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# The Popularity Function: A Spurious Regression? The Case of Austria

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*Abstract.* In this paper we apply the unit root and cointegration methodology of modern econometric time series analysis to estimated popularity functions for the Austrian parties in government since the mid-1970s. We find no evidence for and rather strong evidence against influences of unemployment or inflation on the popularity of the political parties in the federal government, thereby challenging previous studies that claimed to have established such influences. The usefulness of the applied methodology to clarify such questions is demonstrated by this example.

*JEL Codes:* D3, H11, P16

*Keywords:* Austrian popularity function, economic influence on popularity, spurious regression.

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## 1 Introduction

Estimating vote and popularity functions is one of the most frequent activities in empirical public choice analysis. Nannestad and Paldam (1994), in their influential survey of this work, refer to a large number of studies estimating links between economic variables and voters' evaluation of political parties and governments in many countries. One of their main conclusions was that a clear link exists in particular between unemployment and governments' and ruling parties' evaluation by the voters as expressed by results of elections or voting intentions embodied in popularity data from opinion polls and surveys. Weaker, but frequently also significant influences were obtained for inflation rates and sometimes (real) income or income growth rates. Most successful were estimations of vote and popularity functions using time series data, although some progress has also been obtained through micro studies. However, as these authors note, the stability of such functions across time and across countries is often lacking. These observations are confirmed by the more recent survey by Lewis-Beck and Stegmaier (2013), who guess that about 500 such investigations were carried out altogether. It even seems that more recently a new wave of interest in these activities is going on. For a successful use of vote and popularity functions in predicting election results, see, e.g., Fair (2012).

The lack of stability of vote and popularity functions is somewhat disturbing and justifies additional econometric work. For instance, Kirchgässner (2009) has shown that in Germany during the last years the popularity function disappeared or at least did not result in significant and economically easily interpretable estimates for the influence of even the most frequently detected determinants on voters' opinion about the ruling parties, namely unemployment and inflation. He attributes this partly to changes in the European institutional framework, where the rate of inflation is no longer determined on the national level but is the main agenda of the European Central Bank. On the other hand, the lack of significance of unemployment and labor market variables is less easily explained as these are still at least partly under the control of government policies. These and similar concerns call for a reconsideration of the vote and popularity function also for other countries.

One of the most astonishing facts is the small number of econometric studies on vote and popularity functions using the econometric techniques developed in the context of the unit root and cointegration analysis initiated by the seminal work of Granger and coauthors, in particular Engle and Granger (1987). This is surprising in view of the large number of applications of this methodology to other, more traditional economic functional relations (e.g., the consumption function or the money demand function) yielding results which often modified earlier estimations in a fundamental way and giving way to new theories about the behavior of economic agents. One should expect that similar modifications will result from the application of such techniques to the vote and popularity function. One notable exception from the lack of unit root and cointegration techniques is the replication and extension by Harrison and Marsh (1998) of estimations for Ireland by Borooah and Borooah (1990), which, although confirming some results of the earlier study, showed also important modifications of others.

More generally, it seems possible that the high coefficients of determination obtained in some vote and popularity functions combined with the lack of stability are the result of spurious regressions in the sense of Granger and Newbold (1977). In such a case, the presence of stochastic or deterministic trends preventing stationarity of the time series involved may lead to seemingly strong correlations between economic variables which in fact are unrelated at all.

Such may well be the case also for some vote and popularity functions and may contribute to the lack of stability and the often weak performance of these functions in forecasting election results.

In this paper, we perform a first examination of popularity functions for a particular country, namely Austria, using some techniques of unit root and cointegration analysis. Due to the lack of sufficiently long time series for election results, we confine ourselves to popularity functions only, where we have consistent annual data at least for the period 1976 to 2010. Austria has been the object of studies by several authors (Neck 1979, 1988, 1996; Hofreither 1988; Neck and Karbuz 1995, 1997; Schneider et al. 2012). Most of them found at least plausible and sometimes significant effects of unemployment on the voters' evaluation of the governing parties. However, also these results may suffer from the spurious regression problem and therefore need to be reexamined in the light of the unit root and cointegration methodology. As it turns out from our results, severe doubts about the appropriateness of these earlier results arise, and we are led to the conclusion that they are likely to be examples of spurious regressions.

The following parts of the paper are organized as follows. Section 2 provides some theoretical considerations about popularity functions as well as a literature review. In Section 3, we give an introduction to the political system of Austria insofar as it is of relevance to the estimation of popularity functions. Section 4 reports about results for the Social Democrats, who were in charge of economic policies from the beginning of the period under consideration until 1999. Results for the People's Party (Christian Democrats or Conservatives), who were part of the federal government from 1987 to the end of the period are presented in Section 5. Section 6 summarizes the main results and gives some reasons for the apparent lack of links between macroeconomic variables and the popularity of the parties in Austrian federal government.

## **2 Theoretical considerations and literature review<sup>2</sup>**

In this section, we provide some theoretical considerations and give a short literature review with a focus on the latest papers.<sup>3</sup> Vote and popularity models analyze the relationship between economic and political variables and the support for a government. According to Nannestad and Paldam (1994) and Paldam (2004), during the last 30 years about 300 papers on vote and popularity functions have been written.<sup>4</sup> Most of this research is of an empirical nature, and if one summarizes the theoretical reasoning starting with Downs (1957), Davis, Hinich and Ordeshook (1970), Mueller (1970), Stigler (1973), Frey and Schneider (1978a,b, 1979), Fair (1978), Hibbs (1977), Hibbs and Vasilatos (1981), and Kirchgässner (1986), one general finding of these authors<sup>5</sup> is that, according to the theory of Downs, selfish politicians' and voters' behavior can be reduced to the operational idea known as the responsibility hypothesis: Voters held the government responsible for the past development of the economy. This

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<sup>2</sup> This part is taken from Schneider et al. (2012).

