

**Measuring the Impact of the Depression on the Radical Vote in the Weimar Republic
A Spatio-temporal Approach¹**

**Eine Messung des Einflusses der Wirtschaftskrise auf die Wählerradikalisierung in der
Weimarer Republik: Ein räumlich-zeitlicher Ansatz**

by

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Abstract

In this paper the question of how to measure the extent, to which the depression was responsible for the political collapse of the Weimar Republic, is explored. By using a spatio-temporal framework and newly constructed proxies in addition to the determinants employed in earlier studies of voting behaviour in the Weimar Republic an aspect of the radicalization of the German electorate that has thus far been neglected is illustrated: Even though - in contrast to the Communists - the Nazis did not benefit directly from rising unemployment, the drastic decline of income in the early thirties was an important prerequisite for their successes in the national polls. Moreover, it will be demonstrated that for the early NSDAP voters the process of political radicalization contained a hysteretic element.

In diesem Aufsatz versuchen wir zu messen, wie stark der Einfluss der Wirtschaftskrise für den politischen Zusammenbruch der Weimarer Republik war. Indem zusätzlich zu den in früheren Untersuchungen analysierten Bestimmungsgrößen neu konstruierte Proxies sowie ein räumlich-zeitlicher Ansatz verwendet werden, wird ein weiterer Aspekt der Radikalisierung der Wählerschaft herausgearbeitet, der in der Literatur bisher vernachlässigt worden ist: Obwohl - im Gegensatz zu den Kommunisten - die NSDAP nicht direkt von der steigenden Arbeitslosigkeit profitierte, war doch die drastische Abnahme des Einkommens als zweite bedeutende Folge der Wirtschaftskrise eine wesentliche Voraussetzung für ihren Siegeszug.

JEL classification: N, R15

1. Introduction

The National Socialist German Workers' Party (NSDAP) and the Communist Party of Germany (KPD) clearly increased their vote share in the course of the Great Depression at the expense of the parties supporting the pluralistic Weimar Republic. The central aim of both radical parties was to abolish the existing order - consequently they would not participate in a government with democratic parties - and to replace it by their respective ideal polity - either in the form of a *völkisch* state community or a soviet-based proletarian dictatorship. After the national election in July 1932 these two parties together had a majority in the *Reichstag*, thereby being able to prevent the establishment of a democratically legitimated majority government. Hence, a minority cabinet headed by Chancellor Brüning (an independent, without a party affiliation) was formed which enacted a severe austerity policy by cutting social expenses and reducing wages with the aim of balancing the heavily encumbered budget. This policy intensified a wide-spread pauperization in Germany, that clearly benefited the NSDAP and the KPD enabling them to achieve substantial electoral successes.

The economic crisis obviously induced voters to choose not only an 'opposition within the system, but an opposition to the system' (Kaltefleiter, 1966, 95). Yet, cross-sectional analysis of the economic determinants of voting behaviour on the level of administrative units of *Kreise*, the lowest level at which voting data are available, has shown that the unemployment rate was positively correlated only with the KPD share, whereas it was negatively related to the NSDAP share (Falter, 1983 and 1991). By using an income proxy in addition to the unemployment rate as indicators of economic crisis, the aim of this paper is to demonstrate that the depression had a measurable impact on both the KPD and the NSDAP vote and not - as previously supposed - only on the Communist vote share. This is the basic requirement for quantifying the approximate extent to which a counterfactual expansive fiscal policy in the period of Brüning's government could have increased voters' support of the democratic parties sufficiently to prevent the Nazi seizure of power.

With only one exception (O'Loughlin, Flint and Anselin, 1995) the spatial dimension of party choice in the Weimar Republic has thus far been neglected. Moreover, analysis of voting

¹ The research on which this paper is based is supported by a grant from the Volkswagen-Foundation whose

behaviour has been restricted predominantly to isolated cross-sectional studies of individual *Reichstag* elections. In contrast, in this analysis a spatio-temporal approach will be employed in order to capture the full spatial and temporal dynamics of the politico-economic process of radicalization in Germany at the *Kreis* level.

The organization of the paper is as follows. Section 2 gives background information about the economic situation and the essentials of the respective party programs. In Section 3 the data, the construction of latent variables representing the propensity of voters to switch party affiliation based on local socio-economic conditions and the basic features of the model are described. Section 4 introduces the methodology of the spatial statistical approach. Section 5 concludes with a presentation and discussion of the estimation results.

2. The Nazis' and Communists' appeal for different groups of voters

The most obvious evidence for the economic crisis in Germany was the increase of unemployment from 1.1 millions in May 1928 to 6.2 millions in March 1933. Over the same period unemployment payments were cut back by approximately one half resulting in a decrease of the percentage of people receiving benefits from unemployment insurance from 83.2% to 37.8% (Adamy and Steffen, 1982). The unemployed (and their families) whose unemployment benefits had expired, had to rely on public relief, which provided a bare subsistence level of living. Coinciding with the increase in unemployment, wages were drastically cut back and partial lay-offs also increased strongly. As a result, labour income decreased from 10.2 billion *Reichsmark* in 1928 to 6.1 billion *Reichsmark* in 1933. Agriculture, employing the largest percentage of the labour force (30.5%), was troubled by declining prices - especially for dairy products and livestock whose price decreased by over 50% from 1928 to 1933 - resulting in a debt crisis and numerous enforced foreclosures (Brustein, 1996, 66). Table 1 summarizes the development of election results for both radical parties and some economic indicators over the course of the depression.

Table 1: Vote Shares and Economic Performance, 05/1928-03/1933

Election Date	NSDAP	KPD	Radical	SPD	Liberals	Zentrum/ BVP	Democ- ratic	DNVP	Unempl Rate	Labour Income ^a	Labour Utilization ^b
05/1928	2,6	10,6	13,2	29,8	13,6	15,2	58,6	14,2	6,0	-	70,5
09/1930	18,3	13,1	31,4	24,5	8,5	14,8	47,8	7,0	8,0	35,46	54,5
07/ 1932	37,4	14,5	51,9	21,6	2,2	14,2	38,0	6,2	42,3	27,75	34,5
11/1932	33,1	16,9	50,0	20,4	1,9	15,3	37,6	8,9	42,2	28,37	38,7
03/1933	43,9	12,3	56,2	18,3	2,0	14,1	34,4	8,0	52,4	27,37	33,4

Source: Institut für Konjunkturforschung (1933), pp. 13f, 16, 80, Statistisches Reichsamt (various issues).

