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COALITION GOVERNMENTS AND FISCAL PERFORMANCE IN ITALY (1950-1992). AN IMPULSE RESPONSE ANALYSIS

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Coalition Governments and Fiscal Performance in Italy (1950-1992). An Impulse Response Analysis*

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Abstract

This paper attempts to examine the size of public sector and the persistence of fiscal disequilibria in Italy over the 1950-1992 period according to the main findings of the war of attrition theory. We extend previous studies in two directions. First, we use a voting power index to measure fragmentation within the government coalition. Second, we test the divided governments-fiscal perfomance nexus through an impulse response analysis which is an useful way to capture the dynamics of the relationships. Data support implication of our version of war of attrition models in the 1950-1971 sub-period only. Moreover, there is not a long run relationship between the variables: the results show that the response of deficits and expenditures to a shock in our war of attrition variable returns to zero after three years.

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1 Introduction and review of the literature

Barro's (1979, 1989) tax-smoothing model predicts that actual tax and expenditure policy is the outcome of intertemporal optimization from the government. In other words, infinite horizon, benevolent policy makers use budget deficits and surpluses to keep tax rate constant over time, despite business-cycle induced fluctuations of the output (the tax base). While surpluses occur when expenditure is temporarily low, deficits happen when expenditure is temporarily high because changes in the tax rate are costly in terms of social welfare. Starting from this view, recent theoretical and empirical studies suggest that fiscal performance can only partly be addressed to genuine macroeconomic variables. This literature emphasizes the role of the political and institutional arrangements in explaining the persistence of deficits and debt in most industrialized countries since the 1970s.

One class of this line of research focuses on the so-called fragmented governments. In their seminal work, Roubini and Sachs (1989a; 1989b) argue that governments composed of large, short-lived and uncohesive coalitions are associated with high budget deficit. Since coalition governments are characterized by a certain number of parties with conflicting interests, the members of the coalition face a prisoner's dilemma with respect to budget cuts: all partners within the coalition are prone to reduce deficit, but each of them have an incentive to protect the part of the budget which may favour the own clientele. The more parties participate to the coalition, the less successful is a coordination on budget deficit reduction. Moreover, each party has a *veto* power against the changes of the *status quo* by virtue of its ability to break up the government, but at the same time it has only little power to implement its own program. In addition, coalition governments may have more difficulties in keeping budget in balance because they have a tenure length shorter than one-party, majoritarian governments have. Government instability reduces the time horizon for the repeated game among coalition members and, by consequence, their incentives to cooperate.

The central idea of Roubini and Sachs has been described by Alesina and Drazen (1991) as a war of attrition between partners of the coalitions. Such war of attrition occurs because each party has different distributional objectives and therefore seeks to transfer the burden of the fiscal adjustment to the other members of the coalition. The disagreement ends up and a stabilization is enacted only when one party (the "loser") concedes and bears a disproportionate share of the burden. However, no party is interested in doing so immediately because each party believes the possibility that another will give up first. The result is a delay in the adoption of a stabilization policy. In equilibrium, the optimal time of concession for each party is determined by the condition that the cost of waiting[1], represented by the loss of the utility for living in a distorted economy, is just equal to the benefit of waiting, namely the product of the conditional probability that one's rival party concedes multiplied by the gain if the other group concedes.

The theoretical hypotheses developed in the seminal works of Roubini and Sachs (1989a; 1989b) and Alesina and Drazen (1991) have received mixed support from empirical studies. To capture possible effects of divided versus single party governments, Roubini and Sachs (1989a, 1989b) construct an index[2] of power dispersion which measures the size of the governing coalition and show that after 1973 in several industrialized countries it appears a clear tendency for larger deficit in governments characterized by the presence of many political parties in the ruling coalition. This finding has been seriously criticized by subsequent researches. Edin and Ohlsson (1991) reformulate the Roubini and Sachs' political variable on the base of argument that a multidimensional dummy is subject to some degrees of arbitrariness. They used a dummy for each group and found that the estimated positive effect of the coalition governments on the budget deficit reported by Roubini and Sachs (1989a, 1989b) is entirely due to an effect of minority governments. Re-examining the empirical evidence in support of the hypothesis that institutional arrangements affect the observed pattern of budget deficits in several OECD countries, de Haan and Sturm (1994; 1997) and de Haan *et al.* (1999) conclude that neither the growth of government debt nor growth rate of government spending are related to the Roubini-Sachs power dispersion index.

Recent developments have broadened the main contributions of this approach by exploring different aspects of fragmentation. Following this line, Kontopoulos and Perotti (1999; 2002) define fragmentation as the degree to which the costs of a dollar of aggregate expenditure are internalized by individual decision makers and argue that previous studies have overlooked what they call *size fragmentation*. Empirically this notion has two key components: the number of spending ministers - which they call *cabinet fragmentation* - and the number of parties of the coalition - which they call *coalition fragmentation*. They show that cabinet size and, to a lesser extent, coalition size are positively associated with the growth of deficits and expenditure in a panel of 19 OECD countries.

Volkering and de Haan (2001) discuss the size fragmentation as outlined in

Kontopoulos and Perotti (1999; 2002) and measure this variable as the total number of ministers in government minus the ministers of finance and/or the budget and the prime minister[3]. They also consider political fragmentation analyzed in terms of ideological coherence of the cabinet and investigate on the government's position *vis-à-vis* the parliament. They capture two aspects of the relations between the executive and the legislative bodies of government that concerns fragmentation. The first one is related to the seats held in parliament by the ruling coalition: if the coalition controls more seats than needed for a simple majority, the power of any partner of the coalition will be weaker and the government less susceptible to policy demands from the parliament, which is likely to strengthen fiscal prudence.