<sup>3</sup> There is a huge literature about the theory of voting, which will not be discussed in this paper; we will provide only some theoretical considerations and latest empirical results; compare e.g. the excellent survey by Nannestad and Paldam (1994, 1997), and the papers by Kirchgässner (1985, 1986), Goodhart and Bhansali (1970), Kramer (1971), Paldam (2004), Nannestad, Paldam and Rosholm (2003) and Lewis-Beck and Paldam (2000).

<sup>4</sup> Compare Nannestad and Paldam (1994), Paldam (2004), but also the earlier survey of Schneider and Frey (1988).

<sup>5</sup> Except for Stigler (1973), who criticized these approaches, arguing that voters have rational expectations and hence the past development of economic variables has no influence on the election outcome.

hypothesis predicts that if the economy goes well, voters will approve this and the popularity or the election outcome of the government party (parties) will be increasing, and if the economy is in a bad shape the popularity and the election outcome of these parties will deteriorate.

Most authors choose a linear functional relation to model the vote/popularity function, and in most cases the economic variables unemployment rate, inflation rate and growth rate of personal disposable income have been used. This will also be done in this paper; hence, we model the popularity and vote function in the following way:

$$\left. \begin{array}{l} \text{\{POP-Austrian-Party-A} \\ \text{Election Outcome Party-A\}} \end{array} \right\} \text{ or } = F \left\{ \begin{array}{l} \text{unemployment rate } UNQ, \text{ rate of inflation} \\ \text{RCPI, growth rate of personal income } RPI, \text{ and} \\ \text{other non-economic variables} \end{array} \right\}$$

The theoretically expected signs are for  $UNQ < 0$ ,  $RCPI < 0$ ,  $RPI > 0$ .<sup>6</sup>

Following the contribution by Lewis-Beck and Paldam (2000), Table 2.1 stylizes and summarizes the facts about the empirical results of the vote and popularity functions over the period 1970 to 1990. From Table 2.1 we summarize first that most of the empirical findings of vote and popularity functions derive from the estimates built upon the responsibility hypothesis. This hypotheses offer a simple and reduced link between the economy and the voter. A second important finding is that the vote and popularity functions do not produce very stable results. Third, it is difficult to compare the results of the various authors and of the different countries because almost every author has his/her own specification.

One of the latest studies has been undertaken by Kirchgässner (2009) with the provocative title “The lost popularity function: Are unemployment and inflation no longer relevant for the behavior of German voters”. As we have seen in the discussion just before, unemployment and inflation (and in most cases the growth of real disposable income, too) have been those variables which quite often showed up highly statistically significant in vote and popularity functions in most countries. Kirchgaessner (2009) correctly argues that up to now there was a general empirical finding that increasing unemployment and inflation have a negative impact on government’s popularity. This was true for Germany as well: for the governments of Adenauer, Erhard, Brandt, Schmidt and Kohl they had the theoretically predicted negative influence on the popularity of these governments and were highly statistically significant. However, this result does not hold for the Schröder government: when Kirchgässner estimates the popularity for the Schröder government, neither unemployment nor inflation have a statistically significant influence on the popularity of this government. Kirchgässner argues that the missing impact of unemployment might be due to statistical reasons: the short observation period and the low variance of the explanatory variables. Considering inflation, the citizens might have recognized that they cannot hold responsible the government for this phenomenon any longer as the European Central Bank (ECB) is executing monetary policy in Europe since 1999. Although Kirchgässner finds no significant influence of the macroeconomic variables on the popularity of the Schroeder government, he thinks it is much too early now to draw the general conclusion that voters do not held responsible a government for the economic development because one needs more and better data to undertake further investigations to confirm these results.

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<sup>6</sup> In this paper, we do not discuss whether from an economic/public choice standpoint it is rational to vote at all and whether voters react as rational agents with a forward looking perspective. Compare here the excellent survey by Paldam (2004); the first papers on this were Fiorina (1978, 1981) and Kinder and Kiewiet (1979).

The only studies which according to our knowledge deal with the Austrian situation are the ones by Neck (1979, 1988, 1996), Hofreither (1988) and Neck and Karbuz (1995, 1997). In their papers, these authors present econometric evidence for the influence of macroeconomic variables on the popularity of political parties in Austria. They use popularity data provided by the Institute for Market and Social Analyses (IMAS), Linz, and use quarterly data over the period 1975 to 1993. The main results are as follows: the rate of unemployment, the growth rate of disposable income and the rate of inflation were identified as economic determinants of voters' evaluation of political parties. They found out that there is evidence for a structural break in the popularity functions related to the change from a one-party and/or small coalition government to a "grand" coalition (a coalition of the big parties SPOe and OeVP). For a one-party government or a small coalition, the predictions of the responsibility hypothesis for the popularity functions are confirmed, meaning that unemployment rate and inflation rate have the theoretically predicted negative sign and are statistically significant in most cases. However, these results are not very stable; in some cases they had the predicted statistically coefficient and theoretically expected sign, in other cases they did not.

### **3 Politics and the economy in Austria: a brief introduction**

We are considering popularity functions for Austria for the period 1976 to 2010, hence it is appropriate to introduce readers briefly to the political system and some economic policy issues in this country during these years. During the 1970s (more precisely, from 1970 to 1983), Austria was governed by a one-party government led by the Social Democratic Party (SPOe) under federal chancellor (prime minister) Bruno Kreisky. During this period, the effects of the first and second oil price shocks resulted in a deceleration of growth and (in 1975) even negative growth. This prompted the government to start a policy later dubbed "Austrokeynesianism", which consisted in expansionary fiscal policy measures (mainly increasing government expenditures, financed by public debt) to combat unemployment and monetary policy following a strict peg to the deutschmark (the so-called "hard-currency policy") aiming at "importing" low inflation rates from Germany, Austria's main trading partner. The institutional background was the system of "social partnership", a voluntary cooperation of the main interest organizations of employers and employees, which guaranteed moderate wage growth and the virtual absence of strikes, but included also extensive interventions of these interest groups into the Austrian economy.