Radical = NSDAP + KPD, SPD: Social Democrats, Liberals: DDP (German Democratic Party) and DVP (German People's Party), Zentrum and BVP (Bavarian People's Party): Catholic Parties, Democratic = SPD + Liberals + Zentrum / BVP, DNVP: German National People's Party (right-wing conservative)

^a Weekly, per capita income (own calculation; see Appendix II)

^b Working hours as percentage of working capacity of employed persons

Although the economic crisis affected every aspect of society, its implications varied sectorally and regionally. According to the census in June 1933 for example, 44.5% of blue-collar workers were unemployed in contrast to only 27.2% of white-collar employees. In addition, official unemployment was much lower in agriculture - especially in regions with small farms - than in the industrial or services sector. Regional variations were also very high in the extent of indebtedness, because large grain farms were concentrated in the east whose wage and social security obligations were higher than for medium-sized or family-run farms.

Each radical party addressed the grievances of a different group of voters. The KPD directed its program directly at the demands of the industrial proletariat. The most prominent themes were calls for wage increases for industrial workers and measures for improving the situation of the unemployed.² The KPD also tried to attract other groups of dependent workers, for example agricultural laborers. However, by calling for a reduction of tariffs on food imports in order to ensure lower food prices for urban labor, the party in the end favored the interests of the industrial over the rural proletariat. The Communists shared interests of white-collar employees and blue-collar workers as dependent labour. But instead of attracting the support of white-collar employees, this raised their fear of becoming proletarianized (Brustein, 1996, 113).

² A 1929 KPD's publication with suggestions for improving the situation of Berlin unemployed among others included higher unemployment compensation, exemption from property taxes, financial aids for paying rents and free milk for children (Brustein, 1996, 135).

The rejection of private property put the Communists also in opposition to small independents like farmers, shopkeepers and artisans.

Until 1928 the NSDAP likewise focused its propaganda on industrial blue-collar workers. Yet, their unexpected success in rural *Kreise* in the *Reichstag* election of May 1928 led them to adjust their program to the needs of middle-class occupations such as farmers and civil servants. Nevertheless, typical blue-collar concerns such as the proposal work creation programs remained an important element in the Nazis' economic program. Though, realizing that the strong ties between primarily unskilled, industrial workers and the KPD - especially in branches with a high degree of unionization including mining and iron- and steelworks - could not be broken, the Nazis concentrated after 1928 on skilled workers who were concentrated in such branches as construction, wood working and machine building. This middle-class orientation was accompanied by a reinforced endorsement to private property. The Nazis' agrarian program contained both tariffs on food imports and impartible inheritance; the later was closely related to the suggestion of resettling the disinherited in the East. This policy was enthusiastically received in the northern and north-eastern provinces where impartible inheritance was already practiced, but less enthusiastically in the predominantly Catholic southern and south-western regions where partible inheritance was practiced. The Nazis' call for cheaper credit and lower taxes appealed not only to farmers, but also to small shopkeepers and artisans (Brustein, 1996, 96). Another important middle-class element of the Nazi program was the demand that the social and economic standing of civil servants, which in comparison to other groups of employees had been overproportionately curtailed during Chancellor Brüning's austerity measures, should be restituted (Brustein, 1996, 114).

In addition to socio-economic factors religious conviction was an important determinant of voting behaviour. Catholics, accounting for about a third of the population, were concentrated in the south and west of Germany. Catholics lived in their own milieu: for example, they had confessional kindergartens and schools, and most of them regularly attended the Sunday mass. They also had their own political parties: the *Zentrum*, and the Bavarian People's Party (BVP), which defended the right for practicing their own culture such as to attend parochial schools which had been taken from them transitorily by Bismarck as part of the *Kulturkampf*. In fact, as will be shown below, the Catholic share of a *Kreis* is the most important single predictor for the NSDAP share.

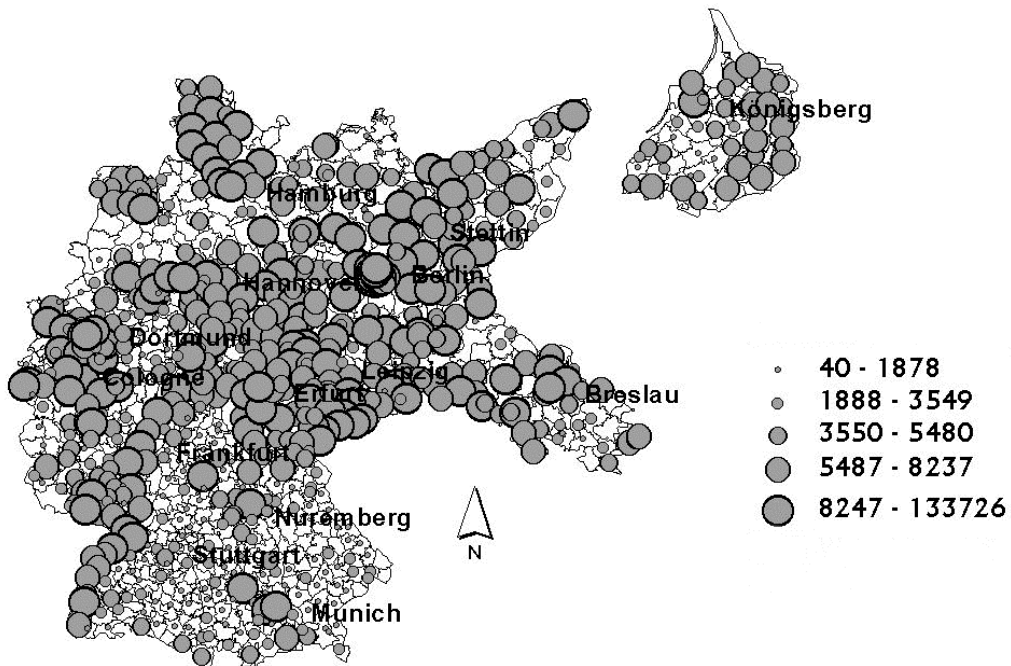
Due to differences in the respective party programs, the vote shares of the NSDAP and KPD are expected to vary with respect to the sectoral and confessional composition of *Kreise*. A way to model the complex nexus between voting results and socio-economic variables will be demonstrated in the next section.

3. Data and Model Specification

To understand Weimar elections, it is important first to consider the electoral system. The Weimar Republic was divided into 35 districts ranging in 1933 from 647.662 eligible voters in the Palatinate to 1.740.702 in Southern Westphalia. For each 60.000 votes in an electoral district a party won one seat in the *Reichstag*. The remaining votes in each ward were added to the remaining votes in adjacent regions. In this second round of calculation 30.000 votes yielded a seat in parliament. In the third round, the left over votes were summed up over the entire Reich again with the relation of 30.000 votes per seat in parliament (Schuhmacher, 1973). Figure 1a and 1b show the electoral mosaic for the NSDAP and the KPD, displaying the total vote for both parties on *Kreis* level.³ This form of representation takes account of voting results independent of the area of a *Kreis*. It becomes apparent that Nazism in contrast to Communist support, which was centered in urban areas such as Westphalia, Saxony and Berlin, was regionally much more evenly distributed. Already by visual inspection, spatial patterns that are clearly visible point to the necessity of explicitly including space as a determinant of voting results. This topic will be addressed in section 4.

