

**COMBINING INCREMENTALISM  
AND EXOGENOUS FACTORS IN  
ANALYZING NATIONAL BUDGETING:  
AN APPLICATION TO SPAIN**

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Acknowledgments: We are grateful to Jorge Onrubia-Fernández and Jorge Martínez-Vázquez for their insightful comments on a previous version of this paper. The research was financially supported by the Spanish Institute for Fiscal Studies ([www.ief.es](http://www.ief.es)).

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Edita: Instituto de Estudios Fiscales

N.I.P.O.: 602-10-026-2

I.S.S.N.: 1578-0252

Depósito Legal: M-23772-2001

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## **ABSTRACT**

This paper focuses on the impact of both incrementalism and exogenous factors in budgeting. After a survey of related literature, we present a double-distinction-based proposal combining incrementalism and exogenous factors to analyze national budgeting. Two of the four resulting approaches are then applied to the case of Spain. We combine several statistical tools to avoid the shortcomings of the Davis, Dempster and Wildavsky econometric method and its extensions appearing in the literature of the 70s and 80s. Results suggest that incrementalism explains changes in budgeted figures remaining within relatively narrow bands, but additional variables are needed to explain: *i*) the dynamics of marginal change in the budget total, and *ii*) the non incremental changes within the budget.

**Key words:** budgetary incrementalism, public spending, Spanish government finances.

**JEL classification:** H61, H50, H83.



## I. INTRODUCTION

Incrementalism is an old (but good?) theory of public budgeting<sup>1</sup>. After its beginning in the mid-1960s, the body of incrementalist literature expanded rapidly during the two following decades, albeit the late 80s brought with it a decline in such studies<sup>2</sup>. Over the past ten years, however, there has been a resurgence of interest<sup>3</sup>. Incrementalist theory has reemerged among empirical research on public budgeting. This paper will, therefore, survey the most recent empirical contributions to budget incrementalism. We will also attempt to demonstrate the relevance of coupling incrementalism with exogenous variables to account for budgetary variation. First, we propose a simple 2x2 methodological taxonomy, according to the role of exogenous variables and the existence (or lack) of a within-budget reference to measure incrementalism. Second and finally, we analyze the Spanish case from the perspective of two of those four methodological combinations.

The case of Spain is interesting for several reasons. While most empirical research on budgetary incrementalism focuses on Anglo Saxon countries with presidential or Westminster systems, Spain is a Latin-European country with a parliamentary system and a government model rooted in the French tradition of the *Droit Administratif*. These institutional differences can affect factors like political conflict and bureaucratization that underlie incrementalism. Moreover, Spain's public sector has undergone dramatic changes since the early 1980s, both in the development of public welfare services and in the decentralization of political power. It is therefore interesting to examine the extent to which those changes have been integrated into an incrementalist budget pattern. In doing so, we combine several statistical approaches to avoid some of the shortcomings of earlier works.

The paper is organized as follows. In section two surveys empirical literature on budgetary incrementalism, and discusses the above mentioned double-

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<sup>1</sup> We paraphrase here the title of the Swain and Hartley (2001) survey.

<sup>2</sup> Yet in 1984 Wildawsky himself appeared to hint at the passing of incrementalism with his recognition that the conditions necessary for incremental budgeting had disappeared (Rubin 1989, 78). This was like a prelude to the decline in interest detected since the late eighties. Dezhbakhsh, Tohamy and Aranson (2003, 533) speculate that those who would have otherwise been interested in budgetary incrementalism have been turning instead to deductive models of New Institutional Economics. Robinson (2006, 135-136) adds that a key to the decline of incrementalism lied in its vague definitions. Few propositions of incrementalism could be falsified because each problematic finding could be met with a shift in definitions rather than with outright rejection of any theoretical hypothesis. As a result, the theory progressed little.

<sup>3</sup> We paraphrase here the title of the Swain and Hartley (2001) survey.



distinction-based proposal coupling incrementalism and exogenous factors in analyzing national budgeting. Section three presents in detail our empirical work on the case of Spain: data, variables, specifications, econometric methods and main results. In section four we summarize the most important findings and make recommendations for further research.

## **2. EMPIRICAL RESEARCH ON BUDGETARY INCREMENTALISM**

Budgetary incrementalism is a polyhedral theory of social science. The seminal work by Wildavsky (1964) integrated qualitative descriptive arguments with empirical, analytical, and normative theory arguments into an holistic conception of budgeting (Swain and Hartley 2001, 17). This plural sided and rich descriptive nature of incrementalist theory represents both its strength and one of the principle challenges in empirical testing. The criteria for budget outcomes that are consistent with incrementalism remains unclear, and therefore incrementalism as an empirical theory remains vague and difficult to define. In the words of William D. Berry (1990), budgetary incrementalism is a “confusing case”, with “too many meanings for a single concept”.

### **2.1. Budgetary incrementalism in its earliest Wildavskian times: from analytical core to empirical models**

The core of Wildavskian budgetary incrementalism builds upon contributions made by Simon (1955) and Lindblom (1959). These authors argued for incrementalism over comprehensive rationality on the grounds that cognitive limits, information costs and political constraints in complex and uncertain environments created an environment more conducive to incremental than to large, deliberate budgetary changes. Wildavsky (1964) added two other arguments in favor of incrementalism that are especially relevant to public budgeting: *i*) the need to maintain political conflict under tolerable limits; and *ii*) the institutionalized bureaucracy of the budgetary process (Robinson 2003, 2006). Those responsible for national budgeting are generally confronted with burdensome calculations, strict deadlines, repetitive tasks and expectations. These individuals lack knowledge and resources to compare the merits of alternative programs or predict the consequences of budget reallocations. In this scenario, decision-making cannot proceed deliberately and comprehensively as comprehensive rationality suggests, but must proceed through small, incremental budgetary changes. Agency budgets are constructed using only slight variations from an existing budget base, which may be approximated by last year’s amount.

While Wildavsky (1964) offered essentially qualitative evidence in support of incremental budgetary theory, he also considers some quantitative evidence in



predicting the range of variation in the percent annual change in budget appropriations. However, the first econometric test carried out by Wildavsky was the Davis, Dempster and Wildavsky approach (1966a, 1971), which suggested the following *basic model*:

$$x_t = \beta_0 y_{t-1} + \xi_t \quad (1)$$

$$y_t = \lambda_0 x_t + \mu_t \quad (2)$$

In this system of equations,  $x_t$  represents the agency's budgetary request through the Office of Management and Budget, and  $y_t$  represents the congressional appropriation for the agency in year  $t$ .  $y_{t-1}$  represents the congressional appropriation for the same agency in the previous year, and  $\xi_t$  and  $\eta_t$  represent random disturbances. The structural form of the model resulting from a combination of equations 1 and 2 was written by the authors in standard econometric format in the following vector-matrix equation:

$$\begin{pmatrix} x_t \\ y_t \end{pmatrix} \begin{pmatrix} -1 & \lambda_0 \\ 0 & -1 \end{pmatrix} + \begin{pmatrix} x_{t-1} \\ y_{t-1} \end{pmatrix} \begin{pmatrix} 0 & 0 \\ \beta_0 & 0 \end{pmatrix} + \begin{pmatrix} \xi_t \\ \eta_t \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \quad (3)$$