When the Social Democrats lost the absolute majority in Parliament in 1983, they formed a "small coalition" with the third-largest party, the Freedom Party (FPOe), which at that time stood for a right-wing liberal policy stance. This coalition was finished in 1986 when the charismatic Jörg Haider became leader of the FPOe, turning this party towards right-wing populist positions. After another election that year, in which the SPOe kept its relative majority in Parliament in spite of considerable losses, the Social Democrats formed a so-called "great coalition" with the second-largest party, the Austrian People's Party (OeVP), a Christian Democratic or conservative party. Following successful actions resulting in the prevention of nuclear and hydro power plants, in 1986 a fourth party, the Greens (environmentalists), was elected into Parliament for the first time since 1959.

The SPOe-FPOe "small coalition" did not manage to keep the public budget deficit under control, hence a primary goal of the SPOe-OeVP "great coalition" was to consolidate the federal budget. Another challenge came from the political and economic development in the late 1980s

with the eventual demise of the Eastern block and the centrally planned economies in Central and Eastern Europe and the Soviet Union. Sooner or later, the Austrian government became convinced that it would be desirable to enter the European Union to find an appropriate status in the new European political architecture. After a positive referendum, at the beginning of 1995 Austria became a member of the EU, together with Sweden and Finland. The cooperation of the two biggest parties (and, what was very important, the organizations of the “social partnership”) in managing the Austrian entry into the EU is generally regarded as the main achievement and justification of the “great coalition”.

On the other hand, the coalition government was less successful in keeping the federal budget under control, and after the EU entry tensions increased between the two ruling partners. This was amplified by the rise of the FPÖ, the main opposition party, which increased its voting share from less than 5 percent in 1983 to nearly 27 percent in 1999. Growing frustration about political deadlock due to divergent positions of the two coalition parties, especially within the ÖVP which was tired of being number two in the government, prompted the end of the “great coalition” (which was not really “great” anymore, as the FPÖ had replaced the ÖVP as second-largest party in the 1999 election) and the formation of another “small coalition”, this time between FPÖ and ÖVP, led by ÖVP politician Wolfgang Schüssel.

The new government aimed at major changes (in their language: a “turnaround”) in several policy fields, especially economic policy. In spite of strong criticism, both international and national, against the participation of the right-wing populist and nationalist FPÖ, the “small coalition” managed to implement several reforms to secure the sustainability of public finances. However, a (near-) balanced budget was achieved only once, and the coalition came under stress from internal differences and a split of the FPÖ as well as from several scandals shaking its credibility. Thus after a period of dominance of the ÖVP, which became the strongest party in the 2002 elections, in 2006 the SPÖ regained its former position as number one in the voters’ grace. This led again to the formation of a “great coalition” government of SPÖ and ÖVP, which had to cope with the “Great Recession” 2007-2010 (which it did fairly well) and suffers from steady decrease of its popularity due to the lack of a long-term project justifying its existence.

#### **4 Popularity functions for the Social Democrats (1976–1999)**

The SPÖ was leading the Austrian government, with the federal chancellor and the minister of finance coming from this party, during the period 1976 to 1999, hence we first conduct an analysis for this party. Although for the larger part of this period it had to share power with another party, it is reasonable to assume that voters attributed successes and failures in economic policy largely to the SPÖ if at all. Figure 4.1 shows that the rate of unemployment (national measurement, the only series available over the entire time horizon) began to rise a few years after the first oil price shock from around 2 percent to 7 percent at the end of the millennium. The rate of inflation (measured by the growth rate of the consumer price index), on the other hand, after some oscillations in the first few years, decreased towards the end, resulting eventually in virtual price stability. Figure 4.1 also shows the development of the popularity of the SPÖ during these years, which after 1983 decreased more or less steadily. It may be conjectured (and was also the result of the studies mentioned earlier) that this fall of the SPÖ popularity is related to the simultaneous increase in unemployment, which is a

phenomenon relevant especially for the potential electorate of this party which at least in the past was a typical workers' and employees' party.

Equation (1) in Table 4.1 gives the result of a traditional popularity function with the arguments unemployment rate ( $UNQ$ ) and inflation ( $RCPI$ ). It indicates a seemingly clear negative effect of the unemployment rate on the popularity of the SPOe as predicted by theory. The inflation rate's effect has the wrong sign and is insignificant. The latter result also accords with earlier studies and is easily explainable: voters of the Social Democrats are by far more affected by the threat of becoming unemployed and by social and political troubles from high unemployment than by inflation, which poses a higher threat to wealthier people who overwhelmingly show no potential sympathy to the SPOe anyway. Moreover, already before the introduction of the euro and the shift of monetary policy to the EU level, it was generally recognized that a small open economy like Austria depended to a large extent on foreign (global, European, and German) developments with respect to inflation, hence the government and the ruling parties were rarely made responsible for the development of the price level.

Equation (2) seems to suggest that the negative effect of the unemployment rate is even stronger when omitting the inflation variable. Entering some income growth rate variable did not result in significant effects in either of our estimations and are therefore not reported here. Interestingly, using the inflation rate as the only regressor results in a significant (but positive) effect, which points toward a spurious regression (equation (3)). Thus a first conjecture might be that the increase in the unemployment rate contributed to the decrease in the popularity of the Social Democrats in Austria during the 1980s and 1990s. However, we have to check whether this apparent effect is not also due to a spurious regression.

For this purpose, we examine the stationarity properties of the time series involved. The usual procedure is to execute unit root tests on them. Table 4.2 presents the results of the Augmented Dickey-Fuller unit root tests (ADF test) for the unemployment rate and its first difference. The null hypothesis is always the presence of a unit root, hence non-stationarity. The "Probability" column gives the MacKinnon one-sided p-values. The results clearly cannot reject a unit root for the unemployment rate at any reasonable significance level. For the first difference, the unit root hypothesis can be rejected at the 10, 5 and 1 percent level in the three versions of the ADF test reported, which we accept as evidence for the stationarity of the first difference. Hence the unemployment rate is integrated of order one, an  $I(1)$  variable. For the sake of completeness, we mention that we also conducted ADF tests for the (insignificant) inflation rate and found that it is an  $I(2)$  variable during this period which may or may have not a deterministic trend.