The second one concerns the strength of the government *vis-à-vis* the parliament. Such a strength depends on the number of the parties in parliament: the more parties a government faces, the more difficult it will be for the opposition to form a united front against the government. The results support the idea that more fragmented parliaments (including opposition) entail higher central government's budget deficit in a sample of 22 OECD countries over the 1971-1996 period.

Moving from these studies, Ricciuti (2002) analyzes three aspects of fragmentation - *size, institutional* and *over time fragmentation* - and introduces the *control fragmentation*. Such new kind of fragmentation is concerned with the relative strength of the parties of the government coalition and the opposition. By using a panel of 19 OECD countries over 1975-1995, the author suggests that size and over time fragmentation poorly affect fiscal outcomes, while turns out to be more relevant institutional and control fragmentation.

A time series analysis of these models yield ambiguous results too. While Padovano and Venturi (2001) find evidence in support of the hypothesis of war of attrition in a sample of 1948-1994 Italian data and Galli and Padovano (2002) confirm these results in an error correction model that compare the explanatory power of alternative theories explaining fiscal disequilibria, Balassone and Giordano (2001) clearly support the government weakness-fiscal performance nexus in the case of Italy only for the period 1971-1990.

Our paper builds upon this literature and attempts to examine the size of public sector and the persistence of fiscal disequilibria in Italy over the 1950-1992 period. Since the foundation of the Republic in 1948, coalition governments have been in power in Italy. On the other hands, from the oil shocks in 1970s Italy experienced larger fiscal disequilibria. Such a scenario appears particularly interesting to verify the explanatory power of the war of attrition theory.

We extend some methodological issues stemmed from previous studies in two different ways:

1. We measure the fragmentation within the government through the standard deviation of the voting power of political parties that take part of it. One of the measurement used in the war of attrition literature to capture fragmentation is the Herfindhal index. Such index is based on the shares of seats of parties - i. e. on the voting weight of parties. However, the allocation of different voting weights to different members is not also an allocation of voting power. The influence (power) of each party over the decision making process depends on the complete configuration of seats (votes) assigned to all of the other members as well. In order to have a measure of this power we apply a voting power index, namely the Shapley-Shubik Index, since such kind of index takes into account all parties (members) and their relative influence.

   Following recent developments of this literature, we also analyze the government's position *vis-à-vis* the opposition and describe it as the sum of the Shapley-Shubik Index of each political party in power.

2. We test the fragmented governments-fiscal performance nexus using an impulse response analysis. By tracing the response of the system to an unexpected shock in one of the variables, this kind of analysis represents an useful tool to capture the dynamics of the relationships among the components of the system. As the war of attrition models identify in coalition governments an explanation of the *persistence* of fiscal disequilibria, we stress on the long run relationship between deficit and expenditure and our war of attrition variable. In this way, the impulse response analysis does appear particularly appropriate.

Our sample of 1950-1992 Italian data presents several advantages. During this period, the institutional framework is relatively stable: budgetary approbation procedures are not affected by relevant changes and the electoral system remains almost the same, switching from a pure proportional to a plurality system only in 1993. The "divorce" of the Bank of Italy from the Treasury in 1981, that involves a more significant independence of the Central Bank (Tabellini, 1987), represents the only important institutional reform, which can be controlled for. These institutional conditions allow us to relate changes in the fiscal performance solely to the political struggles between the members of the coalitions and therefore to adhere more closely to the hypotheses of war of attrition models.

We should now be explicit on the issues that we do not address in this paper. War of attrition models suggest that fragmented governments stabilize fiscal policy with delay, focusing fundamentally on two order of variables: 1) the number of the coalition parties (or the spending ministries) and 2) the ideological preferences of the parties members of the coalition government[4]. We do not study the impact of the degree of ideological polarization of coalition members as a mean to measure the attrition among them. The reason is that from 1948 to 1994 - the so-called First Republic- political equilibria in Italy are founded on the relation between two main parties, the Christian Democratic party (DC) and the Communist party (PCI): while the Communists were always at the opposition, the Christian Democrats took always part of the government. Such a scenario suggests that Italian political parties followed opportunistic, rather than ideological strategies in their intra-government interaction[5].

The remainder of the paper is organized as follows: Section 2 exposes the econometric methodology we apply. Section 3 presents the specification of the variables and introduces the Shapley-Shubik Index as a measure for government fragmentation. In Section 3 we also analyze the stochastic properties of the series. The results are described in Section 4. Section 5 offers some concluding comments.

2 Econometric methodology

In order to verify the theoretical hypotheses previously described, we specify and estimate a vector autoregression (VAR) model; hence, we utilize the impulse response analysis based on this VAR to investigate the dynamic relationships between the variables. In this section we shortly illustrate this methodology[6].