Estimating these equations for fifty-six non-defense US governmental agencies over the period from 1947 to 1963, they obtained a good model fit measured by the multiple correlation coefficients ( $R^2$ s). Nevertheless, the break of the time series into two parts and the subsequent use of Chow's test revealed the existence of frequent "shift points" or changes in the equation parameters—in other words, over time changes in the actors' decision-making rules could be observed. Moreover, the occurrence of extreme disturbances was seen as evidence of "deviant cases", in which decision-makers temporarily set aside their usual rules for decision-making. These findings suggest the need to introduce exogenous factors to explain not only these shift points and deviant cases, but also observed differences in the parameter magnitude among the agencies. Not surprisingly, seven years later the same authors chose a set of 18 exogenous variables for possible inclusion in what they labeled the *extended model* (Davis, Dempster and Wildavsky 1973). According Davis, Dempster and Wildavsky (1974, 427), by incorporating (3) these exogenous variables  $z_1, \dots, z_m$ , as well as the process gaming-variable  $(y - x)_{t-1}$  which represents the difference between the previous year's appropriation and request, expressions (1) and (2) become respectively

$$x_t = (\beta_0 + \beta_1 z_{1t} + \dots + \beta_m z_{mt}) y_{t-1} + \beta_{m+1} (y - x)_{t-1} + \xi_t \quad (4)$$

$$y_t = (\lambda_0 + \lambda_1 z_{1t} + \dots + \lambda_m z_{mt}) x_t + \lambda_{m+1} (y - x)_{t-1} + \eta_t \quad (5)$$

Exogenous variables are selected in order to capture factors that influence coefficients over a number of years, and are entered multiplicatively into both equations, such that the *beta* coefficients can be interpreted as a basic change in



relationships. The authors also opted to treat some continuous variables as binary to model the discrete shocks (war, depression, party shift) affecting the budgetary process. In their belief, “although it is basically incremental, the budget process does respond to the needs of the economy and society, but only after sufficient pressure has built up to cause abrupt changes precipitated by these events” (Davis, Dempster and Wildavsky 1974, 421).

## 2.2. Evolution and new directions in incrementalist literature

In his survey of the empirical literature on budgetary incrementalism, Berry (1990, 183-185) distinguishes among three *internalized change model approaches* to the testing of incrementalism. The first approach is the regression of budgetary outcomes on a time trend. This approach consists of studies from Fenno (1966, 390-392) and Bunce and Echols (1978) who measure incrementalism by the degree of linearity in budget change over time. The second approach is the uni-variate analysis of between-year differences in budgetary outcomes, exemplified by the works of Wildavsky (1964, 14, 1975, 242), Danziger (1976, 342-343), Le Loup and Moreland (1978, 235) and Kemp (1982, 651). These authors considered a distribution tightly concentrated around a low central tendency as evidence of incrementalism. The third approach consisted of regressing an outcome in one year on the outcome from the previous year. This approach was adopted by Davis, Dempster and Wildavsky (1966a), Cowart, Hansen and Brofoss (1975), and Danziger (1976, 343-344) who presume that high  $R^2$ s represented empirical support for incrementalism.

Moving away from internalized change approaches, exogenous variables are added in some of the works surveyed by Berry (Davis, Dempster and Wildavsky 1974; Brouthers and Stimson 1980; Fischer and Kamlet 1984) in order to build *internal-external change approaches*. The selection and introduction of exogenous variables change depending on the behavioral assumptions and methodologies adopted.

The most recent developments in the empirical literature on budgetary incrementalism proceeds mainly along the five following directions:

i) *Overcoming the statistical limitations of traditional research on incrementalism*. In the 1970s and 1980s, several scholars noted and/or attempted to rectify the shortcomings of the Davis, Dempster and Wildavsky statistical method. In some cases the authors modified the dependent variable, detrended the data, or used alternative budgetary measures. In other cases they used residual diagnostics to identify break points or impose a fiscal constraint on budgetary figures. These refinements notwithstanding, statistical concerns continue to motivate research efforts. For instance, Boyne, Ashworth and Powell (2000, 59) state that the apparent statistical success of the most frequent

test for budgetary incrementalism “is simply too good to be true”. They argue that the high positive correlations between the level of expenditure of one year and that of the previous year demonstrate neither marginality nor regularity in budgetary outputs. To account for this, rather than use a level-on-level regression, the authors opt to regress the real *change* in net per capita expenditure in year  $t$  on the same *change* in year  $t-1$ . Statistical success is defined as a positive correlation coefficient that is close to one and an  $R^2$  that is greater than 50%.

Dezhbakhsh, Tohamy and Aranson (2003) stress that the Davis, Dempster and Wildavsky’s econometric method suffers from two main shortcomings which are exacerbated when budgetary data are non-stationary. First, the authors note the frequent recurrence of high  $R^2$  between unrelated trended series. Second, the Chow’s test is subject to several limitations. As an alternative, they adopt a new approach by identifying statistical cases with *marginal* outcomes to then examine the outcome *regularity*. To do this, the authors first pool the annual rate of real change in the budget for all agencies and all years together, and then standardize the rates by subtracting them from the median and dividing by the standard deviation of the pooled rates. To determine which of the standardized change rates are marginal, the authors construct several statistical bands, each with a size that varies from year to year as the cross-agency variance of the annual budget change varies over time. The second step is to analyze the regularity of the marginal change rates, using a four-year period inside the band as the minimum length for classifying the marginal changes as incremental.

ii) *Establishing a tested formal theoretical basis for incrementalism.* Although Davis, Dempster and Wildavsky formalized several budget decision-making rules consistent with incrementalism, they did not try to formalize the theoretical basis of incrementalism. In recent years, however, some scholars have tried to establish and test a formal theoretical basis for incrementalism. Le Maux (2005), for example, presents a simple model of procedural rationality for capturing complexity as a cause of incrementalist decision-making. Further, he presents a political bargaining model (based on the Rubinstein-Ståhl alternating-offers bargaining game) for measuring the effects of political culture and pluralist polity. Empirical testing with data from French *départements* indicates the presence of budgetary incrementalism due to both complexity and political conflict. Alternatively, Tohamy, Dezhbakhsh, and Aranson (2006) model a utility-maximizing legislature confronting a meta-decision between single-period budgeting or multi-period budgeting, where the first of these two strategies is associated with a greater chance of non-incremental outcomes. The authors then test the implications of the model using an empirical procedure developed in their previous work (Dezhbakhsh, Tohamy and Aranson 2003). Evidence



consists of 1946-1994 budget data for a cross-section of 93 non-defense U.S. government agencies. Results support the model's prediction that incrementalism varies systematically with certain economic variables embedded in legislators' payoffs.

iii) *Investigating the determinants of incrementalism vs. non-incrementalism.* As seen in the preceding subsection, Davis, Dempster and Wildavsky built extended models in order to better understand the factors that led to non-incremental or irregular budgetary changes. Where once these changes were mainly conceptualized as the "shift-points" in the otherwise stable relationships between Congress and agencies, the predictive capacity of the incrementalist theory was recognized as crucially dependent on stating the conditions under which such shift-points would occur. Therefore, what really matters is not as much to confirm whether budgeting is incremental, as it is to know when and under what circumstances is incremental or non-incremental, regular or irregular in its interactions (Dempster and Wildavsky 1979, 378). Indeed, the quest for this kind of knowledge has become a growing concern, while the conceptualization of non-incremental behavior as "shift-points" is not always adopted.