Table 4.2 also contains the results of the ADF test for the popularity of the SPOe (variable  $SP$ ). Here the situation is more difficult to interpret. The ADF tests for  $SP$  accept the unit root hypothesis, but only at the 10 percent level when including a deterministic trend. This (negative) trend is highly significant in the respective version of the test (t value:  $-3.21$ ). Moreover, the test equations for the first difference of  $SP$  (not reported here) show that specifications without the trend have coefficients of determination near zero, which shows that the trend must not be omitted. Nevertheless, we also run ADF tests for the first difference of  $SP$ , which unambiguously reject the unit root hypothesis. Hence,  $SP$  is either  $I(1)$  or its movement is governed by a deterministic trend.

Accepting for the moment the assumption that  $SP$  is an  $I(1)$  variable, we can attempt to check whether the two series  $SP$  and  $UNQ$  are cointegrated. Remember that this is a necessary condition for running a regression like equation (2) as both variables are in any case non-



stationary, and in the absence of a cointegration relation the regression will be spurious. Table 4.3 presents result of the Engle-Granger and the Phillips-Ouliaris cointegration tests. The null hypothesis is always that the series are not cointegrated. In no instance can the null hypothesis be rejected at the 5 percent level. Next, Table 4.4 gives the results of various versions of the Johansen cointegration test. They are mixed, rejecting cointegration only in one case (with no intercept and no trend). Therefore the hypothesis of cointegration cannot be regarded as disproven but needs further investigation, especially in view of the possibility of the presence of a deterministic trend. One argument against the cointegration hypothesis comes from the fact that we are not successful in estimating an error correction equation for  $SP$ , which would be a necessary and sufficient condition for cointegration between  $SP$  and  $UNQ$ .

Let us now consider the evidence on the deterministic trend. First, we include the trend in the estimated equation for  $SP$ . Equations (4) and (5) in Table 4.1 show that it is highly significant when included both as the only regressor and together with the unemployment rate. Moreover, when the unemployment rate is included in addition to the trend, it becomes completely insignificant (equation (5)) and the adjusted  $R^2$  even deteriorates. This implies that the deterministic trend must be included when explaining  $SP$ , and gives a strong indication that the unemployment rate does not contribute to the explanation of the decrease in the popularity of the Social Democrats during their presence in power in the 1980s and 1990s.

In order to make the  $SP$  series stationary, it is necessary to remove the deterministic trend. This can be done by either taking first differences or by regressing the series on the trend and taking the residuals of that equation instead of the series itself. For the first possibility, we note that the first difference of  $SP$  does not contain a stochastic trend and can therefore be regressed on the first difference of the unemployment rate in order to check whether at least a short-run link exists between the change in the unemployment rate and the Social Democrats' popularity. This regression results in an insignificant positive ("wrong") coefficient of  $UNQ$  and an adjusted  $R^2$  of 0.03, hence also such a short-run effect is not present.

The same result is obtained if we remove the deterministic trend by taking the trend-free component of  $SP$  instead of the variable itself. First, we take the residual of equation (4), to be called  $SPS$ , as systematic part and examine its properties. ADF tests confirm that  $SPS$  does not contain a unit root. When regressing it on the change in the unemployment rate, this variable again has a positive coefficient which is significant at the 10 percent level only, confirming the presumption of no cointegration. Just to complete this task, we note that the second difference of the inflation rate used as regressor turns out to be also positive and completely insignificant.

To summarize: The development of the popularity is mainly driven by a downward deterministic trend, irrespective of the development of the rate of unemployment. Although it cannot completely be excluded, only very weak evidence exists for a systematic relation between unemployment and the popularity of the SPOe. The decline in the SPOe popularity is therefore overwhelmingly determined by other factors than the usual independent economic variables in the popularity function.

## **5 Popularity functions for the People's Party (1987–2010)**

Next, we examine popularity functions for the People's Party OeVP during its participation in the federal government of Austria (1987 to 2010). Figure 4.2 shows the development of its popularity ( $PP$ ) and of the unemployment and the inflation rate during these years. It shows first the rise in the unemployment rate which then, with short-lived downward movements,

remains around 7 percent. The inflation rate first increases until 1992 and then falls to levels compatible with price stability except for a second peak in 2008 at the end of the boom before the “Great Recession”. The popularity of the OeVP falls until the end of the 1990s, then rises with the OeVP being number one during its “small coalition” with the FPÖ but already from 2005 on falls again rapidly until the end of the period.

For the People’s Party, the a priori presumption of systematic economic effects are weaker than for the SPÖ because the OeVP was only a junior partner from 1987 to 1999 and at most an equal partner since 2007 (when the finance minister but not the federal chancellor belonged to it). It might be conjectured that the rate of inflation might be more important than the rate of unemployment for the popularity of this Christian Democratic or conservative party as most of its potential voters (self-employed, farmers, civil servants, executive employees and similar groups) are not strongly affected by higher unemployment.

We first start with “naïve” OLS regressions of *PP* against *UNQ* and *RCPI*; see equation (6) in Table 4.5. Both economic variables have the expected negative sign but are insignificant, and the  $R^2$  is rather low. Equation (7) shows that the inflation rate taken alone remains insignificant (and the coefficient even switches its sign) while the unemployment rate (equation (8)) taken alone becomes significant at the 10 percent level at least. If anything, unemployment seems to have a stronger (but still doubtful) effect also on the popularity of the OeVP during this period.