A VAR model can be represented by

$$\mathbf{y}_t = \mathbf{A}_1 \mathbf{y}_{t-1} + ... + \mathbf{A}_p \mathbf{y}_{t-p} + \mathbf{u}_t \tag{1}$$

where $\mathbf{y} = (y_1, y_2, ..., y_k)'$ is a k-dimensional vector of variables, $\mathbf{A}_i$ are $(k \times k)$ matrices of coefficients and $\mathbf{u}_t = (u_{1,t}, u_{2,t}, ..., u_{k,t})'$ is a white noise k-dimensional, that is $E(\mathbf{u}_t) = \mathbf{0}$, $E(\mathbf{u}_t\mathbf{u}_t') = \mathbf{\Sigma}$ positive definite and $E(\mathbf{u}_t\mathbf{u}_s') = \mathbf{0}$ per $t \neq s$. Now, we consider the matrices

$$\mathbf{\Phi}_i = \sum_{j=1}^{i} \mathbf{\Phi}_{i-j}\mathbf{A}_j \qquad (i = 1, 2, ...) \tag{2}$$

with $\mathbf{\Phi}_0 = \mathbf{I}_k$ and $\mathbf{A}_j = \mathbf{0}$ for $j > p$. It is well known that the jh-th element of the matrix $\mathbf{\Phi}_i$, $\phi_{jh,i}$ represents the response of variable $y_{j,t+i}$ to a unit change in $y_{h,t}$, under the assumption that $\mathbf{y}_s = 0$ for $s < t$, $\mathbf{u}_s = 0$ for $s > t$ and $\mathbf{y}_t = \mathbf{u}_t$ where $\mathbf{u}_t$ is a k-dimensional unit vector, with one as the h-th coordinate and zero elsewhere. The sequence

$$\left\{\phi_{jh,i};\ i = 0, 1, ...\right\}$$

is the impulse response function. It traces out the time path of a unit shock in y_h on the variable y_j.

A problematic assumption of the impulse response analysis is that a shock occurs only in one variable at a time. Such assumption holds if the shocks in different variables are independent. However, in general, unrestricted VARs like (1) have non-diagonal covariance matrices. Accordingly, a shock in one variable is likely to be accompanied by a shock in another variables. This is the reason why the impulse response analysis is often performed considering the matrices

$$\begin{aligned} \mathbf{\Theta}_0 &= \mathbf{P} \\ \mathbf{\Theta}_i &= \mathbf{\Phi}_i\mathbf{P} \qquad (i = 1, 2, ...) \end{aligned}$$

where $\mathbf{P}$ is the lower triangular Choleski decomposition of $\mathbf{\Sigma}$ such that $\mathbf{\Sigma} = \mathbf{PP}'$. We note that the components of $\mathbf{w}_t = \mathbf{P}^{-1}\mathbf{u}_t = (w_{1,t}, w_{2,t}, ..., w_{k,t})'$ are uncorrelated and have unit variance. The jh-th element of $\mathbf{\Theta}_{ii}$, $\vartheta_{jh,i}$, is again interpreted as the response of variable y_j to an impulse in y_h, i-periods before, where the size of the impulse is one standard deviation of w_h. The sequence

$$\{\vartheta_{jh,i};\ i = 0, 1, ...\}$$

is called orthogonalized impulse response function.

As it is well known, these orthogonalized impulse responses, in general, depend on the particular ordering of the variables in the VAR. Thus, it is important to check whether the results are robust to the ordering of the variables[7].

3 Data

3.1 Measurement of the variables

In order to settle our version of wars of attrition, we measure fragmentation within the government coalition and the position of government *vis-à-vis* the opposition on the basis of a voting power index, namely, the Shapley-Shubik Index (Shapley and Shubik, 1954)-henceforth SSI[8].

We assume that the political decision making process within the parliament and the government can be modeled as a *simple voting game*. Players (political parties) form "winning" coalitions (majority coalitions) and share the benefits of their cooperation, i.e. budgetary policies.

The SSI measures the chances of any player (party) of turning a "losing" coalition into a "winning" one as follows. Let N as the set of all players and $S \subset N$ any coalition of players. Consider the function $\nu : 2^N \longrightarrow \{0, 1\}$ such that $\nu(N) = 1$ and ν nondecreasing, i.e., $\nu(S) \leq \nu(T)$ whenever $S \subset T \subset N$. A coalition S is winning if $\nu(S) = 1$ and losing if $\nu(S) = 0$. The collection of all winning coalitions is denoted by W. The Shapley -Shubik Index for the player $i \in N$ can be calculated as

$$SSI(i) = \sum_{\{S \subset N:\, i \notin S\}} \frac{s!(n-s-1)!}{n!} \left[\nu(S \cup \{i\}) - \nu(S)\right]$$

where n and s are cardinalities of sets N an S, respectively.

Obviously, we assume that all combinations among parties are *a priori* equally possible even by means of "external support" or by abstention from voting against. This implies that also the combination between DC and PCI is possible. Note that SSI is calculated on the basis of the seats obtained by each party in the Chamber of Deputies only. This because over the 1950-1992 period political parties held a similar percentage of seats in the Chamber of Deputies and in the Senate. Figure 1 shows the dynamic behavior of SSI of parties that took part of the coalition governments. It is clearly evident that the voting power is not equally distributed: the SSI presents a higher value for the Christian Democratic party (DC) than for other parties (PSI, PSDI, PRI, PLI)[9].

[Fig 1. approx. here]

We propose to interpret fragmentation in terms of dispersion of power within the government. We measure this variable, labeled $DISPERSION$ (DIS), through the standard deviation of SSI of parties of the government coalition weighted for the number of days of the year that each government stayed in power. The values of these indices are distributed in the [0,1] interval. In one-party majority parliamentary governments we pose the value of $DISPERSION$ equal to 1. Thus, the greater the value of $DISPERSION$, the lower the fragmentation within the coalition. Furthermore, we call $STRENGTH$ (STR) the variable that captures the government's position *vis-à-vis* the opposition. To construct this variable we add for every government coalition the SSI of each party that takes part of it. These original coalition-based values are transformed on yearly basis by weighting such values for the number of days of the year that each government stayed in power[10]. From 1976 to 1979 an agreement between the Christian Democratic party and the Communist party allowed the former to stay in power by means of the abstention from voting against of the latter together with the PLI, PRI, PSDI (Mammarella, 1990). Thus, during the so-called *governi della non sfiducia* we calculate $STRENGTH$ by including in the government coalition also the PCI, PRI, PSDI and PLI.