Jones, True and Baumgartner (1997) explored the impact of political dissensus on budget volatility, assuming that greater budget volatility implied less incrementalism in the budgeting process. They defined volatility as the intersextile range of percent annual change in all domestic US budget sub-functions from 1947 through 1995. They then estimated an exponential decay model regressing the log of the dependent variable on time and three measures of political dissensus. Results indicated that one of the measures, divided government, was positively associated with budget volatility but that this volatility had decreased from earlier decades. Robinson (2003) built a model to test the impact of bureaucratization on incrementalism in budgeting for the Texas school system. Meanwhile, Dezhbakhsh, Tohamy and Aranson (2003) used a Poisson regression of non-incremental counts of their abovementioned series to examine how these counts were affected by both political and economic variables<sup>4</sup>. A further attempt was done by the same authors in testing the model they formulated three years later (Tohamy, Dezhbakhsh, and Aranson 2006). More recently, Harbridge and Anderson (2008) replicated the analysis of Jones *et al.* (1997) for different levels of aggregation, while using only one of their three measures of political dissensus (divided government). Their empirical results confirm a positive and significant relationship between divided

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<sup>4</sup> The political variables were Democrat' control of the White House, changes in congressional majority, changes in executive administration, and election year. Economic variables included nominal discount rate, inflation rate, growth rate of government revenues, and government deficit.

government and budget volatility, but only at the most aggregated level (sub-functions), and not at the subaccount or agency level.

iv) *Examining the “punctuated incrementalism” variant*<sup>5</sup>. The budgetary behavior depicted by the punctuated equilibrium theory is reminiscent of the Davis, Dempster and Wildavsky’s (1974, 421) quotation above. It states that, “although it is basically incremental, the budget process does respond to the needs of the economy and society, but only after sufficient pressure has built up to cause abrupt changes precipitated by these events”. This pattern of stasis interrupted by periods of dramatic change had been amply discussed in policy studies before Baumgartner and Jones’ (1993) importation of the punctuated equilibrium theory, though such discussions lacked a “central organizing metaphor” and “theoretical vocabulary” to empower analysis (Robinson 2006, 136). New theory advocates criticize incrementalism on the grounds that it either relies on external shocks in order to explain large-scale budgetary changes or fails to explain such shocks altogether (True 2000). In contrast, punctuated equilibrium theory incorporates both incrementalism and large-scale changes into its view of government as a complex, interactive system. Incrementalism is then discarded as a comprehensive explanation of budget changes, serving rather as a component of punctuated equilibrium theory. Summarized in True’s (2000, 13) own words, it is not so much incorrect as simply incomplete.

Punctuated equilibrium theory was early tested for several spending categories and aggregation levels with 1947-98 US Federal Budget data. Statistical tests included pattern analysis, ordinary least square regression analysis, autoregressive-integrated-moving average (ARIMA) analysis, generalized least squares analysis, and uni-variate distributional analysis<sup>6</sup>. Nevertheless, it was not until True, Jones, and Baumgartner (1999) that a precise standard frequency of small and large changes defining PET was settled upon. This standard was more frequent than in a normal distribution –which Jones *et al.* saw as associated with traditional incrementalism. Concretely, the presence of a kurtosis measure higher than 3, often referred to as a *leptokurtic* distribution, was confirmed not only on American data but on European data, as

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<sup>5</sup> For convenience, we adopt the Reddick’s (2003a, 259-260) expression of “punctuated incrementalism” to refer to the application of *punctuated equilibrium theory* to budgeting. We acknowledge, however, that this theory also represents an *alternative to* and an *attempt to surpass* incrementalism.

<sup>6</sup> As an example, Jones, Baumgartner and True (1998) used an ARIMA format to show the presence of two dramatic shifts in spending patterns since World War II. Although their dependent variable was represented by median real annual percent change in the US domestic budget from FY 1947 to FY 1995, they also estimated the intersextile ranges for these annual percent changes to depict change variability.

well. John and Margetts (2003) found that the 1951-96 UK real budget changes formed a leptokurtic distribution in most policy sectors. High kurtosis values were also obtained by Baumgartner, Foucault, and François (2006) for France, another Latin European country. In recent years, however, research on punctuated equilibrium has shifted away from testing such behavior pattern to searching for factors that cause behavior to be more or less “punctuated”, as Robinson (2006, 143) highlights<sup>7</sup>.

v) *Comparing incrementalist model results with those of other theoretical models.* Both in policy making and in budgeting, incrementalism has always had to be developed in conjunction with other competing theories, as revealed in Rubin’s (1989, 79) *reproach* to Wildavsky for his neglect of a mushrooming of nonincrementalist quantitative literature. More recently, Reddick (2002, 2003a, 2003b) have tested three rival decision-making theories using budget outputs. These theories are “garbage can”, incrementalism and rational budgeting. They are characterized respectively, by low, intermediate and high degrees of economic rationality assumed to be present in real world budgeting. Reddick defines garbage can budgeting as a *random process* (random expectations) which allows for the assignment of annual spending variation to a random error, and whose presence can be discarded by rejecting a unit root in a Dickey-Fuller test of the spending series. Budgetary incrementalism can be conceived of as a *backward-looking process* (adaptive expectations) and can be tested by examining whether spending follows a first-order autoregressive process. Finally, rational budgeting can be viewed as a *forward-looking process* (rational expectations) whose existence is corroborated when: i) the surplus/deficit series follows a first-order moving average process, and ii) the results of the Phillips-Perron and Augmented Dickey-Fuller tests rule out the existence of a unit root. Using data from the United States, the United Kingdom and Canada, Reddick found no evidence for garbage can budgeting, some support for budgetary incrementalism, and consistent support for rational budgeting. Moreover, at the

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<sup>7</sup> A pioneer in this shift was Jordan, who in 2003 tested whether budget functions associated with low-conflict political environments have lower large change frequencies and probabilities. Meanwhile, Jones, Sulkin and Larsen (2003) used kurtosis analysis and distributional tests to determine if increased “institutional friction” led to increased punctuated equilibrium behavior. Such friction came from the informational, cognitive, decision and transaction costs of change decisions. The following year, Robinson (2004) found that bureaucratization of Texas school districts was linked to a substantially lower kurtosis in the distribution of budgetary change, suggesting that such bureaucratization reduced institutional friction. More recently, Mortensen (2005) explored whether different interest configurations resulted in more punctuations in some policies than in others, while Robinson *et al.* (2007) tested the influence of organizational size and structure on the punctuation processes. Finally, Jones *et al.*’s (2009) ambitious comparative study found that the I-kurtosis scores correlate with measures of institutional friction factors like presidential systems, coalition government, low party discipline, or federalism.

macro level, in all three countries spending total incrementalism was found to coexist with rational budgeting of the surplus/deficit.

Reddick (2003a) examines competing theories by Dickey-Fuller and Phillips-Perron (for “garbage can” and rational budgeting) and the AR test (for budgetary incrementalism). As data, he uses the *monthly* US national government budget outcomes from 1968 to 1999. The new empirical evidence indicates that a rational or balancing component at the macro level does not prevent the domination of incrementalism at more micro-level spending sectors (Reddick 2003a, 271). Interestingly, however, the author now acknowledges that some of his studies neglected empirical support for garbage can and incrementalism theories in favor of rational budgeting. In Reddick (2003b), such a bias appears mitigated by the following developments: *i*) a test of the garbage can model which implements panel unit root tests developed by Im *et al.* (1997) on disaggregated US state budgetary data; *ii*) the redefinition of rational budgeting as referring to program, zero-based and biennial budgeting; and *iii*) a test of incrementalism not only in isolation, but also along with rational budgeting and a set of control variables. In contrast to his previous studies, Reddick (2003b) finds support for the garbage can model at the disaggregated level (functional areas), despite prevailing rational and incremental budgeting at more aggregated levels. The author concludes by suggesting a research path that combines several models, to capture what is most likely “a hybrid form of budgeting” (Reddick 2003b, 337).