The next step consists in testing for unit roots in the three variables for this period. Table 4.6 gives the results of the ADF tests. According to them, the unemployment rate has a unit root, its first difference does not so, hence it is  $I(1)$ . For the inflation rate, we find again it to be  $I(2)$ : neither for *RCPI* nor for its first difference can the null hypothesis of a unit root be rejected. For the popularity variable *PP*, the ADF tests give mixed results (two rejections of the unit root, one acceptance), but Phillips-Perron tests (PP) accept the null at least at the 5 percent level. Also for the first difference of *PP*, the ADF tests are inconclusive but here the PP tests reject the null hypothesis of a unit root strongly. Therefore we conclude that *PP* is an  $I(1)$  variable. For none of the variables a deterministic trend becomes significant.

This implies that cointegration may exist between *PP*, *UNQ* and the first difference of *RCPI*, all of them being  $I(1)$  variables. In view of the insignificance of the explanatory variables in the candidate for a cointegration equation and its low  $R^2$  as shown in equation (9) in Table 4.5, it does not seem very promising to look after a cointegration relation, but we nevertheless do so. Table 4.7 presents the results of the Engle-Granger and the Phillips-Ouliaris cointegration tests. Neither of them rejects the hypothesis that the series are not cointegrated. The Johansen cointegration tests give mixed results for the equation with both variables but indicate at most one cointegration relation (Table 4.8). If we look at the Johansen test for each of the regressors separately, we see that cointegration between *PP* and *UNQ* is clearly rejected by one Johansen test, and cointegration between *PP* and the first difference of *RCPI* is rejected in all but one of the tests. In addition, no error-correction mechanism equation can be established. Altogether, we can be fairly sure that no cointegration exists between this set of variables.

Although no long-run relation exists between the variables considered, it is still possible that there is some short-run influence of economic variables on the OeVP popularity. This is tested by regressing the first difference of *PP* on the first difference of *UNQ* and/or the second difference of *RCPI*. As expected from the previous results, none of these regressions gives any significant coefficient, and the adjusted  $R^2$  is even negative in all three cases. Hence we can be confident in saying that the popularity of the OeVP is not affected by either of the usual

economic independent variables of popularity functions. Additional support for this statement comes from pairwise Granger causality tests which also do not reject the null hypothesis of no Granger causality between any of these economic variables and the popularity of the People's Party.

## **6 Concluding remarks**

We can summarize our results as follows: Neither during the first period with the dominance of the Social Democrats nor during the second (overlapping) period with the participation of the People's Party in government, influences of either unemployment or inflation on the popularity of the respective party can be established. This puts a big question mark on previous results for this country, which claimed to have found such influences. There is a real possibility that those earlier studies fell into the trap of spurious regressions.

However, it would be premature to conclude from this that the popularity function is non-existing altogether. First, our results refer to a particular country with peculiar characteristics, in particular, being a small open economy within (at least partly) being a member of a currency union. Hence voters may rationally hold international developments instead of domestic politicians responsible for macroeconomic developments. Moreover, Austria is far from a two-party competitive political system, with a great coalition over most of the periods considered and the "social partnership" having decisive influence even when only one of the major parties is in government, hence not too much discretion is available for partisan policy making. Finally, the time periods investigated are rather short, and the data on party popularity may be unreliable, in particular when annual data are being used. Nevertheless, the real possibility that the popularity of the larger political parties does not depend on economic developments can at least not be discarded for that country in spite of seemingly plausible previous estimates of popularity functions. On the positive side, we have shown that the use of the unit root and cointegration methodology can lead to new and unexpected results. It remains to be seen whether applying these methods to data of other countries provides similar challenges for their popularity functions.

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## **7.2 Data sources**

UNQ = Unemployment quota in percent; Statistic Austria, STATAS, Vienna, various years.

RCPI = inflation rate, consumer price index; Statistic Austria, Vienna, various years.

Popularity = popularity of the SPOe (Socialist Party) or OeVP (People's Party) in percent, yes-shares; Fessel GfK, Vienna, 2014 and various years.

Figure 4.1. Development of the unemployment rate, the inflation rate and the popularity of the SPOe (Socialist Party), 1976–1999

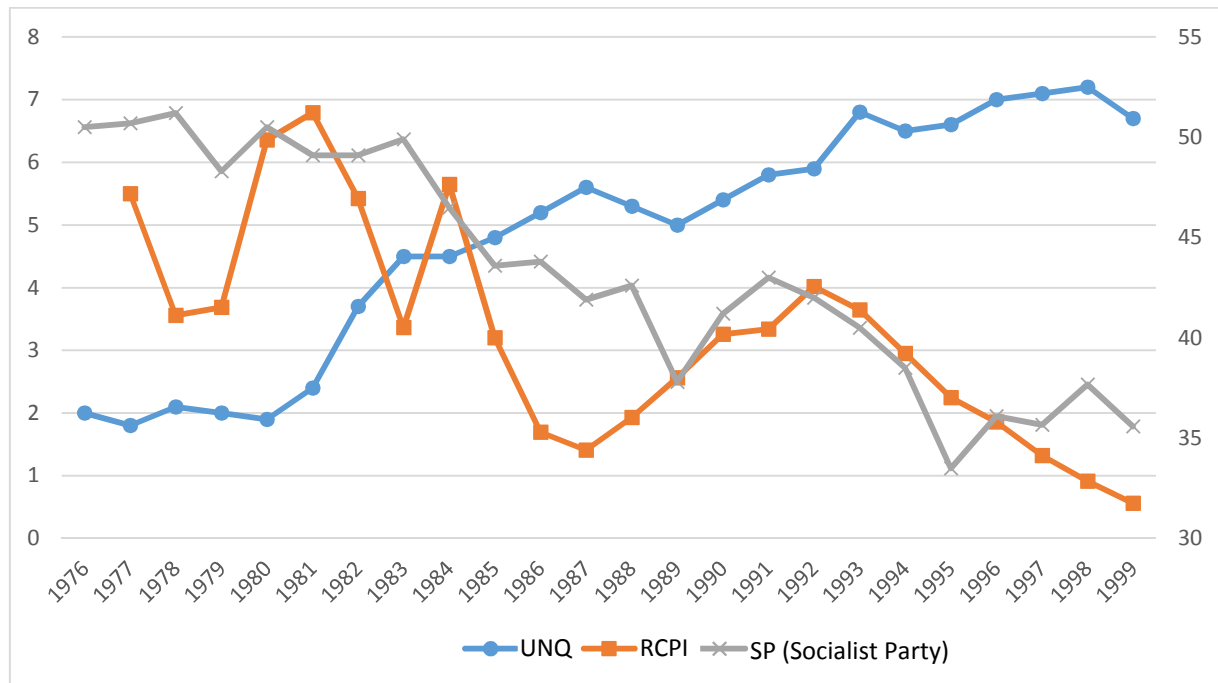


Figure 4.2. Development of the unemployment rate, the inflation rate and the popularity of the OeVP (People’s Party), 1987–2010

