA requires a dichotomisation of the variables, what in many cases means information and preciseness are getting lost. – Regression models allow to including not only binary, but also ratio scaled dependent and independent variables.
- Wider opportunities do not only regard the significance tests: Further, regression analyses offer much more powerful opportunities for the testing of alternative hypotheses.

Where the number of variables and variable configurations gets close to the number of cases, QCA seems a very useful method, as conclusive statistics do not bring any results for those studies.
If however we have larger numbers of cases, regression models do not only reproduce what we are able to achieve with QCA, but further have many additional assets, yet are much more precisely working. However, we might not miss QCA – rather as a descriptive tool for a visual analysis of the data structure. But it remains the advantage of real quantitative methods to conclude on connections between variables in sense of the comparative method.

Necessary, sufficient conditions and contradictory cases

One asset of the QCA methodology is the possibility to identify necessary and sufficient conditions of impacts. This is a logic that is reported to be alien to regression methods (Ragin 2000). Is it?

I describe a necessary condition found by a comparative QCA study as a necessary condition for the cases we investigated. If those cases for some reasons are indicative for a larger population, we might suppose that the conclusions are valid for other cases too. However, we conclude on the existence of a necessary condition through the absence of counter-examples; thus, there all the cases that lead to a certain outcome have a certain similar input variable – the necessary condition. Probability does not enter the game, because QCA analyses work without probabilistic elements.

Actually, in binary logistic regressions, as used above, we have similar element that however do not gain important consideration (as the quantitative school considers concepts of necessity and sufficiency less central). In binary logistic regressions, for each of our cases a probability may be calculated that it takes a positive outcome; thus the model might make for a certain element either a very clear estimation about what the outcome might be (y-value, or odds-ratio close to 0 or 1), or might be rather undecided (odds-ratio about 0,5). Those probabilities are compared with the actual outcome (that is always 0 or 1). We may simplify the results by cases by rounding each of those estimated outcomes to 0 (if below 0,5) or 1 (if above 0,5), and then compare with the real outcome values of the variables (an analysis that standard statistics software provides), however in some cases the binary regression then leads to wrong predictions.

The definition of a necessary condition means that there are no cases with a positive outcome where the condition is not met. In the logic of binary logistic regressions, this means that if our model predicts all the positive outcomes correctly, then it is similar to a necessary condition. (However, it might for some cases predict a positive outcome, despite in reality it's negative.)

In terms of formulas, this would look as follows:

The odds-ratio shows the probability of a positive outcome (p), dependent on a sum of explanatory variables ($\hat{y}$).

Odds-ratio:
$$p = \frac{e^{\hat{y}}}{1 + e^{\hat{y}}},$$

with
$$\hat{y} = \alpha + \beta_1 x_1 + \ldots + \varepsilon$$

Cases with $p > 50\%$ are predicted to have probably a positive outcome, while others are predicted to have a negative outcome. Transformed, this would mean that cases with $\hat{y} > 0$ have a positive outcome and those with $\hat{y} < 0$ a negative one.

Thus, if we have a model which predicts all the positive outcomes correctly, the necessary condition would be that $p > 50\%$ – or transformed $\hat{y} > 0$; and from this we might calculate the range of x that lead to this condition.

However, usually the results of binary logistic regressions do not bring by solutions where all the positive outcomes are predicted correctly, but rather there are errors both of type α and β.

In those cases, the model accords p-values below 50% to some of the actually positive cases, for instance at 20% or 30%, and consequently classes them in the negative group. This however does not

mean that we have to resign, but it requires a further step: In fact, we have to identify the positive case with the lowest predicted p-value. As all the cases with positive outcome are above this value, this is the threshold for a necessary condition. For each value of p, the according ŷ might be derived, and the necessary conditions calculated.

As an example, we might test a simple model that includes only three variables, the size of the ethnic minority, special electoral districts and ethnic party ban, including interactive terms of those variables.

Observed			Predicted		
			party		Percentage Correct
			0	1	
Step 1	party	0	77	0	100.0
		1	10	19	65.5
	Overall Percentage				90.6

a The cut value is .500

		B
Step 1(a)	BAN	-19.574
	SPECIAL	42.406
	SIZE {1;2}	19.574
	SPECIAL * SIZE {1;2}	-19.574
	Constant	-21.203

a Variable(s) entered on step 1: ban, special, sizeb, special * sizeb .