As Padovano and Venturi (2001) highlight, the war of attrition models are conceived in terms of expected life; hence when constitution does not fix government tenure length, as in the italian case, it is necessary to use an *ex ante* indicator to set up government expected life; this because "*governments can predict their durability from their inner fragmentation and use the budget to extend their life as much as possible. A government that recognize, e.g. from the results of the confidence vote, that its supporting coalition is shaky, rationally ... will spend more and/or tax less to maintain its majority united and procrastinate its dissolution*" (Padovano and Venturi, 2001, p. 18). According to this argument, the index we apply is an *ex ante* indicator of government expected life. It is calculated on the basis of the seats held in the Parliament (Chamber of Deputies) by all parties of the government coalition after the vote results of the government's initial confidence debate.

We also include in the analysis the real public sector budget deficit - that we call DEF- and the real public sector total expenditures- that we call EXP. We use the par value of the deficit calculated as the total value of outlays minus the total value of receipts of the consolidate central government.

Data on public sector total expenditure, public sector budget deficits and consumer price index are from ISTAT (various years a, b). Data on parliamentary seats are from Camera dei Deputati della Repubblica Italiana (1994).

Finally, since 1981 the Bank of Italy is longer more obliged to subscribe all the debt issues that are not bought by the household through the market. We control for this event by using a dummy variable.

3.2 Stochastic properties of the series

Before applying the impulse response analysis it is necessary to determine the time series properties of each variable. All the series used in the analysis are tested for stationarity using the standard augmented Dickey-Fuller tests. The models for the tests are:

$$\begin{aligned} ADF(h)\text{ test} \qquad \Delta y_t &= \mu + \rho y_{t-1} + \sum_{i=1}^{h} \gamma_i \Delta y_{t-i} + \varepsilon_t \\ ADF(h)\text{ test with trend} \qquad \Delta y_t &= \mu + \gamma t + \rho y_{t-1} + \sum_{i=1}^{h} \gamma_i \Delta y_{t-i} + \varepsilon_t \end{aligned}$$

where y is the variable under investigation and ε is a random error term. The lagged first differences of dependent variables provide a correction for possible serial correlation. The number of lag h is chosen using the Schwarz Bayesian Criterion (SBC). For all tests the null hypothesis, $\rho = 0$, is that the series contains a stochastic trend. Results from augmented Dickey-Fuller (ADF) tests (with and without deterministic trends) are reported in the Table 1 and Table 2. If the series in levels proves non-stationary, then it is differenced n times until it passes the test for non-stationarity. The order of integration $I(n)$ is given in the final column of Table 1. The test results indicate that the political variables DIS and STR appear to be stationary and that DEF and EXP can be considered integrated of order one. Thus, the variables cannot be cointegrated.

[Tab 1. approx. here]

[Tab 2. approx. here]

4 Empirical results

We consider a system consisting of $DISPERSION$ (DIS), $STRENGTH$ (STR) and the first difference of the real budget deficit (ΔDEF). In particular, we estimate a VAR model of the form:

$$\mathbf{y}_t = \mathbf{a} + \mathbf{b}x_t + \mathbf{c}d_t + \mathbf{A}_1\mathbf{y}_{t-1} + ... + \mathbf{A}_p\mathbf{y}_{t-p} + \mathbf{u}_t \qquad t = 1, ..., T.$$

where $\mathbf{y}_t$=$(DIS_t, \Delta DEF_t)'$, $x_t = STR_t$, $\mathbf{a}$, $\mathbf{b}$ and $\mathbf{c}$ are three (3×1) vectors of coefficients, d_t is a non-stochastic dummy variable which control for the "divorce" of Bank of Italy from the Treasury, $\mathbf{A}_i$ are (2×2) matrices of coefficients and $\mathbf{u}_t = (u_{1,t}, u_{2,t})'$ is a white noise bi-dimensional. Allowing for a maximum VAR order of five[11], Schwarz's criterion was minimized for order $p = 1$. The dynamic behavior of ΔDEF in response to a shock on DIS is examined introducing d and x as control variables.

The autoregressive representation of the data has been inverted to give a moving average representation (MAR). The MAR expresses $\mathbf{y}_t$ vector in terms of accumulated past shocks or errors in the system. Thus, a simulation can be performed where a variable is perturbed and the resulting response of the system is generated.

Figure 2 shows the responses of ΔDEF to a shock in DIS when the ordering of the variables in the VAR is (DIS, ΔDEF) (causal ordering A). The two lines in each side of the impulse response function provide the standard error bands computed by the asymptotic analytical formula, as in Hamilton (1994; p.339). Over the whole sample, the impact response is negative but insignificant.

[Fig 2. approx. here]

We also investigate on the effects that fragmented governments have on the first difference of public expenditure, by considering a three-dimensional system consisting of $DISPERSION$ (DIS), $STRENGTH$ (STR) and expenditure (ΔEXP). The responses of ΔEXP to a shock in DIS are presented in Figure 3. As the plot indicates, none of them is significant.