³ I would like to thank Colin Flint, University of Miami, for providing me with a digitized map of *Kreis*-boundaries.

NSDAP Votes 09/14/1930



KPD Votes 09/14/1930

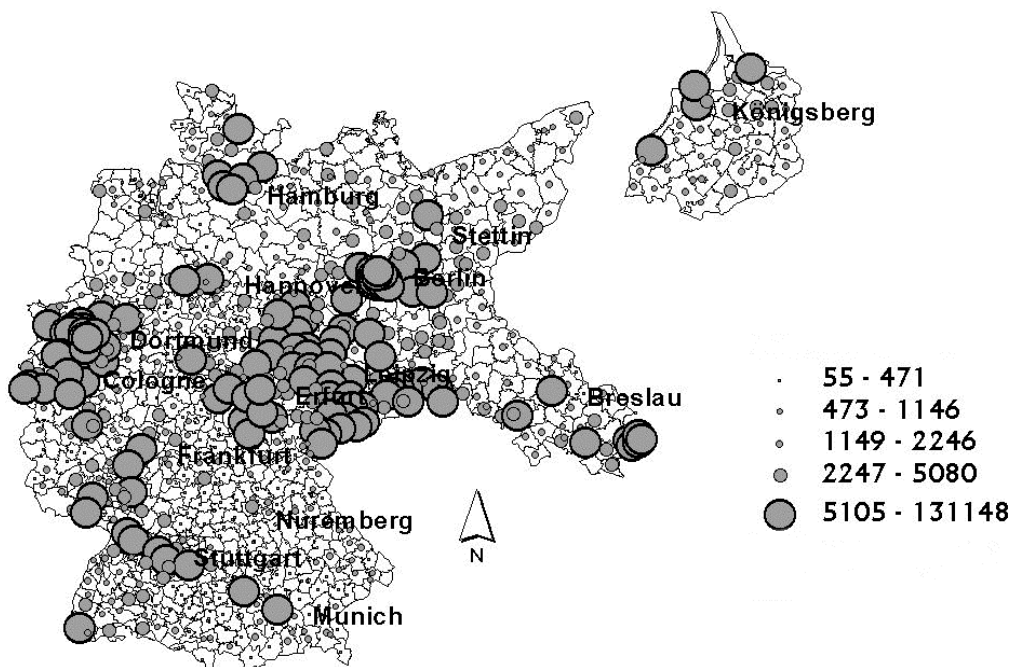


Fig.1: Radical Vote in *Reichstag* election 07/31/1932, *Kreise* are divided into voting quantiles, size of circles corresponds to number of votes

The data set that will be used contains besides voting results numerous variables on the socio-economic composition of the electorate at the *Kreis* level for 744 units, which remained geographically stable over the period of analysis.⁴ However, the only original variable which can be used as an indicator of the economic deterioration, and which can be matched directly to the elections are unemployment figures. Being measured in different units, election and socio-economic variables have been standardized for obtaining meaningful regression results.

In order to make use of the richness of the variables contained in the data set without increasing the degree of multicollinearity of the exogenous variables in the regressions, factor analysis has been used to construct latent variables underlying and explaining the covariances and correlations between the socio-economic variables.⁵ Based on 11 indicator variables five latent variables representing the composition of the German electorate have been extracted. Figure 2 shows the measurement model for the latent variables.⁶

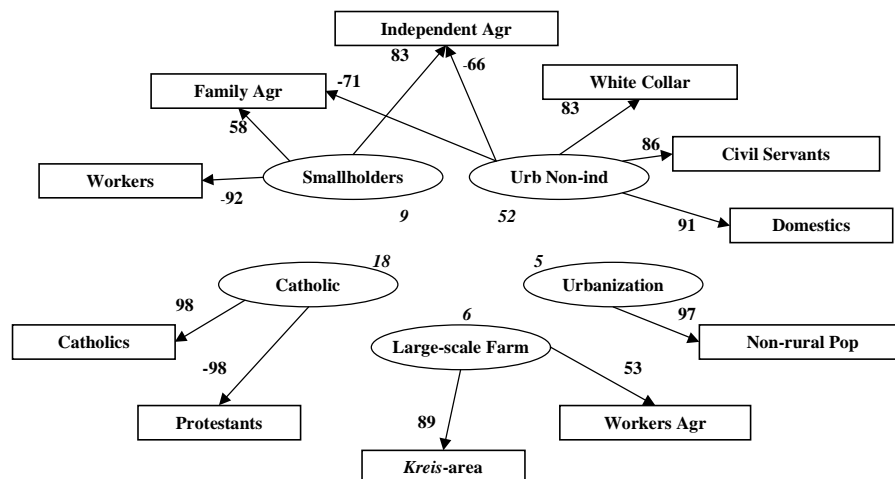


Fig. 2: Measurement model for the latent variables representing the socio-economic composition of the electorate

Latent variables in circles, observed variables in squares; figures at arrows are factor loadings times 100, numbers in italics give the percentage of total variance of indicator variables explained by the respective latent variable

Using an exploratory approach, the criterion for extracting factors from the correlation matrix of the indicator variables was that the percentage of total variance of these variables

⁴ I would like to thank Jürgen Falter, University of Mainz, for providing me with the data set. For a description see Hänisch (1989).

⁵ For a similar approach see Falter e.a. (1983) and Falter (1992) and Bolen (1989) for a theoretical introduction.

⁶ For variable definition see Appendix I.

explained be at least 90%. This way, the indicator variables were compressed into five latent factors. The numbers displayed at the arrows are the factor loadings of the indicator variables, i.e. the extent to which the indicator variable can be explained by the underlying latent variable. The figures in italics give the percentage of total variance of all indicator variables explained by the respective latent factor.

The highest percentage of variance (52) of the socio-economic indicators is explained by the latent variable representing urban non-industrial employees, with high positive factor loadings for white-collar employees (83), civil servants (86) and domestics (91) and negative factor loadings for helping family members in agriculture (-71) and independent farmers (-66). The latent factor describing the confessional structure has the second highest amount of variance explained (18) with opposite factor loadings for the Catholic share (98) and the Protestant share (-98). Farming - either small-scale farming with high positive factor loadings for helping family members (58) and independent peasants (83) and a negative relationship with workers (-92) or large-scale farming with positive loadings for agricultural workers (53) and the area of a *Kreis* (89) - together account for 15% of deviations of the socio-economic composition. Finally, urbanization, measured by the percentage of population living in settlements with more than 10.000 inhabitants (97), explains an additional five percent.