Table x: SPSS Outputs for the three-variable binary regression to detect necessary conditions.

As a consequence of multi-collinearity and the absence of some case groups (for instance there are no cases with the configuration BAN * SPECIAL), some of the interactive terms have been excluded. Actually, the model predicts all the negative outcomes correctly (what means that we detected a sufficient condition, but this is not our goal), but 10 out of 29 cases with positive outcome are predicted wrongly (if the threshold of positive prediction is set at 50%). The casewise analysis (as provided optionally by statistic packages as SPSS) shows that the lowest p-value of observed positive outcomes is at 16,4%, or the corresponding ŷ is at –1,63.

In order to figure out the necessary condition, I have just to resolve the following equation:

$$\hat{y} > -0{,}71$$

with $\hat{y}$ = -21.203 – 19.574 BAN + 42.406 SPECIAL + 19.574 SIZE{1;2} – 19.574 SPECIAL * SIZE{1;2}

-> -1.63 < -21.203 – 19.574 BAN + 42.406 SPECIAL + 19.574 SIZE{1;2} – 19.574 SPECIAL * SIZE{1;2}

Resolved for the variable BAN, this means that

BAN < (-21.203 + 1.63 + 42.406 SPECIAL + 19.574 SIZE{1;2} – 19.574 SPECIAL*SIZE{1;2})/19.574 … or

BAN +0.9999 < 2.166 SPECIAL + SIZE{1;2} – SPECIAL*SIZE{1;2}

… as BAN, SPECIAL and SIZE {1;2} are all dichotomous variables, if BAN is positive (1), then

1,9999 < 2.166 SPECIAL + SIZE{1;2} – SPECIAL*SIZE{1;2}

… from what we may derive that *either the absence of BAN or the presence of SPECIAL is a necessary condition (ban + SPECIAL)*, and as there are no cases with BAN*SPECIAL, QCA might add this as a logical case and formulate ban as a necessary condition (however empirically it has not been shown for the empirically missing and theoretically implausible category BAN*SPECIAL).

If however BAN is negative (0), then

0,9999 < 2.166 SPECIAL + SIZE{1;2} – SPECIAL*SIZE{1;2}

… from what we may derive that *SPECIAL or SIZE {1;2} is a necessary condition, in combination with the absence of BAN*.

Thus, our formula for necessary conditions we might derive from the analysis of the binary logistic regression model with three variables is:

ban (SPECIAL + SIZE {1;2}) + SPECIAL

The same approach might be used to detect sufficient conditions. The calculation has just to be reversed, looking first for the negative outcomes with the highest p-value, and then accordingly resolving the equation.

So far, the analysis shows the application for the experimental study presented in this paper. Under the given conditions (only a small number of cases per variable configuration), probabilistic considerations had to be dropped, similar as in the QCA approach; we may only distinguish configurations with a clear outcome from contradictory configurations with either a hardly predictable outcome or with a tendency towards positive or negative results, however just based on a very small number of observations.

How could the necessary and sufficient-approach be adopted in regression models with a higher number of cases per configuration where probabilistic considerations get sense, but clear outcomes per configuration get rare? Under those conditions, often neither necessary nor sufficient conditions might be found: Instead, we might define an error margin at a certain threshold (for instance 5%). Under this view, a necessary condition distinguishes those cases where a positive outcome is very unlikely from those where a positive outcome is possible. Or, for each "cell" (variable configuration) that is contained in the necessary condition, the outcome should be positive at least at 5% (if a 5% threshold is adopted). The necessary condition would thus describe the area at which $y > -3$ (or an area with $y > 3$ as a sufficient condition) – or $y > -4.5$ for a 1% threshold.