[Fig 3. approx. here]

However, based on the dynamic of the fiscal variables, we split our sample in two sub-periods (1950-1971 and 1971-1992) and we discover that the results presented so far hide a substantial difference when the model is estimated separately over the two subsamples. The pattern that emerges is clear: while in the post-1971 sample the responses of ΔDEF and ΔEXP to an innovation in DIS are again insignificant, in the pre-1971 period such responses become significantly negative. As Figure 4 and Figure 5 display, the evidence is remarkably much stronger in the response of public expenditures. These results are consistent with the prediction that fragmentation of government coalition is positively related with budget deficits and expenditures. In the pre-1971 period Italian coalition governments delayed stabilization more. Furthermore there is not a long run relationship between the variables: after three years the responses of ΔDEF and ΔEXP to a shock in DIS are insignificant from zero at all horizons.

[Fig 4. approx. here]
[Fig 5. approx. here]

We interpret such results by considering the Italian political framework. Since the foundation of the Republic in 1948, the Christian Democrats (DC) took always part of the government: even when they did not head the cabinet, they had the key ministries in it. Figure 1 shows the voting power of the Christian Democratic party and of the other parties -PSI, PLI, PSDI, PRI- which in turn have been in power over the 1950-1992 period, by forming with DC coalitions of "pentapartito", "quadripartito" and of "tripartito"[12]. It is evident that the voting power is not equally distributed among coalition partners. There is a clear large cut -even when the SSI of DC decreases- between the voting power of the Christian Democrats and those of the other members of the coalitions. In other words, coalition governments are characterized over the 1950-1992 period by the constant presence of the same party (DC) which is also the leading party of the coalitions (Pombeni, 1994). The stronger position of such party, both in terms of its voting power and of its ability to maintain power over time, increases the incentives to cooperate and reduces the timing of war of attrition among all coalition partners.

However, the analysis suggests that the effects of fragmented governments on deficit and expenditure are not large: as Figure 6 and Figure 7 show, in the post-1971 period the prediction of the theory is not verified. An explanation of this result is connected with the behavior of Italian policy makers.

[Fig 6. approx. here]

[Fig 7. approx. here]

During the second half of the so-called First Republic, Italian politicians did not perceive the stabilization of fiscal disequilibria both as a goal and a constraint (Lepre, 1993; Scoppola, 1991). The war of attrition theory builds upon the hypothesis that a stabilization will occur, focus on the disagreements between the coalition partners to explain the delay in the adoption of fiscal adjustment programs and finally, solves for the expected time of stabilization. Therefore, in the post-1971 period the assumption of the war of attrition models are not satisfied.

These results are in part in contrast with the findings of Padovano and Venturi (2001). The authors conclude that the war of attrition models are indeed an important explanation of the dynamics of budget deficits and public expenditures in Italy over the 1948-1994 whole sample. However, when they control for the appropriateness of the specification of the model by applying a Granger causality test, they find that their political variables do not cause their dependent variables (budget deficit and public expenditure). This result is consistent with the main suggestion of our paper.

4.1 Other robustness checks

The results presented so far are based on a specific othogonalization of the innovation, with DIS ordered first (causal ordering A) in both VARs. In doing so, we have utilized the Choleski factorization of the variance-covariance matrix of innovations. This imposes an instantaneous causal ordering between the variables of the system. The first variable in the VAR affects all other variables contemporaneously, the second variable influences all but the first, and so on. We select causal ordering A over the other on the basis of the theory. However, to check whether the results are robust to the ordering of the variables, all the impulse responses presented so far have been recomputed under the assumption that the ordering is (ΔDEF, DIS) and

(ΔEXP, DIS) (causal ordering B). We find that the ordering of the variables is irrelevant to the results. The shape of the impulse response functions is similar in all cases and the differences minimal: typically, the point estimates of the impulse responses at all horizon change by only a few percentage points.

Since the impulse response analysis is particularly sensitive to changes in the lags, we also checked the robustness of the results by routinely estimating the responses over the whole sample and the two subsamples for p different from those selected by the SBC criterion. We do not present these estimates since they appear similar to these obtained on the basis of Schwarz criterion.

One may wonder whether these results hold when we also consider the economic variables affecting public deficit and expenditure. To meter the state of the economy we choose the first difference of the real gross domestic product ($\Delta RGDP$). We reiterate the exercise over the whole sample and the two subsamples, under the causal ordering A and B. In the interest of space we do not present the results; however, the responses of deficit and expenditure to a shock in DIS are again remarkably similar in all cases to these obtained when we estimate the basic model.

5 Concluding remarks

Our analysis on the Italian data over the 1950-1992 period extends the existing literature in two ways: firstly, we propose to measure the fragmentation within the government through the standard deviation of the voting power of political parties that participate in it. The voting power index that we use stems from a *simple game* and therefore it is able to capture the strategic position of each party (player) of the coalition. Secondly, we test the fragmented governments-fiscal performance nexus applying an impulse response analysis. By tracing the response of the system to an unexpected shock in one of the variables, such analysis represents an insightful tool to describe the dynamics of the relationship.

Our main conclusions can be summarized as follows:

1. The hypothesis of the war of attrition models do not hold over the whole sample and over the second half of the so-called First Republic (subsample 1971-1992). An explanation of this finding can be envisaged in the absence in the fiscal behavior of

Italian policy makers of the stabilization as an objective and a constraint.

2. Coalition governments delayed stabilization more in the first half of our sample. From 1950 to 1971 higher fragmentation provides higher deficits and expenditures. The responses of the two fiscal variables are not too large but robust.