Yet, by nature of their time-invariant character these constructs are not able to measure the impact of the aggravating depression on election outcomes. Therefore, variables changing over the course of the depression have to be included. As has been argued before, measuring the effect of the crisis by the unemployment rate alone captures, above all, its effect on one special group of voters, namely industrial workers. In this analysis, however, we augment the unemployment rate by weekly, per capita income estimates at the *Kreis* level. For the construction of this income proxy both the reductions in wages and the increase in partial lay-offs have been taken into account.⁷ The latent factors which represent the socio-economic composition of the electorate will serve as the background for the influence of the depression.

By including the vote share of the previous election as an explanatory variable, it is possible to distinguish between indirect and direct effects of the exogenous variables on election results and to calculate the total effect of the independent variables on the vote shares. In this analysis, the vote shares of the NSDAP and KPD for all four Reichstag elections of the

⁷ The procedure of proxy construction follows broadly van Riel and Schram (1993) and is shortly described in Appendix II.

depression years will be analyzed in order to capture possible transient features of the system in the form of changing signs between a certain variable and the vote share of a party at different election dates.

4. Controlling for Spatial Effects

Since political parties advocate the interests of specific socio-economic groups, an individual voter's party preference is influenced by the preference structure of a representative member of the socio-economic group to which he/she belongs to. An important factor in determining any voter's affiliation to a certain group is his/her economic status. This implies that workers in a certain branch should vote mainly for the party advocating their interests irrespective of location. The same can be said of the unemployed. In contrast to this view, spatial analysis maintains that location-specific context plays an important role in mediating the effects of structural forces (O'Loughlin and Anselin, 1992). This means that group-oriented voting behaviour has a spatial dimension, too, and as a consequence, the party choice of the unemployed may in part be regionally determined. In addition, a spatial perspective is also necessary because, due to contagion effects, there may exist a systematic spatial dependence of variables in adjacent regions (Cox, 1969).

To make the concept of spatial dependence and heterogeneity more concrete, it is necessary to determine which units in a spatial system influence one another. This influence is expressed through the notion of neighbourhood, more precisely binary contiguity among spatial units. According to this concept, if two spatial units i and j have a common border, they are said to be contiguous. In such a case, the cell w_{ij} assumes a value of one in a square matrix with dimension of n , where n stands for the number of spatial units. If they have no common border, the corresponding value of w_{ij} is zero. For spatial processes operating on a larger scale than directly adjacent *Kreise*, higher order contiguity matrices can be constructed. For example, a *Kreis* i would be second order contiguous to *Kreis* j if it is directly connected to a *Kreis* k that in turn is first order contiguous to j .

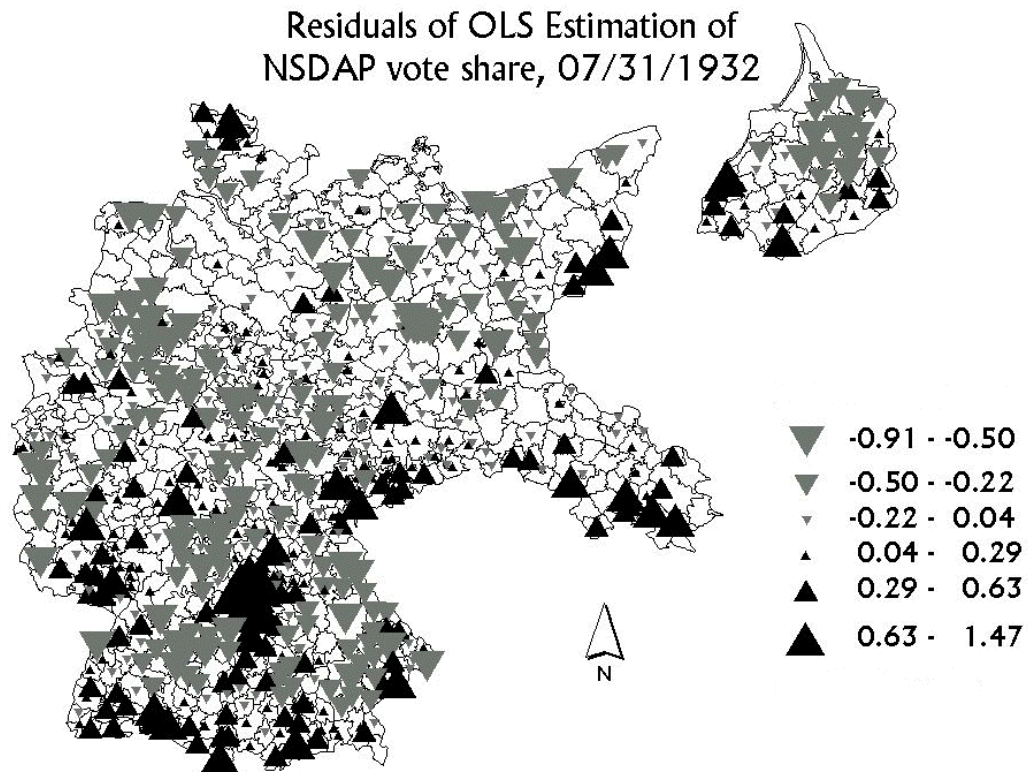


Fig 3.: Residuals of an OLS estimation of the determinants for the NSDAP vote share 07/31/1932

In order to explore the extent of spatial effects, a model of the vote share of the radical parties with the determinants introduced in section 3 - latent variables representing the socio-economic composition of the electorate, the unemployment rate and income proxies - has been estimated by means of OLS. Figure 3 displays the residuals of this estimation for the election in 07/1932 in case of the NSDAP. It is obvious that there are systematic spatial variations of the residuals. This points at the existence of spatial regimes and spatial dependence meaning that the standard OLS assumption of uncorrelated and homoscedastic error terms are not fulfilled. Therefore, several diagnostics for this kind of misspecification have been included in the following regressions in order to find the best model yielding reliable inferences.

If the null hypothesis of spatial independence is rejected, the alternative can take two forms: spatial dependence can either accrue to the dependent variable (spatial lag case) or it may pertain to the error term (spatial error case) in the form of a spatial autoregressive form (Anselin,

1988).⁸ The spatial lag case can be interpreted as spatial contagion or spill-over: the behaviour in one *Kreis* is partially explained by similar behaviour in adjacent *Kreise*.⁹ In addition to this substantive interpretation, the spatial error case can be caused by model misspecification which is not restricted to one *Kreis* but spills over across *Kreise*.¹⁰ In order to decide whether a spatial lag or a spatial error is the reason for spatial dependence, a robust Lagrange Multiplier test is carried out for either case of misspecification.¹¹ The test with the higher value indicates the likely form of misspecification. To check for the presence of heteroscedasticity the Breusch-Pagan test is carried out.¹² Table 2 gives the results for the OLS estimation of the NSDAP's and KPD's share for the election in 07/1932 with diagnostics for either form of spatial misspecification as an example for all *Reichstag* elections in the thirties.