Appendix 2
Abbreviations

Electoral systems

PR	Proportional representation
SMD	Single-member district systems

Ethnic groups *(short form; country; group name)*

AL-MA	Albania, Macedonians
AL-RO	Albania, Roma
AL-SLA	Albania, South Slavs
AL-VL	Albania, Vlachs
BG-MA	Bulgaria, Macedonians
BG-RO	Bulgaria, Roma
BG-SLA	Bulgaria, Slav-speaking muslims
BG-TU	Bulgaria, Turks
BG-VL	Bulgaria, Vlachs
BiH-BO	Bosnia, Bosniak (Muslim)
BiH-HR	Bosnia, Croat
BiH-SE	Bosnia, Serb
CG-AL	Montenegro, Albanians
CG-BO	Montenegro, Bosniaks
CG-HR	Montenegro, Croats
CG-MU	Montenegro, Muslims
CG-RO	Montenegro, Roma
CG-SE	Montenegro, Serbs
CZ-GE	Czech Republic, German
CZ-HU	Czech Republic, Hungarians
CZ-MO	Czech Republic, Moravian
CZ-PO	Czech Republic, Polish
CZ-RO	Czech Republic, Roma/Sinti/Ashkali
CZ-SI	Czech Republic, Silesian
CZ-SK	Czech Republic, Slovak
CZ-UK	Czech Republic, Ukrainian
ES-BE	Estonia, Belarusian
ES-FI	Estonia, Finnish
ES-RU	Estonia, Russian
ES-UK	Estonia, Ukrainian
HR-HU	Croatia, Hungarians
HR-MU	Croatia, Muslim
HR-RO	Croatia, Roma
HR-SE	Croatia, Serb
HR-SLO	Croatia, Slovene
HU-GE	Hungary, German
HU-JE	Hungary, Jewish
HU-RO	Hungary, Roma
HU-SK	Hungary, Slovak
HU-SLA	Hungary, Southern Slav
KO-BO	Kosovo, Bosniaks
KO-GO	Kosovo, Gorani
KO-RO	Kosovo, Roma
KO-SE	Kosovo, Serbs
KO-TU	Kosovo, Turks
LI-BE	Lithuania, Belorussian
LI-PO	Lithuania, Polish
LI-RU	Lithuania, Russian
LI-UK	Lithuania, Ukrainian
LV-BE	Latvia, Belarusian
LV-LI	Latvia, Lithuanian
LV-PO	Latvia, Polish
LV-RU	Latvia, Russian
LV-UK	Latvia, Ukrainian
MA-AL	Macedonia, Albanian
MA-RO	Macedonia, Roma
MA-SE	Macedonia, Serb
MA-TU	Macedonia, Turkish
MD-BG	Moldova, Bulgarian
MD-GA	Moldova, Gagauz
MD-RU	Moldova, Russian
MD-UK	Moldova, Ukrainian
PL-BE	Poland, Belarussians
PL-GE	Poland, Germans
PL-UK	Poland, Ukrainians
RO-GE	Romania, Germans
RO-HU	Romania, Hungarians
RO-RO	Romania, Roma
RO-SE	Romania, Serbs
RO-SK	Romania, Slovaks
RO-TA	Romania, Tartars
RO-TU	Romania, Turks
RO-UK	Romania, Ukrainians
SE-AL	Serbia, Albanians
SE-BC	Serbia, Bunjevac
SE-BG	Serbia, Bulgarians
SE-BO	Serbia, Bosniaks
SE-CG	Serbia, Montenegrins
SE-CZ	Serbia, Czechs
SE-GE	Serbia, Germans
SE-GO	Serbia, Goranci
SE-HR	Serbia, Croats
SE-HU	Serbia, Hungarians
SE-MA	Serbia, Macedonians
SE-MO	Serbia, Moslems
SE-RM	Serbia, Romanians
SE-RO	Serbia, Roma
SE-RT	Serbia, Ruthenians
SE-RU	Serbia, Russians
SE-SK	Serbia, Slovaks
SE-SLO	Serbia, Slovenes
SE-UK	Serbia, Ukraines
SE-VL	Serbia, Vlachs
SE-YU	Serbia, Yugoslavs
SK-CZ	Slovak Republic, Czech
SK-GE	Slovak Republic, German
SK-HU	Slovak Republic, Hungarian
SK-PO	Slovak Republic, Polish
SK-RO	Slovak Republic, Roma
SK-RT	Slovak Republic, Ruthenian
SLO-BO	Slovenia, Bosniak
SLO-HR	Slovenia, Croat
SLO-HU	Slovenia, Hungarian
SLO-IT	Slovenia, Italians
SLO-RO	Slovenia, Roma
SLO-SE	Slovenia, Serb
SLO-YU	Slovenia, Yugoslav

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