### **2.3. A double-distinction-based proposal to couple incrementalism and exogenous factors in analyzing national budgeting**

An operational way of testing incrementalism on budget figures is to verify whether annual budget change rates remain mostly within relatively narrow bands. This corresponds to the second criterion referenced by Berry (1990): that of a change rate distribution *tightly* concentrated around a *low* central tendency. How tight the concentration and low the central tendency have to be –or, in other words, what band size is appropriate– appears as a debatable point<sup>8</sup>. However it be, such an approach suggests that perhaps no general and abstract formulation of incrementalist theory enables the accurate prediction of

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<sup>8</sup> Dempster and Wildavsky (1979) contend that “there is no magic size for an increment” and that, below the “unappealing level” of 50%, the cut-off point is a matter of research strategy, depending on what one concludes to be the importance of any particular size. According Harbridge and Anderson (2008, 11), a threshold commonly used in the literature is 10%. However, Dezhbakhsh, Tohamy and Aranson (2003) consider inappropriate and misleading any arbitrarily predetermined and time invariant cut-off point, and opt for constructing several statistical bands, with a yearly variable size as the cross-agency variance of the annual budget change varies over time.



budget allocations. Instead, what can be deduced from general incrementalist theory is only that budget allocation change rates will follow the aforementioned behavior pattern –i.e., moving within relatively narrow bands for the most of the cases. This relative margin of indeterminacy leaves room to enter exogenous variables into the analysis in order to play the two roles shown in Table I.

**Table I**  
**FOUR INCREMENTALIST INTERNAL-EXTERNAL APPROACHES TO NATIONAL BUDGETING (boldface type indicates approaches that will be applied in the next section)**

Role of exogenous variables  Existence of a within-budget reference to measure incrementalism	<b>EXPLAINING THE DYNAMIC OF MARGINAL CHANGE (EDMC)</b> (What explains how the rate of change evolves within the band?)	<b>EXPLAINING NON-INCREMENTAL CASES (ENIC)</b> (What explains rate of change departures from the band?)
Budget-Total Incrementalism (BTI)	<b>BTI-EDMC approach</b>	BTI-ENIC approach
Within-Budget Incrementalism (WBI)	WBI-EDMC approach	<b>WBI-ENIC approach</b>

In determining our approach to national budgeting, our first proposed distinction is between using exogenous variables to explain how the rate of change evolves within the prescribed bands or explaining departures from those bands. In effect, if incrementalism allows for within-band fluctuations, exogenous variables can generally explain such fluctuations within the predefined statistical bands. Indeed, regressing annual budget change rates on a set of exogenous variables is not necessarily in opposition to an incrementalist approach, because: *i*) fluctuations in this regressant may be compatible with high stability in the budget levels, and *ii*) some exogenous influences may be easily embedded in the incrementalism rationale. The best example of the latter is inflation, as Tohamy, Dezhbakhsh, and Aranson (2006, 49-50) acknowledge when stating that, “adjustments for inflation along with reactions to changing factor costs, give the budgetary process its distinctive incremental character”. Furthermore, incrementalism as a regular pattern of behavior was, in its early days, considered compatible with “discrete shocks” or “abrupt changes” precipitated by events like war, depression or party shift (Davis, Dempster and Wildavsky 1974, 421). Subsequently, the “punctuated incrementalism” theory of budgeting tried to delve into this pattern of incremental behavior interrupted by “punctuations” or periods of dramatic change. Thus, exogenous variables can



also be used to *Explain these Non-Incremental Cases* (ENIC), operatively understood as departures from the predefined statistical bands.

The second distinction we propose is between *Budget-Total Incrementalism* (BTI) and *Within-Budget Incrementalism* (WBI). This distinction remits to the familiar distinction existing among aggregation levels<sup>9</sup>, although it is conceptually and methodologically charged in a different way. Conceptually, national budget total can be considered a *bridge* between macroeconomic policy requirements, and administrative and policy needs. In the short term, public spending represents a substantial share of GDP and, therefore, has an impact on the economy which must be appraised globally. Total spending is not only a sum of the public service needs but also a macro magnitude explicitly connected to monetary variables and general economic policy through the government budget constraint. In the long term, total spending cannot deviate from expected economic growth and tax collection without jeopardizing the fiscal sustainability of a country. The coexistence between spending-total incrementalism and rational budgeting of the surplus/deficit<sup>10</sup> found by Reddick (2002, 2003a) would make sense in light of the long-term upward trend in gross domestic product. Such *budget-total* incrementalism is compatible with more heterogeneous *within-budget* behavior, such that accommodating spending components can offset non-incremental shocks or higher growth patterns in other spending components.

Methodologically, budget-total incrementalism (BTI) cannot be measured relative to any mean or median variation of the same budget, year and aggregation level, as it can when measuring within-budget incrementalism. We can measure a country's BTI relative to the mean or median of a set of countries, but this does not necessarily mean the same thing. While this second central tendency measure does not represent any upper limit distributed among countries, in each country's budget it is possible that the establishment of an increment is first made at the most highly aggregated level by determining an

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<sup>9</sup> One of the most classic methodological controversies in the literature on incrementalism is that of the appropriate *level of analysis* (i.e. level of aggregation). The seminal work of Davis, Dempster and Wildavsky (1966) focuses on agency-level analysis, and Dempster and Wildavsky (1979) find an "agency effect" evidenced by the patterned divergence of agency totals from within-agency budget components. Kanter (1972, 131) and Harbridge and Anderson (2008) argue, however, that the appropriate level of analysis is that in which Congress considers and publishes its budgetary decisions. According to Berry (1990, 188-189), the decision as to the level of analysis requires explicit assumptions about how participants order decisions in the budgetary process. The key lies in identifying the step(s) of the decision-making process that involve(s) simplification by building incrementally upon previous decisions. The decision should then be made based upon the level at which increments are established by decision makers.

<sup>10</sup> This Reddick's notion of rational budgeting of the surplus/deficit corresponds to the long-term budget equilibrating tendency previously found by Wood (2000).



overall government spending increment that becomes a pool of money to be divided among departments and agencies in a competitive process (Berry and Lowery 1990, *apud.* Berry 1990, 188-189).

### **3. AN APPLICATION TO SPANISH NATIONAL BUDGETING**

For reasons provided in the introduction, Spain represents an interesting case in which to apply some of our proposed approaches to the study of budgetary impacts of both incrementalism and exogenous factors. We begin by placing this empirical application within the context of the literature surrounding the Spanish government's budgetary process. The data are then presented and a BTI-EDMC approach is used to analyze the 1985-2009 budget change rates, while a WBI-ENIC approach is used to analyze budget changes for the period of 1997-2009. Although this choice of approaches and periods has been decisively conditioned by data availability (see subsection 3.2.), the pertinence of distinguishing between BTI and WBI was confirmed by a preliminary assessment. Between 1997-2009, the majority of the 27 Spanish national budget spending policies show evolutions uncorrelated to the budget-total evolution. The six exceptions are "culture" and "public debt" (significance at 20%), "access to housing and building promotion" (significance at 10%), "other economic actions" (significance at 5%), and "unemployment and pensions" (significance at 1%). Thus, the existence of a "total effect" –leading to budget-total incrementalism which is not found at more disaggregated levels– cannot be discarded.