Moreover, there is not a long run relationship between the variables. There is a clear evidence that the response of deficit and expenditures to a shock in our war of attrition variable return to zero after three years. We explain this result by stressing on two arguments: 1) the presence of a predominant party (in terms of voting power) - the Christian Democratic party - and 2) the substantial political continuity, since the Christian Democratics took always part of the government. The stronger position of this party, both in terms of its voting power and of its ability to maintain power over time, increases the incentives to cooperate and reduces the timing of war of attrition among all the members of the coalition.

Notes

1. In fact, waiting is costly since the accumulating debt has to be financed by higher distortionary taxes.

2. This index is equal to 0 for one-party majority parliamentary government or presidential government with the same party in the majority in the executive and legislative branch; 1 for coalition parliamentary government with two coalition partners or presidential government with different parties in control of executive and legislative branch; 2 for coalition parliamentary government with three or more coalition partners; 3 for minority parliamentary government.

3. The authors follow the literature on budgetary procedures where the ministries of finance are generally not considered to be spending departments but as those taking the public interest into account.

4. Existing literature have differently settled ideology variable. De Haan and Sturm (1994), Franzese (1998), Kontopoulos and Perotti (2002), among others, use the Ideological Complexion Index (ICG), classified by Woldendorp, Keman and Budge (1993; 1998). This index assigns scores from 1, for 'Right Wing Dominance', to 5, for 'Left Wing Dominance', based on the share of seats of the parties supporting the governments.

5. See Paolini and Douglas Scotti (1995) on this point.

6. A detailed treatment of impulse response analysis can be found in Lutkepohl (1981).

7. The importance of the ordering depends on the magnitude of the correlation coefficient between the $u_{j,t}$'s. If the estimated correlations are almost zero, the ordering is immaterial.

8. The most frequently used power indeces are the Banzhaf Index (1965) and the Shapley-Shubik Index (1954). In the literature it is still an open question which is the best index between these two at least in theoretical terms (Leech, 2002). Felsenthal *et al.* (1998) associate the SSI with an "office-seeking" behavior in which the process of constructing

a winning coalition is accompained by a bargaining over how to distribute the spoils of office among players. On the other hand, the Banzhaf Index does not make such association with the bargaining process.

9. PLI, PRI, PSDI, PSI, are respectively the Liberal party, the Republican party, the Social Democratic party and the Socialist party.

10. The construction of the variable *DIS* and *STR* by a voting power approach is also proposed by Huber, Kocher and Sutter (2002). The authors: 1) use the Bahanzaf index of voting power to settle their war of attrition variable in a panel of 21 OECD countries; 2) measure the dispersion of power within the government by the standard deviation of the Bahanzaf index of the parties in power. In our paper we discuss this measurement of dispersion, since Huber, Kocher and Sutter implicitly and uncorrectly associate the maximum fragmentation to a one-party majority parliamentary government.

11. We choose this order by considering that maximum tenure length of the parliament in Italy is five years.

12. Five, four and three party coalitions, respectively.

References

Alesina, A. and Drazen, A. (1991). Why are stabilizations delayed? A political economy model. *American Economic Review* 81: 1170-1188.

Balassone, F. and Giordano R. (2001) Budget deficits and coalition governments. *Public Choice* 106: 327-349.

Banzhaf, J. F. (1965). Weighted voting does not work: a mathematical analysis. *Rutgers Law Review* 35: 317-343.

Barro, R.J. (1979). On the determination of public debt. *Journal of Political Economy* 87: 940-971.

Barro, R.J. (1989). The Ricardian approach to budgets deficits. *The Journal of Economics Perspectives* 3: 37-54.

Camera dei Deputati della Repubblica Italiana (1994). Notiziario della camera dei deputati. Compendio statistico dalla I alla XII legislatura. Dati statistici e quantitativi. Roma: Camera dei Deputati della Repubblica Italiana

de Haan, J. and Sturm, J.E. (1994). Political and institutional determinants of fiscal policy in the European Community. *Public Choice* 80: 157-172.

de Haan, J. and Sturm, J.E. (1997). Political and economic determinants of budget deficits and government spending: A reinvestigation. *European Journal of Political Economy* 13: 739-750.

de Haan, J., Sturm, J.E. and Beekhuis G. (1999). The weak government thesis: Some new evidence. *Public Choice* 101: 163-176.

Edin, P.A. and Ohlsson, H. (1991). Political determinants of budget deficits: coalition effects versus minority effects. *European Economic Review* 35: 1597-1603.

Felsenthal, D.S., Machover, M. and Zwicker W. (1998). The bicamerl postulates and indeces of a priori voting power. *Theory and Decision.* 44:83-116.

Franzese, R.J. (1998). Are budget deficits used strategically? Mimeo: University of Michigan (http://www-personal.unimich.edu).

Galli, E. and Padovano F. (2002). A comparative test of alternative theories of the determinants of italian public deficits (1950-1998). *Public Choice* 113: 37-58.

Hamilton, J. (1994). *Time series analysis.* Princeton: Princeton University press.

Huber, G., Kocher, M. and Sutter, M. (2002). Government strength, power dispersion in governments and budget deficits in OECD countries. A voting power approach. Universitat Innsbruck. Working paper.

ISTAT (various years a). Conto delle spese e delle entrate dello Stato. Roma: Istat.

ISTAT (various years b). Annuario statistico italiano. Roma: Istat.

Kontopoulos, Y. and Perotti R. (1999). Government fragmentation and fiscal policy outcomes: Evidence from the OECD countries. In J.M. Poterba and J. von Hagen (Eds.), Fiscal institutions and fiscal performance, 81-102. Chicago: The University of Chicago Press.