⁸ Ignoring substantive spatial dependence will result in biased OLS estimates, disregarding error dependence will result in unbiased but inefficient OLS estimates.

⁹ The *spatial lag* case can be expressed in a mixed regressive, autoregressive model as follows:

$$y = \rho Wy + X\beta + \varepsilon,$$

where Wy is a spatially lagged (a weighted average of the variable values in *Kreise* adjacent to the observed *Kreis*) dependent variable and ρ is the spatial autoregressive coefficient.

¹⁰ The *spatial error* case can be formalized as an autoregressive process in the error terms:

$$y = X\beta + \varepsilon$$

$$\varepsilon = \lambda W\varepsilon + \zeta,$$

whith $W\varepsilon$ as spatially lagged error term, λ as the autoregressive coefficient and ζ is a well-behaved (homoscedastic and uncorrelated) error term.

¹¹ The Lagrange Multiplier error test (LM_{ERR}) is χ^2 distributed with one degree of freedom and has the form

$$LM_{ERR} = \frac{\{e'We / s^2\}^2}{tr\{W'W + W^2\}}$$

where tr is the trace matrix operator, e is a vector of OLS residuals, $s^2 = e'e / N$ represents the ML estimate for the residual variance and W stands for the spatial weights matrix.

The Lagrange Multiplier lag test (LM_{LAG}) has a χ^2 distribution with one degree of freedom and can be expressed as

$$LM_{LAG} = \frac{\{e'Wy / s^2\}^2}{\{(WXb')MWX\beta / s^2 + tr(W'W + W^2)\}}$$

where tr is the trace matrix operator, $M = I - X(X'X)^{-1}X'$, y is the the vector containing the dependent variable, e is a vector of OLS residuals, W is the spatial weights matrix, $s^2 = e'e / N$ represents the ML estimate for residual variance and β is the vector of OLS estimates. The robust form of the Lagrange Multiplier test which is applied here is rather robust for non-normality in the error terms. (Anselin, 1992)

¹² The Breusch-Pagan test equals one half of the sum of squares in a regression of $(e_i^2 / s_{ML}^2 - 1)$ on a constant and z variables (Anselin, 1992)

Table 2: OLS estimation of the determinants of the radical parties vote share, 07/31/1932, with spatial diagnostics

Variable	NSDAP	KPD
Constant	-,003 (-,234)	,003 (,236)
Urb-Non Ind	,086 (2,15)	-,016 (-,526)
Catholic	-,586 (-29,26)	,048 (3,73)
Smallholders	-,014 (-,053)	,017 (,810)
Large-scale Farm	,015 (,073)	-,054 (-3,35)
Urbanization	,021 (1,50)	,014 (1,30)
Unemployment	-,090 (-3,60)	,100 (5,03)
Income	-,207 (-4,10)	-,032 (-,830)
Temporally Lagged Vote	,500 (28,20)	,904 (58,06)
Log likelihood	-329,39	-128,44
Multicollinearity Cond. Number	7,96	8,62
Breusch-Pagan, DF = 8	34,83 [p<,000]	10,63 [p=,223]
Lagrange Multiplier Error, DF = 1	247,66 [p<0,000]	116,84 [p<0,000]
Lagrange Multiplier Lag, DF = 1	65,27 [p<0,000]	22,97 [p<0,000]

t-values in round brackets, p-values in square brackets, DF: degrees of freedom

The value of the multicollinearity condition number of 7,96 / 8,62 is far below the critical range (20-30) indicating that multicollinearity is not a problem. The diagnostics for heteroscedasticity and tests for spatial dependence show that the model is spatially misspecified.

For the NSDAP vote share the Breusch Pagan test points clearly ($p < 0.000$) to non-constant variances of the observations, which means that the estimated standard errors of the coefficients of the standard OLS-model are incorrect. In contrast, non-constant residuals are not a problem for the estimation of the KPD vote share. This points to the Communist vote having a much more homogenous regional foundation than the Nazi vote. The robust Lagrange Multiplier tests for spatial dependence hint at spatial dependence at a very high probability level. The higher value of the robust Lagrange Multiplier for the error case (247,66 / 116,84) in comparison to the lag case (65,27 / 22,97) suggests that for the entire Reich spatial dependence is probably caused by model specification errors which are not restricted to one *Kreis* rather than by the vote of the radical parties having a contagious effect on adjacent *Kreise*. Since the spatial error model for both parties consistently yielded the best fit over all *Reichstag* elections, this kind of model specification has been used for the estimation of the full model in the next section.¹³ In addition, because of indications of heteroscedasticity for both parties the residuals were transformed according to a linear additive heteroscedastic formulation depending on a constant and the population of a *Kreis* in 1933.¹⁴ The spatial error models were estimated with spatial weights matrices up to third order, exhibiting the expected result that higher order contiguity - essentially meaning augmenting distance between the units of observation - resulted in a decrease of the influence of the explanatory variables on the vote share.¹⁵ Therefore, in this analysis only first order spatial weights matrices were used. Figure 4 in Appendix III displays the full model.¹⁶

5. Results and Discussion

Figure 5 contains the maximum likelihood estimates for the above model.¹⁷ For the sake of clarity only highly significant relations ($p < 0,075$) have been displayed.¹⁸

¹³ For the spatial error model the diagnostic for remaining spatial dependence is a Likelihood Ratio test on the spatial autoregressive coefficient λ . This diagnostic equals twice the difference between the log likelihood in the spatial error model and the log likelihood in standard regression with the same set of exogenous variables, i.e. $\lambda = 0$. It has a χ^2 distribution with one degree of freedom.

¹⁴ The structure of the transformed residuals is:

$$\sigma_i = \sigma^2 (\alpha_0 + \alpha_{pop33} Pop33)$$

where σ^2 is a scale factor and α_0 and α_{pop33} are parameters.

¹⁵ The estimation results for different orders of contiguity are available from the author.

¹⁶ For a path model of the NSDAP vote without time-varying economic variables or spatial autocorrelation see Falter e.a. (1983) and Falter (1992).