#### **3.1. Summary overview of the literature on Spanish government's budgetary process; novelty of the present research**

In the late eighties, Sánchez-Reventa (1989) and Zapico (1989) demonstrated, in mainly descriptive analyses, that program budgeting in Spain occurred more in principle than in practice. Coinciding with a wave of New Public Management (NPM) reforms, the beginning of the nineties saw the birth of a stream of qualitative studies that called for a results-oriented budgetary reform (Zapico 1992, Zapico 1993, Boix, Lasheras and Ruiz-Huerta 1993, Ruiz-Huerta and Giménez-Montero 1994, and Onrubia 1996). Since that time, other works have analyzed shortcomings in the Spanish government's budgetary process using different theoretical approaches. Salinas-Sánchez (1995, 1998 and 1999) analyzes the process from a constitutional economics perspective, whilst Onrubia (1995, 1999) studies the Spanish budgetary behavior and its fiscal policy implications from the postulates of the new economics of organization. For their part, González-Páramo (2001) and Pons and Solé (2001) adopt a political economy of fiscal policy approach in studying the influence of government

composition and parliamentary dependence on budgetary discipline<sup>11</sup>. Later, Zapico (2003), Onrubia (2003) and Ruiz-Huerta *et al.* (2007) evaluated the two decades of budgetary reform reaffirming the critical argument they adopted in the early nineties, while introducing some refinements and nuances<sup>12</sup>. More recently, Ballart and Zapico (2008) revisit the reform weaknesses and underscore the need to go beyond a budget discipline approach, pointing out three requirements for reform success: sustained political support, learning capacity, and right incentives.

Those contributions notwithstanding, current studies have failed to econometrically analyze Spanish public budgeting from an incrementalist point of view. This research represents an attempt to do so, while also considering exogenous influences on budget figures. Rather than assuming a *pure* incrementalist model, our hypothesis is that Spanish national budgeting operates through a process of internal-external change (Berry 1990, 185). Otherwise stated, we recognize both the accuracy of budgetary incrementalism –confirmed for Spain by the qualitative studies cited above– and its insufficiency in fully explaining the complex reality of contemporary public budgeting. In this first quantitative empirical application to Spain, we have opted to rely on the sound and large tradition of incrementalism literature, leaving the more in vogue analysis of Spanish national budgeting from a punctuated equilibrium framework for a future paper.

### 3.2. Data

Unfortunately, for Spanish national budgeting we cannot make use of any homogeneous, disaggregated, long-term databases like those used by US researchers (Cogan 2002, True 2007). In the Spanish Public Sector Economic Database (*Base de Datos Económicos del Sector Público Español*–BADESPE) of the Spanish Institute for Fiscal Studies, the longest central government spending series begin in the mid-eighties and are only disaggregated into economic categories. The series are not comprehensive because they report a single subsector –composed of ministries and constitutional organizations– of the General State Budget (*Presupuestos Generales del Estado*–PGE). We have therefore opted to use other data sources available from the Spanish Ministry of Economy and Finance (*Ministerio de Economía y Hacienda*–MEH) to obtain budget figures whose institutional coverage was that of the so-called

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<sup>11</sup> From the standpoint of the political economy of public budgets, empirical works by Jürgen von Hagen (1992), Hagen and Harden (1994) and Hallerberg, Strauch and Hagen (2007) may also be referenced here, since Spain is included in the set of countries analyzed by the authors.

<sup>12</sup> From a predominantly accounting background, Montesinos (2002) and Pina and Torres (2005) also provide global appraisals of the government financial management reforms in Spain.



“consolidated scope” of the PGE<sup>13</sup>. Such coverage extends to the administrative public sector pertaining or attached to the central government and subjected to legally binding budgets<sup>14</sup>. This is the widest institutional scope for what consolidated budgetary data can be obtained, but only in terms of opening appropriations –supplementary and other modifications of the budget appropriations are not included<sup>15</sup>. The data contain all spending categories except the appropriations for the amortization of financial liabilities.

To test budget-total incrementalism, we built a dataset based on the abovementioned data sources for the period 1984-2009. For previous years, consolidated figures for all the administrative public sector subjected to limiting budgets were not available for us. Unlike the disaggregated panel data used in subsection 3.4, these aggregated time series data are not homogenized, or adjusted for the transfer of justice, health and education services to regional governments. Given that these are not the only services decentralized to regional governments, and that the delivery of such services is financed in part by grants included in the PGE total, we have opted to take the non-homogenized budget figures and add a control variable for level of decentralization to the model.

To test within-budget incrementalism, we use panel data from only one of the data sources (MEH 2009), corresponding to PGE’s 27 spending policies over the period 1996-2009. The same source does not provide data for previous years. An advantage of this source is that its figures for justice, health and education are homogenized to account for services decentralized to regional

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<sup>13</sup> Budget-total data sources are MEH (1985b) for 1984-85, IEF (1991) for 1986-88, the PGE Acts for 1989-1995, and MEH (2009) for 1996-2009. Spending-policy disaggregated data source is MEH (2009). Using the IEF (1991) budget-total data for 1986-88 favours homogeneity with the following years, since these data supposedly incorporate into the budgetary consolidation perimeter several public entities whose inclusion was not made official until 1989 –Institute for Foreign Trade, Nuclear Security Board, and National Inheritance.

<sup>14</sup> Consolidated PGE traditionally covers the following subsectors: *i*) constitutional organizations; *ii*) the General State Administration; *iii*) autonomous bodies belonging to the General State Administration; *iv*) other state entities of public law subjected to legally binding budgets; and *v*) management bodies and common services of the Social Security system, as well as mutual insurance funds for workplace accidents and professional diseases, in their public function of collaborating in the administration of Social Security. The General Budgetary Law of 2003 adds those consortia that meet certain conditions and are mostly financed by any other subjects of the administrative public sector. Within PGE but out of its consolidated scope remain the following subsectors: *i*) semi-commercial public enterprises; *ii*) state commercial enterprises; *iii*) state entities of public law and consortia that are not part of the administrative public sector; and *iv*) state foundations.

<sup>15</sup> 2007 is the first *consolidated* “General Account of the Administrative Public Sector” issued by the Spanish national government. For previous years there is no consolidated expenditure or final appropriation data for the same institutional scope.

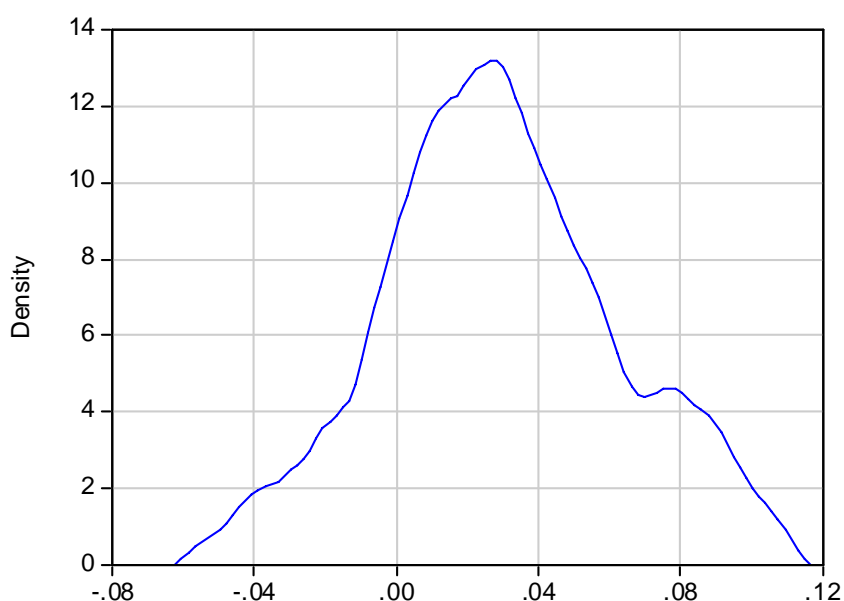
governments during this period. As the appropriations for the amortization of financial liabilities are not included, the spending policy “public debt” refers to debt-related spending other than amortizations. To avoid analysis disturbances, we exclude the anomalous 1,300% increment in “financial and tax administration” in 2009, due to the 20 billion Euro endowment to the Fund for Acquisition of Financial Assets approved by the 6/2008 Royal Act Decree.

In making these choices, we prioritize comprehensive institutional coverage and series homogeneity. As a *quid pro quo*, the data has required us to work with a time series of 25 observations and a panel of 323 observations (as our endogenous variables are annual change rates, the first year is lost for analysis).