Lepre, A. (1993). *Storia della prima repubblica. L'Italia dal 1942 al 1992.* Bologna: Il Mulino.

Leech, D. (2002). An empirical comparison of the performance of classical power indices. *Political Studies* 50: 1-22.

Lutkepohl, H. (1991). *Introduction to multiple time series Analysis.* Berlin: Springer-Verlag.

Mammarella, G. (1990). *L'Italia contemporanea 1943 - 1989.* Bologna: Il Mulino.

Padovano, F. and Venturi, L. (2001). War of attrition in Italian government coalitions and fiscal performance: 1948-1994. *Public Choice* 109:15-52.

Paolini, E. and Douglas Scotti, A. (1995). *Da Badoglio a Berlusconi.* Varese: Sugarco.

Perotti, R. and Kontopoulos, Y. (2002) Fragmented fiscal policy. *Journal of Public Economics* 86:191-222.

Pombeni, P. (1994). *Partiti e sistemi politici nella storia contemporanea.* C

Ricciuti, R. (2002) Political fragmentation and fiscal outcomes. Università degli Studi di Siena. Dipartimento di Economia Politica, Working paper.

Roubini, N. and Sachs, J. (1989b). Government spending and budget budget deficits in the industrialized countries. *Economic Policy* 8: 99-132.

Roubini, N. and Sachs, J. (1989a). Political and economic determinants of budget deficits in the industrial democracies. *European Economic Review* 33: 903-933.

Scoppola, P. (1991). *La repubblica dei partiti. Profilo storico della democrazia in Italia (1945 - 1990).* Bologna: Il Mulino.

Shapley, L.S. and Shubik, M. (1954). A method for evaluating the distribution of power in a committee system, *American Political Science Review*, 48: 787-792.

Spinelli, F. and Fratianni, M. (1991). *Storia monetaria d'Italia.* Milano: Arnoldo Mondadori Editore.

Tabellini, G. (1987). Central Bank reputation and the monetarization of the deficits: The 1981 Italian monetary reform. *Economic Inquiry* 25: 185-200.

Volkerink, B. and de Haan, J. (2001). Fragmented government effects on fiscal policy: New evidence. *Public Choice* 109, 221-242.

Woldendorp, J., Keman, H. and Budge, I. (1993). Special issue: Political data 1945-1990: Party government in 20 democracies. *European Journal of Political Research* 24: 1-119.

Woldendorp, J., Keman, H. and Budge, I. (1998). Party government in 20 democracies. An update (1990-1995). *European Journal of Political Research* 33: 1-119.

Figure 1: The SSI of all parties in power, 1950-1992.

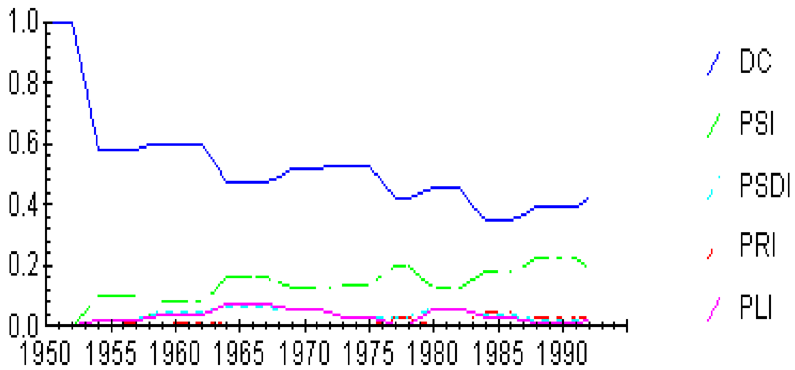

Table 1: Unit root tests. 95% critical value for the ADF statistic is -2.9339 (no trend). 95% critical value for the ADF statistic is -3.5217 (with trend). The figures in brackets denote the number of lag h in the test equations

Variable	ADF no trend	ADF with trend	$I(n)$
DIS	$-3.0306(0)$	$-3.5295(0)$	$I(0)$
STR	$-6.4030(0)$	$-6.3624(0)$	$I(0)$
RDE	$-1.2347(0)$	$-.39883(0)$	$I(1)$
REX	$4.9889(0)$	$-1.1729(0)$	$I(1)$

.

Table 2: Unit root tests. 95% critical value for the ADF statistic is -2.9358 (no trend). 95% critical value for the ADF statistic is -3.5247 (with trend). The figures in brackets denote the number of lag h in the test equations

Variable	ADF no trend	ADF with trend
ΔDEF	$-7.3482(0)$	$-7.6653(0)$
ΔEXP	$-4.1277(0)$	$-6.7778(0)$

.

Figure 2: Impulse response of ΔEXP to a shock on *DIS*, 1950-1992.

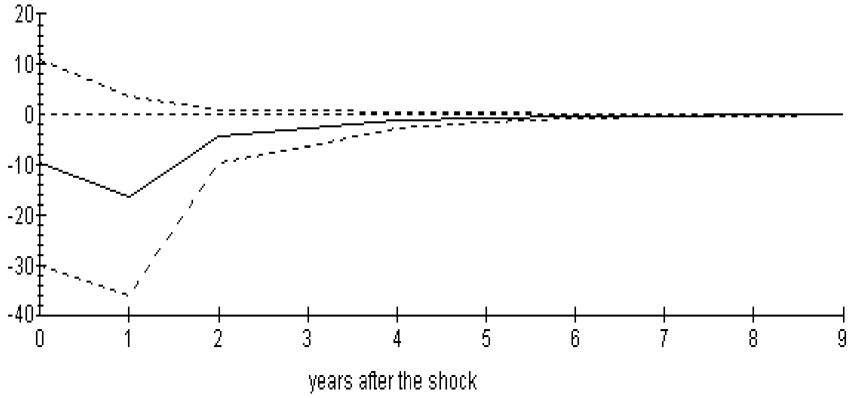

Figure 3: Impulse response of ΔEXP to a shock on DIS, 1950-1992.