¹⁷ A maximum likelihood approach is used for the spatial error model because as a result of the simultaneity implied by the spatial nature of the dependence the autoregressive parameter λ in footnote 13 has to be estimated

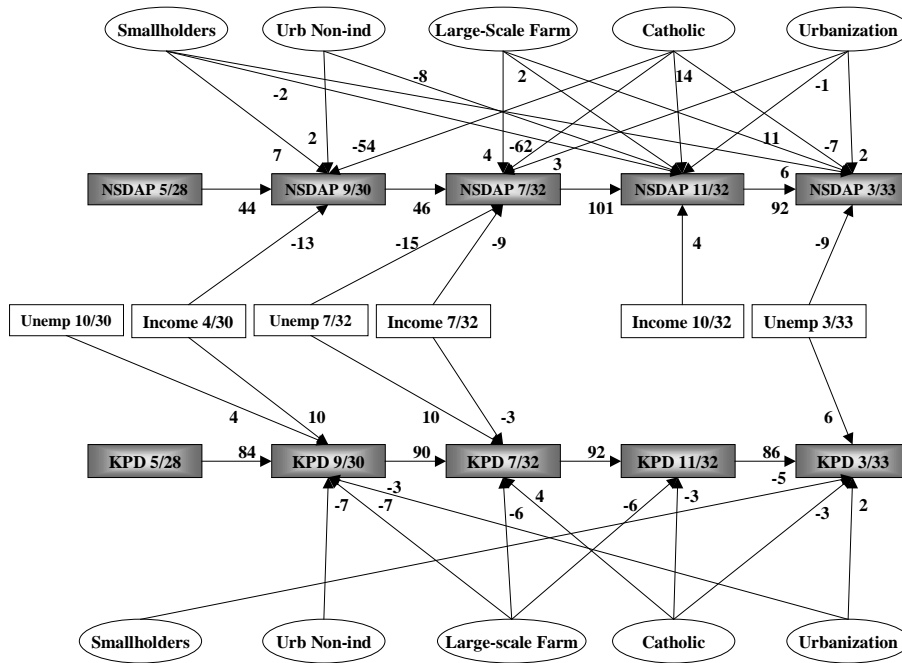


Fig. 5: Constrained path model of the radical parties' vote share, p-value of variables displayed < ,075, figures are ML estimates times 100

Confirming the findings of earlier studies, among the structural factors, the Catholic share is the most influential factor with a very high negative impact on the NSDAP share - except for the election in November 1932. The percentage of Catholics also has a negative, but clearly weaker influence on the KPD share. This reflects the fact that the Nazis rather than the Communists competed with the Catholic interest parties, the Zentrum and BVP, for votes among similar groups. The Catholic share is the only variable exhibiting a similar influence on both the NSDAP and the KPD.¹⁹

Large-scale farming is another factor that had a substantial impact on both parties' vote shares. The Nazis' share considerably increased in those *Kreise* with a high proportion of agricultural laborers in big farms. On the other hand, the Communists' share was clearly negatively related to employment in large-scale farming, meaning that the KPD was not able to

simultaneously with the regression coefficients. Expressing the regression coefficients and error variance as functions of the autoregressive coefficient λ , an estimate for λ maximizing a likelihood function in which the regressions coefficients and error variance have been substituted by λ can be found by a numeric search (Anselin, 1992).

¹⁸ The complete estimates can be found in Table 3 in Appendix I.

get a foothold among the rural proletariat. Since the sign of large-scale farming does not change for the NSDAP in the November 1932 election and also remains unaltered for the KPD over the entire period, this is the variable with the most consistent influence (either positive or negative) on the radical parties' vote share.

Occupation in the agricultural sector dominated by smallholders also had a positive impact on the Nazi share. However, smallholders and their families seem to have voted for the NSDAP at an earlier stage than people employed in large-scale farming.

Urbanization had a predominantly positive effect on the NSDAP vote and an ambiguous influence on the KPD share. The reason for this is that in this analysis the urbanization variable - proxied by the share of population in a *Kreis* living in settlements larger than 10.000 inhabitants - measures the effect of small towns on election outcomes. This indicates that the NSDAP's successes were by no means restricted to purely rural regions, but from the start also had an agglomeration component. In contrast, the KPD's strongholds were situated above all in big cities.

In the first elections of the thirties, employment in the urban, non-industrial sector - consisting of civil-servants, white-collar employees and domestics - tended to increase the Nazi vote, but with the onset of the depression members of this sector seem not to have been attracted by the NSDAP any more. For the KPD the relation is inverted, but less pronounced.

The economic crisis measured by the unemployment rate and weekly per capita income exhibits an adverse impact on the radical parties' vote shares. High unemployment only benefited the KPD, whereas it was detrimental to the NSDAP share. Income exerted a different influence. On average, the Nazis did better in *Kreise* with low per capita income, whereas the Communists benefited from high income levels. It was only in the election in July 1932 that low income increased both parties' share. In this election - after labour income had been reduced about one quarter in comparison to the previous election - voters exhibit obviously a responsibility type of behaviour, i.e. they punished the government by going over to non-democratic parties in response to a drastic deterioration of their material situation. Only in this election the income loss was strong enough to induce voters with a low income background to jump over the usual political cleavage which would have meant radicalizing towards the NSDAP, and to vote for the KPD instead. On the other hand, an opposite effect exists for the KPD in the November election 1932. The

¹⁹ At http://www.vwl.uni-muenchen.de/ls_komlos/christian.html an animated sequence of 3D maps can be viewed and downloaded demonstrating the spatio-temporal impact of the Catholic share on the NSDAP vote.

vanishing of the strong positive impact of unemployment on the KPD share in the November 1932 election indicates that the transitory easing of labour market figures clearly made the Communists' appeal for the unemployed disappear.

For the NSDAP the sign of all variables except for large-scale farming changes for the election in November 1932. The reason for this is that by including the lagged vote share as explanatory variable the effect of decreasing unemployment (07/32: 2.695.493; 10/32: 2.509.330) and rising income (07/32: 27,75 *Reichsmark*; 10/32: 28,37 *Reichsmark*) indirectly and the marked decline of the NSDAPs' share (07/32: 9.429.471; 11/32: 8.062.653) directly modify or even reverse the influence of the other variables. Given the general aversion of Catholics to the Nazi movement in the course of economic deterioration until July 1932, which is captured indirectly by the lagged vote share, the positive direct impact of the Catholic share in November 1932 indicates that Catholic voters did not rally around the flag of the church any longer after the economic crisis seemingly came to an end. The same holds for the unemployment and income variable. In November 1932 the Nazis primarily lost in *Kreise* where they had scored electoral successes in previous elections, whereas those *Kreise* which resisted before, increasingly fell prey to the Nazi movement in times of easing economic circumstances.

The early adopters of the Nazi message, i.e. the typical NSDAP voters - with an agricultural, Protestant, small-town, moderate unemployment, low income background - obviously did radicalize to a large extent in reaction to the depression, but they also switched back again from the Nazis in better times. On the contrary, the late adopters, i.e. the atypical Nazi voters - with a Catholic, high unemployment, high income background - after having switched to the Nazis stuck by them, even when the economic situation improved. Hence, for the atypical Nazi voters there seems to exist a hysteresis effect in radicalization, i.e. for this group the decision to vote for the Nazis not only depended on the current state of the economy, but also on past conditions. Figure 6 depicts this mechanism in terms of probabilities.²⁰

²⁰ Note that an overall negative relation between the NSDAP share and the unemployment rate for all *Kreise* does not contradict the fact that there was a positive relation for single *Kreise* over time.