### 3.3. Budget-total incrementalism in the 1985-2009 Spanish national budgets

Figure I shows the kernel density of the 1985-2009 PGE total growth rates, adjusted using the public consumption deflator provided by the Bank of Spain. The distribution is tightly concentrated around a low central tendency, which we considered as evidence of incrementalism in subsection 2.3. Results remain essentially the same when appropriations were adjusted using the GDP deflator, with a marginal mean increase (2.5%), and almost all observations between -2% and 6%. Moreover, this band would be even narrower if we eliminated the negative variations of 1996 and 2002: the former due to the parliamentary rejection of the budget bill, and the latter due to changes in regional government finance and the devolution of powers in health care to regions.

**Figure I**  
**KERNEL DENSITY OF GROWTH RATES FOR DEFLATED**  
**BUDGET TOTALS: 1985-2009**





To provide additional confirmation of the dependency of one year's budget on the previous year, and to explore the viability of testing the AR(1) model for the budget-total, two unit root tests were applied to budget figures expressed in both current and constant prices. In order to deflate nominal series, the public consumption deflator was used. According to both the ADF and the Philips-Perron tests, the existence of one unit root in the level of both series cannot be discarded (Table 2). Results hold when logarithms were used.

**Table 2**  
**UNIT ROOT TESTS FOR VARIABLE (1985-2009)**

	Budget in current prices	Budget in constant prices
ADF (p-value)	0.99	0.82
Philips-Perron (p-value)	0.99	0.84

Note:  $H_0 : \rho = 1$ . All specifications include intercept and time trend.

Hence, instead of estimating an AR(1) model with expenditure level as an endogenous variable, the nominal growth rate of expenditure is used as endogenous variable ( $E_t$ ). This approach leads back to what Danziger called the “strict incremental model” –a model that predicts allocation changes characterized by about the same proportionate increase or decrease from year to year (Danziger 1976: 339). However, unlike his approach, ours does not express the budget growth rates as mere ratios between observed allocation in year  $t$  over observed allocation in year  $t-1$ . Our approach is also not strictly internal but an internal-external incorporating different subsets of the exogenous variables defined in Table 3. Given the focus of this type of model on the dynamics of marginal change rather than the stability of the allocation level, the estimation results do not allow us to rule out incrementalism unless in a very limited and specific version<sup>16</sup>. The general econometric specification to be estimated is as follows:

$$E_t = \alpha + \beta E_{t-1} + \sum_n \phi_n X_{nt} + \sum_m \delta_m Z_{mt} + \varepsilon_t \quad (6)$$

where  $X$  is a set of political and budgetary variables and  $Z$  is a set of economic and demographic variables.

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<sup>16</sup> See Danziger (1976, 339, 347) and Bozeman (1977, 115). Bozeman says that, in a sense, looking at the rate of change “controls for” the incremental nature of budgeting.

**Table 3**  
**VARIABLE DEFINITIONS AND DATA SOURCES**

	<b>Endogenous variable</b>	
$E_t$	Consolidated General State Budgets	Annual growth rate of opening appropriations (deducted to amortize financial liabilities). Figures in current prices. Source: MEH (1985b), IEF (1991), PGE Acts, and MEH (2009)
	Political and budgetary	
$EY_t$	Electoral cycle	Dummy variable coded 1 in pre-election years and 0 otherwise
$LPG_{t-1}$	Left party Government (in $t-1$ )	Dummy variable coded 1 when budget is passed by a leftist Government and 0 otherwise
$DEF_{t-1}$	Fiscal Deficit (in $t-1$ )	Net lending/borrowing of the Central Government and Social Security funds, in terms of national accounting (percentage s/GDP <sub>mp</sub> ). For 2008 government forecast is used. Source: INE (www.ine.es), Bank of Spain (www.bde.es), BADESPE (www.ief.es), and GS (2009)
$RDI_t$	Regional Decentralization growth Index	Annual growth rate in the opening appropriations of the regional governments. Both amortization of financial liabilities and grants from the central government are subtracted. Source: DGCF (2009), MEH (1985a), MEH (1985b), IEF (1991), BADESPE (www.ief.es), PGE Acts, and MEH (2009)
	Economic and demographic	
$GDP_t$	Gross Domestic Product in constant prices	Annual growth rate. Source www.ine.es. For 2009 government forecast is used
$DEFGPD_t$	Deflator of the GDP	Annual growth rate. Source www.ine.es. For 2009 government forecast is used
$INTEREST_t$	Interest rate	Variation in legal interest rate (%). Source: Bank of Spain (www.bde.es)
$P_t$	Population growth rate	Annual growth rate (www.ine.es)
$OPR_t$	Old Population Ratio	Population older than 65 over total population (www.ine.es)



In Table 4, the nominal budget growth rate in year  $t$  ( $E_t$ ) is explained by four different sets of variables. In column (1) the only regressor is the lagged endogenous variable. It is highly significant with a coefficient of over 0.5. In columns (2) and (3) two alternative and more sophisticated models are estimated. Because only 25 observations are available, both models are estimated separately. The former includes a combination of political and budgetary variables. The latter includes economic and demographic variables. In column 3, changes in the unemployment rate were also included in preliminary estimates, but correlation with variable GDP was troublesome. Definitions and data sources are summarized in Table 3. Finally, model (4) combines variables in columns (2) and (3) with the highest t-statistics: variables  $EY_t$  and  $LPG_{t-1}$  in column 2, and  $GDP_t$ ,  $DEFGPD_t$ ,  $OPR_t$ , and  $P_t$  in column 3.

**Table 4**  
**THE DETERMINANTS OF BUDGET GROWTH RATES (1985-2009).**  
**ECONOMETRIC ESTIMATES OF EQUATION (6)**

Model	(1)	(2)	(3)	(4)
Intercept	0.032** (2.19)	0.025 (1.49)	0.028 (1.23)	-0.004 (0.22)
$E_{t-1}$	0.559*** (3.26)			
$EY_t$		0.021 (1.37)		0.021 (1.62)
$LPG_{t-1}$		0.062*** (4.11)		0.042*** (2.91)
$DEF_{t-1}$		0.039 (0.14)		
$RDI_t$		0.033 (0.58)		
$GDP_t$			-0.668 (1.64)	-0.361 (1.03)
$DEFGPD_t$			0.921** (2.60)	0.765** (2.57)
$INTEREST_t$			0.007 (1.13)	
$P_t$			1.355* (1.75)	1.295** (2.04)

(Follow)



(Continuation)

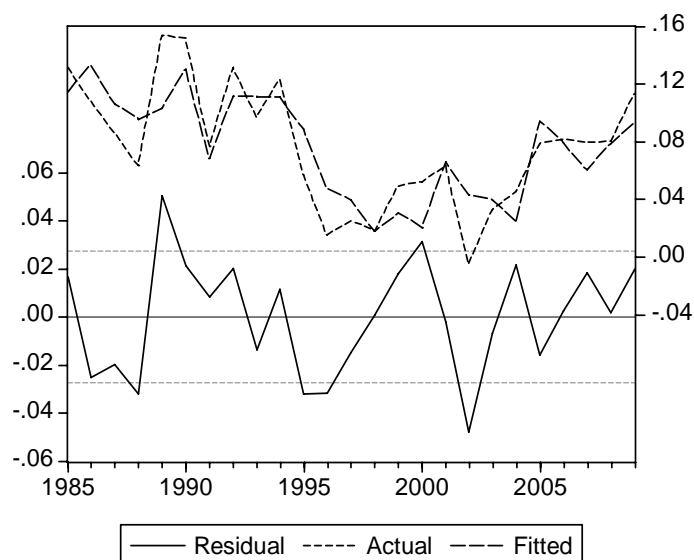
Model	(1)	(2)	(3)	(4)
$OPR_t$			6.380 (1.45)	4.485 (1.30)
B-G (p-value)	0.88	0.31	0.28	0.48
$R^2$	0.325	0.501	0.503	0.693
Observations	24	25	25	25

Notes: All equations are estimated using OLS. Standard t-statistics are in parentheses. B-G is the Breusch-Godfrey Lagrange multiplier test for general, high-order, ARMA errors. The null hypothesis of the test is that there is no serial correlation in the residuals up to the specified order (2).