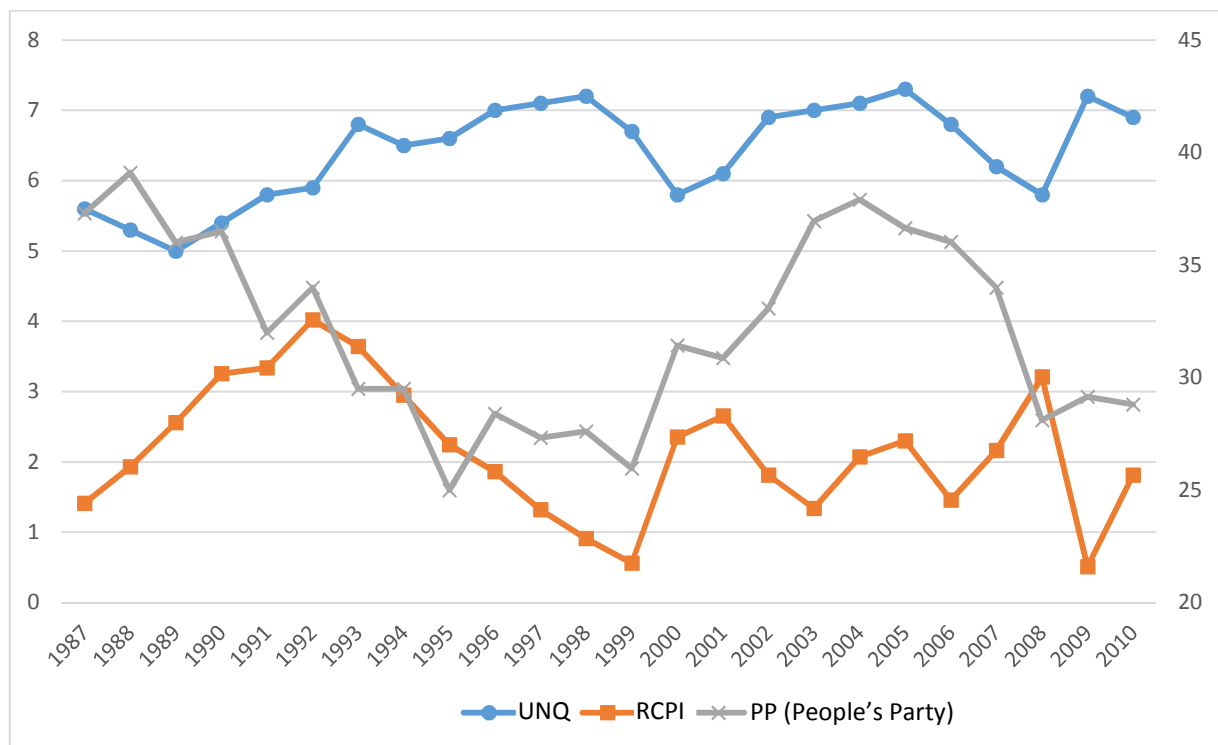


Table 2.1. The main stylized facts about the vote and popularity function<sup>1)</sup>

I.	Vote and popularity functions are basically similar, but the fit of popularity functions is better.
II.	Economic changes explain about one third of the change in the vote.
III.	The big two: the vote reacts to a few macroeconomic variables – mainly unemployment/growth and inflation.
IV.	Voters are myopic and have a short time horizon.
V.	Retrospective/prospective controversy: voters react to past (retrospective) events more than to expected (prospective) ones, but the difference is small.
VI.	Sociotropic/egotropic controversy: sociotropic (national) economic voting is generally stronger than egotropic (personal) economic voting. However, there are some notable country exceptions.
VII.	The grievance asymmetry: voters may react more to negative changes than to corresponding positive ones.
VIII.	Little is known about the macroeconomic knowledge of voters and how it is obtained.
IX.	The instability problem: the main problem in the literature is that the vote and popularity function lacks stability, both in cross-country studies and even in the same country over time.

<sup>1)</sup> See Paldam (1981), Lewis-Beck (1988), Norpoth et al. (1991) and Nannestad and Paldam (1994, 1997) for literature surveys.

Source: Lewis-Beck and Paldam (2000), p. 114.



Table 4.1. Regression results; dependent variable: *SP*; OLS; 1976–1999

No. of Equ.		(1)	(2)	(3)	(4)	(5)
Independent variables	constant	52.27 (15.31) (0.00)	56.45 (39.73) (0.00)	35.10 (20.67) (0.00)	1539.64 (13.56) (0.00)	1495.30 (3.78) (0.00)
	<i>UNQ (unemployment quota)</i>	-2.30 (-5.32) (0.00)	-2.72 (-9.90) (0.00)	-	-	-0.09 (-0.12) (0.91)
	<i>RCPI (inflation rate)</i>	0.63 (1.41) (0.18)	-	2.41 (5.23) (0.00)	-	-
	Trend	-	-	-	-0.75 (-13.17) (0.00)	-0.73 (-3.64) (0.00)
Statistics	R <sup>2</sup>	0.82	0.82	0.57	0.89	0.89
	Adjusted R <sup>2</sup>	0.80	0.81	0.54	0.88	0.88
	S.E. of regression	2.47	2.47	3.75	1.94	1.98
	Log likelihood	-51.85	-54.75	-62.00	-48.89	-48.88
	F-statistic	45.62	97.97	27.35	173.57	82.90
	Probability (F-stat.)	0.00	0.00	0.00	0.00	0.00
	Akaike info criterion	4.77	4.73	5.57	4.24	4.32
	Schwarz criterion	4.92	4.83	5.66	4.34	4.47
	Hannan-Quinn crit.	4.81	4.76	5.59	4.27	4.36
	Durbin-Watson stat.	1.54	1.32	1.01	1.41	1.42