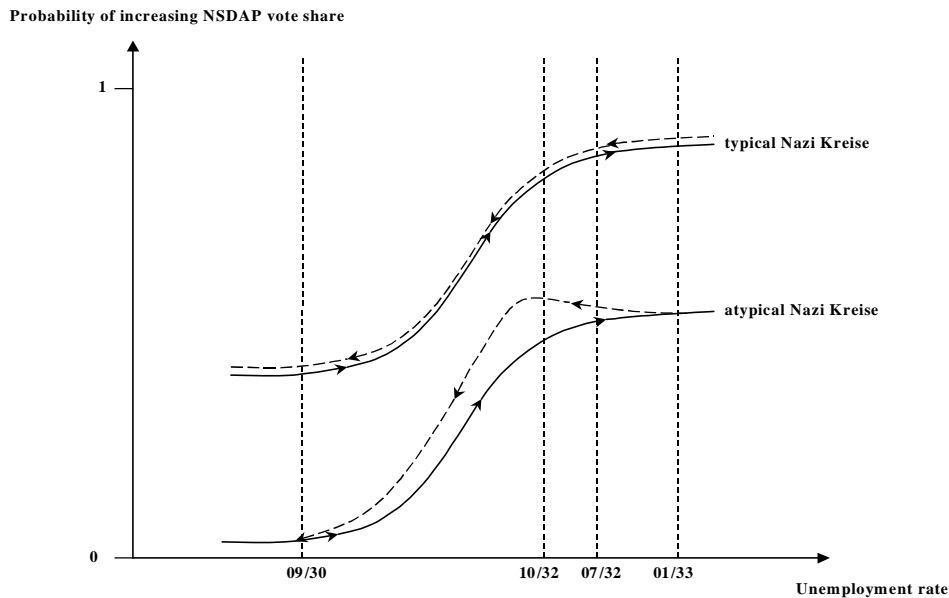


Fig. 6: Probability on *Kreis* level for the vote share of the NSDAP to increase during the depression

Spatial autocorrelation is not displayed in figure 5 because there is no clear substantive interpretation for this phenomenon. A possible explanation would be that the spatial scale of the politico-economic process does not coincide with the delineation of *Kreise* resulting in a spatial spill-over of measurement errors. The estimates corroborate this, since the lower value of the spatial autoregressive coefficient for the KPD, which had its strongholds in cities, indicates that the determinants of the vote share coincide much more with the spatial delimitation of the observational units than for the NSDAP, which scored successfully predominantly in rural *Kreise*.

The finding that the depression had a measurable impact on both radical parties' vote share can serve as empirical foundation for counterfactual policy scenarios how to decrease the radical vote sufficiently to prevent the Nazi Seizure of Power.²¹ Based on the estimates in table 3, for example, the effect of an increase in weekly income in July 1932 of one standard deviation (3,4 *Reichsmark*) would have decreased the NSDAP share in March 1933 from 39,1% to 35,8%

²¹ There is no clearly defined benchmark for a reduction of the radical vote share that would have been sufficient to prevent the Nazi Seizure of Power. Considering the fact that even in March 1933 the Nazis received scored 43,9% and together with the DNVP disposed of only a very slight majority of 51,9% in the *Reichstag*, a reduction of the NSDAP share by 2% would have sufficed to keep the Nazis from taking power. This of course would not have altered the basic parliamentary constellation.

and the KPD share from 10,3% to 9,8%, reducing the radical vote share by a total of 3,8%. However, in order to reasonably estimate the effect of a wage increase on the Nazis' and Communists' appeal, the effects of such a policy on the unemployment rate would also have to be taken into account. Moreover, the question of how to finance such a policy must be considered. This will be the topic for future research.

Appendix I

Variable Definition

Label	Definition	share	sum
NSDAP 5/28	NSDAP vote as share of eligible persons, Reichstag election May 1928	2,1	577.914
KPD 5/28	KPD vote as share of eligible persons, Reichstag election May 1928	7,4	2.090.274
NSDAP 9/30	NSDAP vote as share of eligible persons, Reichstag election Sept. 1930	14,7	4.308.920
KPD 9/30	KPD vote as share of eligible persons, Reichstag election Sept. 1930	10,0	2.937.322
NSDAP 7/32	NSDAP vote as share of eligible persons, Reichstag election July 1932	32,2	9.429.471
KPD 7/32	KPD vote as share of eligible persons, Reichstag election July 1932	11,6	3.406.230
NSDAP 11/32	NSDAP vote as share of eligible persons, Reichstag election Nov. 1932	27,6	8.062.653
KPD 11/32	KPD vote as share of eligible persons, Reichstag election Nov. 1932	13,2	3.884.183
NSDAP 3/33	NSDAP vote as share of eligible persons, Reichstag election March 1933	39,1	11.911.042
KPD 3/33	KPD vote as share of eligible persons, Reichstag election March 1933	10,3	3.137.176
Unemp 30	Persons unemployed as share of total labour force in Oct. 1930	4,7	1.060.098
Unemp 7/32	Persons unemployed as share of total labour force in July 1932	12,0	2.695.493
Unemp 10/32	Persons unemployed as share of total labour force in Oct. 1932	11,2	2.509.330
Unemp 33	Persons unemployed as share of total labour force in Jan. 1933	14,2	3.188.654
Income 30	Per capita weekly labour income (nominal) in April 1930 in Reichsmark	-	35,46
Income 7/32	Per capita weekly labour income (nominal) in July 1932 in Reichsmark	-	27,75
Income 10/32	Per capita weekly labour income (nominal) in Oct. 1932 in Reichsmark	-	28,37
Income 33	Per capita weekly labour income (nominal) in March 1933 in Reichsmark	-	27,37
White Collar	White-collar employees' share of total labour force in 1933	9,4	2.107.796
Civil Servants	Civil servants' share of total labour force in 1933	4,7	1.050.157
Domestics	Domestics' share of total labour force in 1933	3,1	708.801
Workers	Blue-collar workers' share of total labour force in 1933	31,2	6.994.697
Famil Agr	Helping family members in agriculture in 1925 as share of total labour force in 1933	16,6	3.709.656
Independet Agr	Independent Peasants in 1925 as share of total labour force in 1933	17,5	3.912.640
Workers Agr	Agricultural Workers' share of total labour force in 1925 as share of total labour force in 1933	13,2	2.961.299
Pop33	Population in a <i>Kreis</i> in 1933	-	44.495.276
Catholics	Catholics' share of population in 1933	32,0	14.249.246
Protestants	Protestants' share of population in 1933	63,2	28.129.113
Kreis-area	area of a <i>Kreis</i> in km ² in 1933	-	-
Non-rural Pop	Share of population of a <i>Kreis</i> living in settlements larger than 10.000 inhabitants	-	-

The figures (share and total) refer to the data set.