\*\*\*, \*\*, and \* indicate significance at 1%, 5% and 10% level, respectively.

Budget growth is higher when the budget is passed by a leftist government and when the inflation rate, measured by the GDP deflator, is higher<sup>17</sup>. The population growth coefficient is also positive and significant. Finally, budget increases are positively correlated with the ratio of population over 65, albeit only at a marginally significant level (20%). The rest of the variables are not significant at usual levels. Preliminary model estimates in columns (2) to (4), show non-significant coefficients for  $E_{t-1}$ <sup>18</sup>. Moreover,  $R^2$  in column 4 is much higher than in model (1). This indicates that the evolution of  $E_t$  may be better explained by a combination of exogenous factors than by inertia in budget change rates. Actual values, fitted values and residuals from column (4) of Table 4 are shown in Figure 2.

**Figure 2**  
**BUDGET GROWTH RATES (1985-2009). ACTUAL VALUES,**  
**FITTED VALUES AND RESIDUALS FROM COLUMN 4 OF TABLE 2**



<sup>17</sup> This result holds when the public consumption deflator is used instead of the GDP deflator.

<sup>18</sup> P-values were 0.41 in column (2), 0.37 in column (3), and 0.65 in column (4).

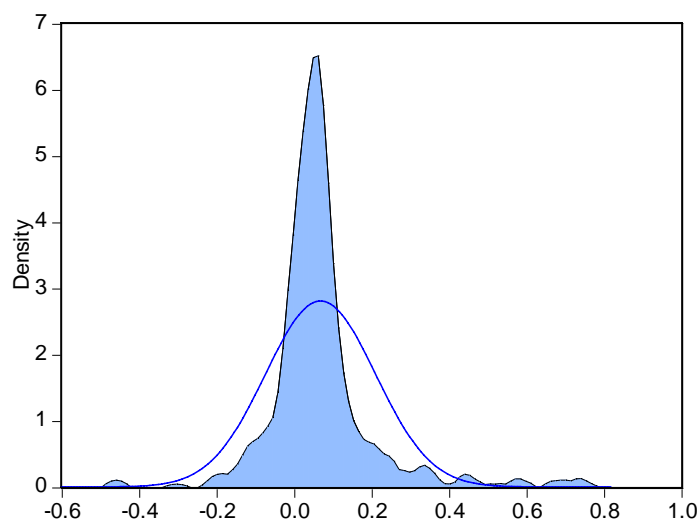
### 3.4. Within-budget incrementalism in the 1997-2009 Spanish national budgets

As indicated above, we will now test within-budget incrementalism on data corresponding to PGE's 27 spending policies. Annual growth rates for each spending policy are computed using the public consumption deflator to convert nominal growth rates into real growth rates. We then apply the Dezhbakhsh, Tohamy and Aranson (2003) method to standardize the rates and obtain their distributions. After pooling all observations for all policies we observe that the distributions are skewed to the right. The rates are, therefore, standardized by subtracting the pooled median (instead the pooled mean) of observed values. Results are divided by the standard deviation of the pooled rates.

The kernel density of the standardized real budget growth rates is shown in Figure 3. The theoretical normal distribution is also represented. The distribution of standardized rates is not normal according to the Jarque-Bera test for normality. In fact, Figure 3 reflects a leptokurtic distribution punctuated equilibrium scholars would consider to be confirmation of their theory. While advocates of punctuated equilibrium argue that traditional incrementalism would require that growth values be normally distributed, we maintain an incrementalism framework in that the distribution is *tightly* concentrated around a *low* central tendency, as required by incrementalist theory<sup>19</sup>.

**Figure 3**

**KERNEL DENSITY OF BUDGET GROWTH RATES**



According to results summarized in Table 5, spending policies exhibiting the most incrementalist decision-making practices are defense, health, and agriculture, fishing and food. All categories show incremental behavior for all observed years. A second cluster includes citizen security / correctional

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<sup>19</sup> We remit the thorough examination of this question to a future work more focused on the application of the punctuated equilibrium theory to budgeting.

institutions, and public debt, followed by justice, culture, and education. Civil research, and Social Security Management and Administration are the policies with the greatest number of years falling outside of prescribed “incrementalist” bands. Critical values of our statistical bands are the same as those used by Dezhbakhsh, Tohamy and Aranson (2003). The small two-sided band is between 40% above zero and 40% below zero, while the large two-sided band is between 45% above zero and 45% below zero. The small and large positive bands are similar to the previous bands, except that they include a lower bound of 0, such that budget decreases are always counted as non-incremental events.

**Table 5**  
**INCREMENTAL (I) AND NON-INCREMENTAL (NI) YEARS OF THE SPENDING**  
**POLICIES ACCORDING TO THE FOUR ELECTED STATISTICAL BANDS**

SPENDING POLICIES	Small two-sided band		Large two-sided band		Small positive band		Large positive band	
	-40 pp./40 pp.		-45 pp./45 pp.		0/40 pp.		0/45 pp.	
	I	NI	I	NI	I	NI	I	NI
Justice (homogenized) (*)	11	2	13	0	11	2	13	0
Defense	13	0	13	0	13	0	13	0
Citizen Security and Correctional Institutions	12	1	13	0	12	1	13	0
Foreign Policy	9	4	10	3	10	3	10	3
Pensions	12	1	13	0	12	1	13	0
Other Economic Loans	9	4	12	1	9	4	12	1
Social Services and Social Promotion	9	4	11	2	10	3	12	1
Employment promotion	10	3	12	1	10	3	12	1
Unemployment	10	3	12	1	10	3	12	1
Access to Housing and Building Promotion	10	3	11	2	10	3	11	2
Management & Administration of Social Security	5	8	9	4	6	7	9	4
Health (homogenized) (*)	13	0	13	0	13	0	13	0
Education (homogenized) (*)	10	3	13	0	10	3	13	0
Culture	10	3	13	0	11	2	13	0
Agriculture, Fishing and Food	13	0	13	0	13	0	13	0
Industry and Energy	9	4	9	4	11	2	11	2
Commerce, Tourism and SMEs	10	3	10	3	11	2	11	2
Subsidies to the Transport	8	5	10	3	10	3	12	1
Infrastructures	9	3	12	1	11	2	12	1
Civil Research	5	8	8	5	5	8	8	5

*(Follow)*



(Continuation)

SPENDING POLICIES	Small two-sided band		Large two-sided band		Small positive band		Large positive band	
	-40 pp./40 pp.		-45 pp./45 pp.		0/40 pp.		0/45 pp.	
	I	NI	I	NI	I	NI	I	NI
Defense Research**	7	6	7	6	9	4	9	4
Other Economic Actions	7	6	8	5	12	1	12	1
Top Management	9	4	13	0	9	4	13	0
General Services	9	4	11	2	10	3	12	1
Financial and Tax Administration	11	1	11	1	11	1	11	1
Transfers to other Governments	11	1	12	0	11	1	12	0
Public Debt	11	2	13	0	13	0	13	0

\* Spending homogenized by the transfers of Justice, Health and Education effectuated since 1995.