Table 4.2. Augmented Dickey-Fuller unit root tests; 1976–1999

Null hypothesis	Exogenous	Lag length	ADF test stat.	Probability
<i>UNQ</i> has a unit root	constant, linear trend	0 (automatic – based on SIC, max. lag=5)	–1.31	0.86
<i>UNQ</i> has a unit root	constant	0 (automatic – based on SIC, max. lag=5)	–1.17	0.67
<i>UNQ</i> has a unit root	none	0 (automatic – based on SIC, max. lag=5)	1.64	0.97
$\Delta UNQ$ has a unit root	constant, linear trend	1 (automatic – based on SIC, max. lag=4)	–3.31	0.09
$\Delta UNQ$ has a unit root	constant	0 (automatic – based on SIC, max. lag=4)	–3.63	0.01
$\Delta UNQ$ has a unit root	none	0 (automatic – based on SIC, max. lag=4)	–3.06	0.00
<i>SP</i> has a unit root	constant, linear trend	0 (automatic – based on SIC, max. lag=5)	–3.39	0.08
<i>SP</i> has a unit root	constant	0 (automatic – based on SIC, max. lag=5)	–0.90	0.77
<i>SP</i> has a unit root	none	0 (automatic – based on SIC, max. lag=5)	–1.47	0.13
$\Delta SP$ has a unit root	constant, linear trend	0 (automatic – based on SIC, max. lag=4)	–5.94	0.00
$\Delta SP$ has a unit root	constant	0 (automatic – based on SIC, max. lag=4)	–6.09	0.00
$\Delta SP$ has a unit root	none	0 (automatic – based on SIC, max. lag=4)	–5.59	0.00

Table 4.3. Cointegration tests; series: *SP*, *UNQ*; null hypothesis: series are not cointegrated; 1976–1999

Test procedure	Cointegrating equation deterministics	$\tau$ -statistic	Probability	z-statistic	Probability
Engle-Granger; automatic lags specification based on Schwarz criterion (max. lag=4)	constant, trend	-3.57	0.15	-16.67	0.14
	constant	-3.23	0.10	-15.40	0.06
Phillips-Ouliaris; long-run variance estimate (Bartlett kernel, Newey- West fixed bandwidth)	constant, trend	-3.67	0.13	-17.08	0.12
	constant	-3.32	0.09	-15.53	0.06

Table 4.4. Johansen cointegration tests; series: *SP*, *UNQ*; lags interval: 1 to 1; 1976–1999

Selected (0.05 level: critical values based on MacKinnon-Haug-Michelis (1999)) number of cointegrating relations by model					
Data trend	none	none	linear	linear	quadratic
Test type	no intercept, no trend	intercept, no trend	intercept, no trend	intercept, trend	intercept, trend
Trace	0	1	1	1	1
Max. eigenvalue	0	1	1	1	1
Information criteria by rank and model					
Data trend	none	none	linear	linear	quadratic
Rank or no. of CEs	no intercept, no trend	intercept, no trend	intercept, no trend	intercept, trend	intercept, trend
Log likelihood by rank (rows) and model (columns)					
0	-61.99	-61.99	-58.91	-58.91	-57.99
1	-57.87	-49.63	-47.94	-47.84	-46.93
2	-57.23	-46.55	-46.55	-45.29	-45.29
Akaike information criteria by rank (rows) and model (columns)					
0	6.00	6.00	5.90	5.90	6.00
1	5.99	5.33	5.27*	5.35	5.36
2	6.29	5.50	5.50	5.57	5.57
Schwarz criteria by rank (rows) and model (columns)					
0	6.20	6.20	6.20	6.20	6.40
1	6.39	5.78	5.76*	5.90	5.95
2	6.89	6.20	6.20	6.37	6.37

Table 4.5. Regression results; dependent variable: *PP*; 1987–2010

No. of Equ.		(6)	(7)	(8)	(9)
Independent variables	constant	47.88 (4.60) (0.00)	30.80 (13.84) (0.00)	46.36 (5.95) (0.00)	47.88 (4.60) (0.00)
	<i>UNQ (unemployment quota)</i>	-2.37 (-1.68) (0.11)	–	-2.22 (-1.84) (0.08)	-2.37 (-1.68) (0.11)
	<i>RCPI (inflation rate)</i>	-0.24 (-0.23) (0.82)	0.62 (0.65) (0.52)	–	–
	<i>ΔRCPI (change of inflation rate)</i>	–	–	–	-0.24 (-0.23) (0.82)
Statistics	R <sup>2</sup>	0.13	0.02	0.13	0.13
	Adjusted R <sup>2</sup>	0.05	-0.03	0.09	0.05
	S.E. of regression	4.10	4.26	4.01	4.10
	Log likelihood	-66.31	-67.82	-66.34	-66.31
	F-statistic	1.64	0.42	3.37	1.64
	Probability (F-stat.)	0.22	0.52	0.08	0.22
	Akaike info criterion	5.78	5.82	5.69	5.78
	Schwarz criterion	5.92	5.92	5.79	5.92
	Hannan-Quinn crit.	5.81	5.84	5.72	5.81
	Durbin-Watson stat.	0.60	0.48	0.60	0.60