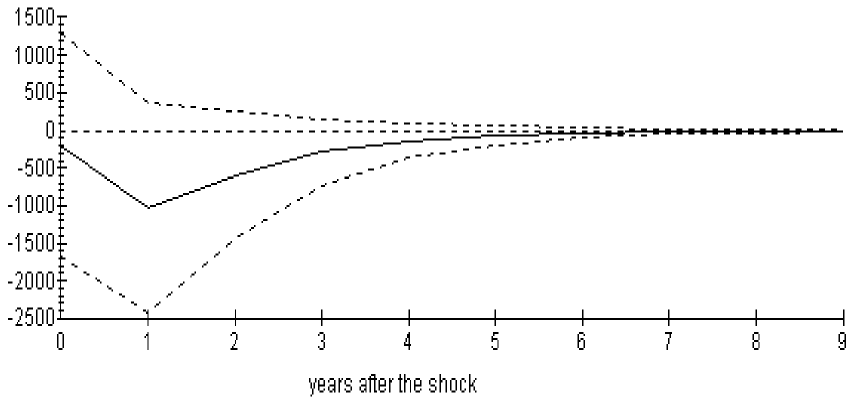

Figure 4: Impulse response of ΔDEF to a shock on DIS, 1950-1971.

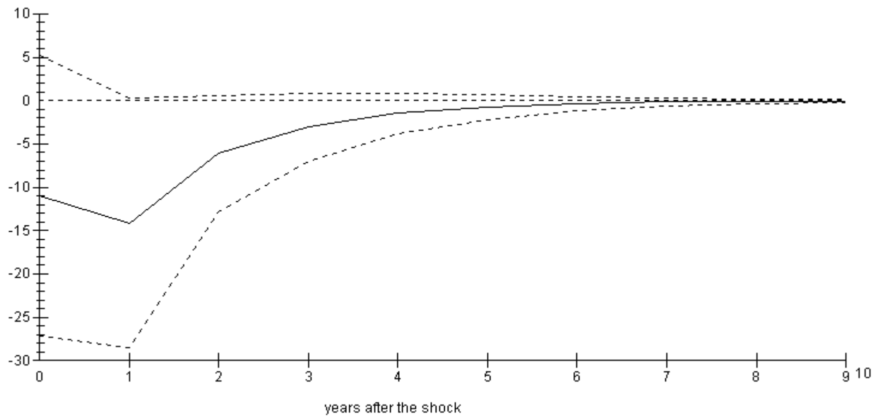

Figure 5: Impulse response of ΔEXP to a shock on DIS, 1950-1971.

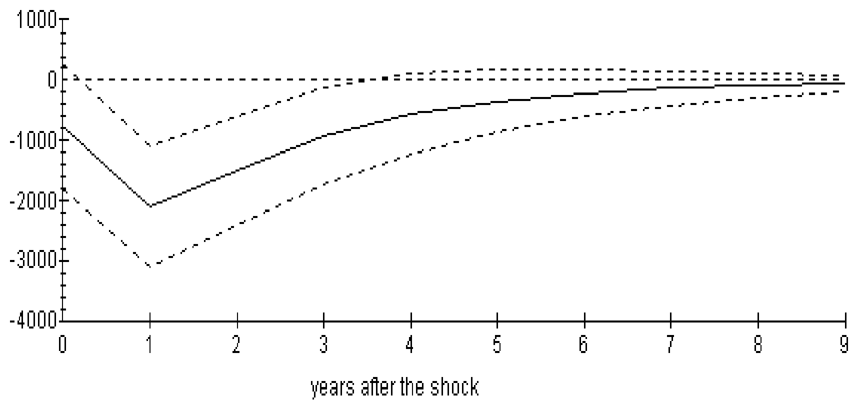

Figure 6: Impulse response of ΔDEF to a shock on DIS, 1971-1992.

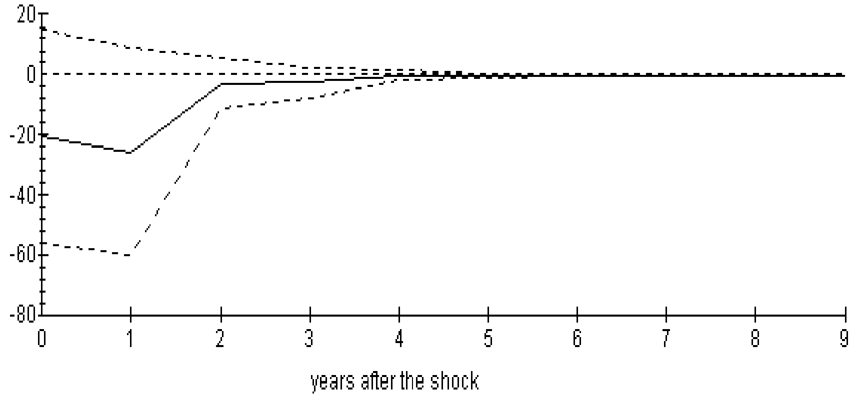

Figure 7: Impulse response of ΔEXP to a shock on DIS, 1971-1992.