Appendix II

The Procedure of Proxy Construction

For the commercial census in June 1933 the number of people employed in 30 different branches has been recorded at the Kreis *level*. In order to calculate income proxies, these data have been spliced to data about hourly tariff wages for these branches. Branches for which tariff data were not available have been assigned the average tariff wage across all branches. For agriculture, data on yearly income and working hours have been used to compute hourly wages. Finally, hourly wages have been combined with information on labour utilization to take into consideration the effect of declining working hours due to partial lay-offs.

Appendix III

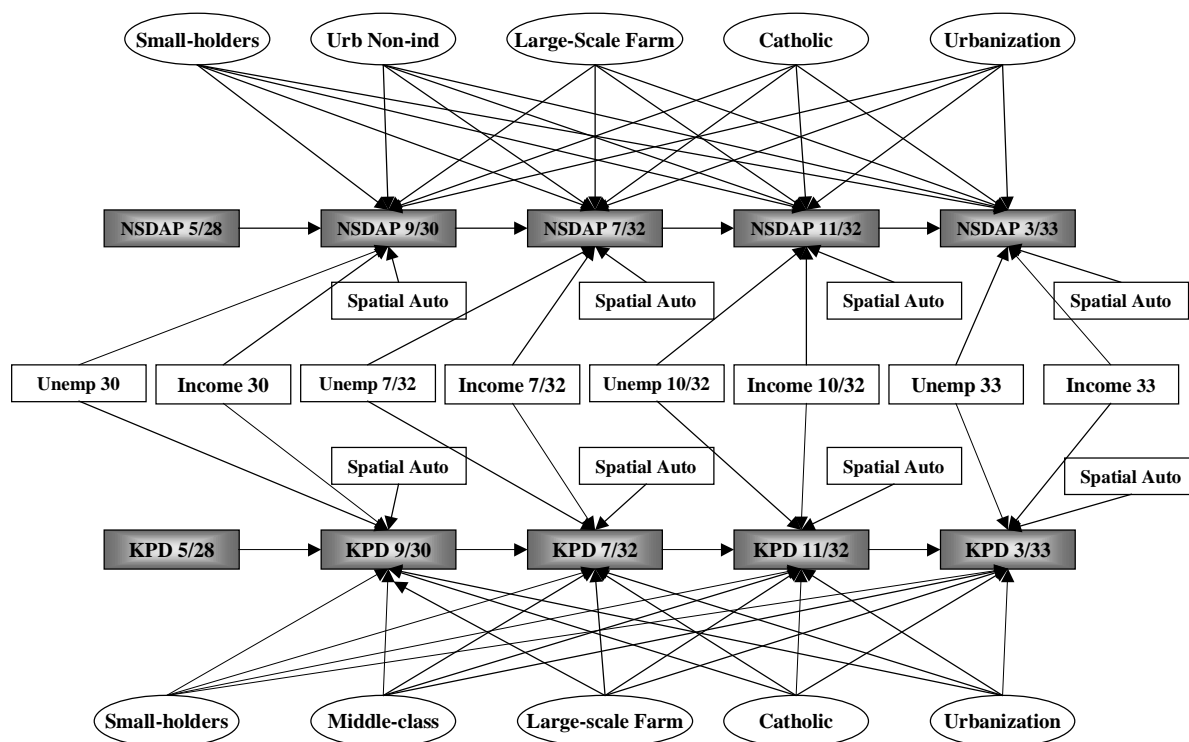


Fig. 4: Path model of the radicals' vote share with spatial autocorrelation, including time-varying economic, latent structural, and lagged endogenous variables

Appendix IV

Tab. 3: ML estimation of the determinants of the radicals' vote share

Variable	09/14/1930		07/31/1932		11/06/1932		03/05/1933	
	NSDAP	KPD	NSDAP	KPD	NSDAP	KPD	NSDAP	KPD
Constant	,014 (,033)	-,013 (-,710)	,029 (1,10)	-,011 (-,731)	,003 (-,274)	-,010 (-,922)	,010 (,403)	-,002 (-,124)
Urb Non-ind	,0228 (4,11)	-,072 (-2,38)	,026 (,795)	-,012 (-,412)	-,078 (-4,72)	-,006 (-,340)	-,040 (-1,64)	,011 (,630)
Catholics	-,542 (-15,83)	-,012 (-,690)	-,621 (-27,75)	,041 (2,64)	,136 (9,28)	-,034 (-3,74)	-,066 (-3,01)	-,034 (-3,35)
Smallholders	,077 (1,78)	,009 (,406)	,037 (1,50)	,024 (1,15)	-,025 (-1,99)	-,010 (-,847)	,060 (3,09)	-,055 (-3,98)
Large-scale Farm	-,035 (-1,01)	-,075 (-4,01)	,037 (1,93)	-,063 (-3,73)	,021 (2,20)	-,058 (-5,72)	,105 (6,98)	-,012 (-1,08)
Urbanization	,022 (1,18)	-,034 (-3,28)	,031 (2,81)	,005 (,543)	-,010 (-1,88)	-,001 (-1,09)	,021 (2,62)	,018 (3,07)
Unemployment	-,039 (-1,01)	,401 (1,96)	-,153 (-6,40)	,103 (4,98)	,013 (1,18)	-,002 (-,160)	-,092 (-5,10)	,057 (4,40)
Income	-,126 (-1,80)	,110 (2,81)	-,090 (-2,17)	-,031 (-,843)	,040 (1,87)	,024 (1,12)	-,030 (-9,20)	,006 (,237)
Temporally Lagged Vote	,478 (19,82)	,843 (46,26)	,458 (26,78)	,896 (51,86)	1,09 (86,20)	,920 (93,28)	,920 (51,92)	,886 (76,88)
Spatially Lagged Residuals	,639 (20,43)	,459 (11,56)	,647 (20,99)	,434 (10,67)	,568 (16,26)	,536 (14,73)	,746 (30,19)	,570 (16,35)
Log likelihood	-600,37	-133,03	-188,60	-78,26	341,01	341,25	350,63	263,35
Breusch-Pagan DF = 1	3,69	1,10	2,10	,11	3,90	,19	5,16	4,69
Likelihood Ratio Test DF = 1	257,53	99,04	281,58	100,37	182,55	137,94	424,62	178,80

z-values (standard errors are asymptotically normally distributed and not t distributed like in the case of OLS) in round brackets

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