Table 4.6. Unit root tests, 1987–2010

Method	Null hypothesis	Exogenous	Lag length	ADF test stat.	Probability
Augmented Dickey-Fuller	<i>UNQ</i> has a unit root	constant, linear trend	0 (automatic – based on SIC, max. lag=5)	-2.46	0.34
	<i>UNQ</i> has a unit root	constant	0 (automatic – based on SIC, max. lag=5)	-2.20	0.21
	<i>UNQ</i> has a unit root	none	0 (automatic – based on SIC, max. lag=5)	0.43	0.80
	$\Delta UNQ$ has a unit root	constant, linear trend	1 (automatic – based on SIC, max. lag=5)	-4.49	0.01
	$\Delta UNQ$ has a unit root	constant	0 (automatic – based on SIC, max. lag=5)	-4.78	0.00
	$\Delta UNQ$ has a unit root	none	0 (automatic – based on SIC, max. lag=5)	-4.80	0.00
	<i>RCPI</i> has a unit root	constant, linear trend	0 (automatic – based on SIC, max. lag=5)	-2.91	0.18
	<i>RCPI</i> has a unit root	constant	0 (automatic – based on SIC, max. lag=5)	-2.68	0.09
	<i>RCPI</i> has a unit root	none	0 (automatic – based on SIC, max. lag=5)	-0.93	0.31
	$\Delta RCPI$ has a unit root	constant, linear trend	0 (automatic – based on SIC, max. lag=5)	-2.91	0.18
	$\Delta RCPI$ has a unit root	none	0 (automatic – based on SIC, max. lag=5)	-0.93	0.31
	$\Delta^2 RCPI$ has a unit root	none	0 (automatic – based on SIC, max. lag=5)	-5.95	0.00
	<i>PP</i> has a unit root	constant, linear trend	4 (automatic – based on SIC, max. lag=5)	-3.77	0.04
	<i>PP</i> has a unit root	constant	4 (automatic – based on SIC, max. lag=5)	-3.63	0.01
	<i>PP</i> has a unit root	none	2 (automatic – based on SIC, max. lag=5)	-1.16	0.22

Table 4.6. Unit root tests, 1987–2010 (continued)

Method	Null hypothesis	Exogenous	Lag length	ADF test stat.	Probability
Phillips-Perron	$PP$ has a unit root	constant, linear trend	3 (Newey-West automatic) using Bartlett kernel	-2.66	0.26
	$PP$ has a unit root	constant	3 (Newey-West automatic) using Bartlett kernel	-2.91	0.06
	$PP$ has a unit root	none	2 (Newey-West automatic) using Bartlett kernel	-1.46	0.13
Augmented Dickey-Fuller	$\Delta PP$ has a unit root	constant, linear trend	1 (automatic – based on SIC, max. lag=5)	-2.53	0.31
	$\Delta PP$ has a unit root	constant	1 (automatic – based on SIC, max. lag=5)	-2.39	0.16
	$\Delta PP$ has a unit root	none	1 (automatic – based on SIC, max. lag=5)	-2.28	0.02
Phillips-Perron	$\Delta PP$ has a unit root	constant, linear trend	2 (Newey-West automatic) using Bartlett kernel	-6.74	0.00
	$\Delta PP$ has a unit root	constant	2 (Newey-West automatic) using Bartlett kernel	-6.61	0.00
	$\Delta PP$ has a unit root	none	3 (Newey-West automatic) using Bartlett kernel	-6.39	0.00

Table 4.7. Cointegration tests; series: *PP*, *UNQ*,  $\Delta RCPI$ ; null hypothesis: series are not cointegrated; 1987–2010

Test procedure	Cointegrating equation deterministics	$\tau$ -statistic	Probability	z-statistic	Probability
Engle-Granger; automatic lags specification based on Schwarz criterion (max. lag=4)	constant	-2.03	0.73	-7.10	0.74
Phillips-Ouliaris; long-run variance estimate (Bartlett kernel, Newey- West fixed bandwidth)	constant	-2.20	0.65	-8.26	0.65



Table 4.8. Johansen cointegration tests; lags interval: 1 to 1; 1987–2010

Selected (0.05 level: critical values based on MacKinnon-Haug-Michelis (1999)) number of cointegrating relations by model					
Series: <i>PP, UNQ, Δ_RCPI</i>					
Data trend	none	none	linear	linear	quadratic
Test type	no intercept, no trend	intercept, no trend	intercept, no trend	intercept, trend	intercept, trend
Trace	1	1	1	0	0
Max. eigenvalue	1	1	0	0	0
Information criteria by rank and model					
Data trend	none	none	linear	linear	quadratic
Rank or no. of CEs	no intercept, no trend	intercept, no trend	intercept, no trend	intercept, trend	intercept, trend
Log likelihood by rank (rows) and model (columns)					
0	-101.31	-101.31	-99.57	-99.57	-97.86
1	-89.78	-89.54	-89.47	-88.00	-87.26
2	-86.67	-86.10	-86.04	-83.80	-83.26
3	-86.67	-83.06	-83.06	-80.56	-80.56
Akaike information criteria by rank (rows) and model (columns)					
0	9.19	9.19	9.30	9.30	9.41
1	8.73*	8.79	8.96	8.92	9.02
2	8.97	9.09	9.17	9.15	9.19
3	9.47	9.42	9.42	9.46	9.46
Schwarz criteria by rank (rows) and model (columns)					
0	9.63	9.63	9.89	9.89	10.14
1	9.47*	9.58	9.84	9.85	10.05
2	10.00	10.22	10.35	10.43	10.51
3	10.80	10.89	10.89	11.08	11.08
Series: <i>PP, UNQ</i>					
Data trend	none	none	linear	linear	quadratic
Test type	no intercept, no trend	intercept, no trend	intercept, no trend	intercept, trend	intercept, trend
Trace	0	0	0	0	0
Max. eigenvalue	0	0	0	0	0
Series: <i>PP, ΔRCPI</i>					
Data trend	none	none	linear	linear	quadratic
Test type	no intercept, no trend	intercept, no trend	intercept, no trend	intercept, trend	intercept, trend
Trace	0	0	2	0	0
Max. eigenvalue	0	0	0	0	0