\*\* For 1996 and 1997 we put the figures resulting from subtracting to the total of the policy Research, Development and Innovation that part allocated to Civil Research.

Table 6, allows us to examine the time evolution of within-budget incrementalism. In 2003, 26 of the 27 spending policies were within the large bands, with 24 policies within the small bands. On the contrary, in 2004 and 2006 over a half of spending policies show non-incremental behavior using small bands.

**Table 6**  
**INCREMENTAL (I) AND NON-INCREMENTAL (NI) CASES BY YEAR**  
**ACCORDING TO THE FOUR ELECTED STATISTICAL BANDS**

YEARS	Small two-sided band		Large two-sided band		Small positive band		Large positive band	
	-40 pp./40 pp.		-45 pp./45 pp.		0/40 pp.		0/45 pp.	
	I	NI	I	NI	I	NI	I	NI
1997	21	6	23	4	25	2	26	1
1998	23	4	24	3	24	3	25	2
1999	23	4	25	2	24	3	25	2
2000	22	5	24	3	23	4	25	2
2001	23	4	25	2	24	3	26	1
2002	22	5	24	3	23	4	25	2
2003	24	3	26	1	24	3	26	1
2004	13	14	26	4	16	11	24	3
2005	20	7	26	4	21	6	24	3
2006	12	15	21	6	14	13	22	5
2007	23	4	24	3	24	3	25	2
2008*	21	6	23	4	21	6	23	4
2009	17	9	21	5	21	5	23	3

\* Budget homogenized, taking into account the extraordinary appropriations for immigration (1/2008 Royal Act-Decree).

In order to test the determinants of within-budget incrementalism a binary variable is defined. A value of 1 represents observations outside of prescribed bands ( $OUT_t$ ), while 0 represents observations within bands (Table 7). The same bands as those in Dezhbakhsh, Tohamy and Aranson (2003) are used. The model is computed for each of the four defined bands. The set of regressors include:

- The lagged endogenous ( $OUT_{t-1}$ ).
- The share of each spending policy on the budget in year  $t-1$  ( $SHARE_{t-1}$ ).
- Three political dummy variables: (1)  $EY_t$  is coded 1 in pre-election years (when the election year budget is discussed and passed) and 0 otherwise; (2) variable  $LPG_{t-1}$  is coded 1 when the budget is drawn up by a leftist government and 0 otherwise; (3) variable  $FB_t$  is coded 1 if the budget is drawn up in the first post election year and 0 otherwise.
- Economic variables  $GDP_t$  and  $DEF_{t-1}$  defined in Table 3 are also used here. The effect of economic and financial conditions on within-budget incrementalism is tested with both variables.
- The off-consolidated budget investment growth rate ( $OCB_t$ ) was also used. This variable reflects the evolution of the investment allocated by public enterprises, foundations and other entities out of the budgetary consolidation perimeter. Data source is [www.minhac.es](http://www.minhac.es) (*Informes Económico-Financieros* and the *Anexos de Inversiones Reales y Programación Plurianual*).

The general econometric specification to be estimated is defined as follows:

$$OUT_t = \beta_1 + \beta_2 OUT_{t-1} + \beta_3 SHARE_{t-1} + \beta_4 EY_t + \beta_5 LPG_{t-1} + \beta_6 FB_t + \beta_7 GDP_t + \beta_8 DEF_{t-1} + \beta_9 OCB_t + \varepsilon_t \quad (7)$$

Equation (7) is estimated using an iterative maximum likelihood estimator for binary logit models (optimization algorithm: quadratic hill climbing). Results hold when different probabilistic models (probit), optimization algorithms (Newton-Raphson, Berndt-Hall-Hall-Hausman) and robust standard errors (Huber-White, GLM) are computed.



**Table 7**  
**ECONOMETRIC ESTIMATES OF EQUATION (7).**  
**THE DETERMINANTS OF NON-INCREMENTAL CHANGES**

Explained variable	OUT <sub>t</sub> (Small bands)	OUT <sub>t</sub> (Positive small bands)	OUT <sub>t</sub> (Large bands)	OUT <sub>t</sub> (Positive large bands)
Intercept	-1.653*** (2.56)	-1.931*** (2.76)	-2.264** (2.45)	-2.55*** (2.42)
OUT <sub>t-1</sub>	1.075*** (3.52)	1.167*** (3.44)	1.655*** (4.03)	1.950*** (4.01)
SHARE <sub>t-1</sub>	-5.916* (1.84)	-5.730* (1.65)	-35.740** (2.37)	-28.181* (1.78)
EY <sub>t</sub>	1.106*** (2.66)	1.064** (2.39)	0.872 (1.50)	0.961 (1.47)
LPG <sub>t-1</sub>	0.361 (0.78)	0.246 (0.50)	0.561 (0.88)	0.432 (0.60)
FB <sub>t</sub>	0.316 (0.72)	0.230 (0.49)	0.516 (0.97)	0.291 (0.43)
GDP <sub>t</sub>	8.365 (0.67)	12.697 (0.93)	8.691 (0.51)	12.226 (0.63)
DEF <sub>t-1</sub>	0.375 (0.33)	1.001 (0.81)	-0.498 (0.33)	0.454 (0.26)
OCB <sub>t</sub>	-2.490** (2.31)	-2.782** (2.35)	-1.893 (1.33)	-2.913* (1.70)
McFadden R <sup>2</sup>	0.089	0.091	0.154	0.148
Observations	323	323	323	323

Notes: z-statistics are in parentheses.

\*\*\*, \*\* and \* indicate significance at 1%, 5% and 10% level, respectively.

The most significant variable is OUT<sub>t-1</sub>. This result is consistent with findings by True (2000: 13-14) which state that a large-scale budget change in year t-1 increases the odds of another large-scale change in year t<sup>20</sup>. Variables FB and LPG are non-significant. Elections (EY) tend to induce non-incremental changes, but this effect is only significant at usual levels when small bands are

<sup>20</sup> From the author's summarization of results, we can also deduct that this effect is something weaker at program and function levels than at the subfunction one. Moreover, in the last case the effect is higher when variation in year t-1 is positive, and it is more probable that non-incrementalist variations in years t-1 and t have opposite signs than they have the same sign.

used. The  $SHARE_{t-1}$  variable is more significant when large bands are used. Thus the higher the share of a spending policy on the previous year's budget, the lower the probability of wide non-incremental budget changes in such spending policy. According to John and Margetts (2003, 427), there is less scope for dramatic increases or decreases in a sector which comprises a large portion of total budget expenditures. This result is also observed by Mortensen (2005, 945-946), although in this study additional analyses did not support the budget share hypothesis as alternative explanation to that initially tested by the author. Finally, the coefficient of variable OCB is negative and significant in columns 1, 2 and 4. This indicates that a higher growth rate in the off budget investment is correlated with a lower probability of non-incremental budgetary changes. These results suggest that taking investments off budget serves as a release for within-budget spending pressures, helping to avoid large scale budget changes in specific spending policies.

#### 4. CONCLUSIONS

After a decrease in popularity between the late eighties and the mid-nineties academic interest in budgetary incrementalism is experiencing a resurgence. A new generation of empirical research has been developed over the past decade with five primary goals: *i)* to overcome the statistical limitations of traditional research on incrementalism, *ii)* to establish a tested, formal theoretical basis for incrementalism, *iii)* to investigate the causes of incrementalism vs. non-incrementalism, *iv)* to examine the *punctuated incrementalism* variant, and *v)* to compare incrementalist model results with those of other theoretical models.

This paper has built upon insights from recent literature offering a double-distinction-based proposal to combine incrementalism and exogenous variables in the analysis of national budgeting. The two criteria for distinction are the role of exogenous variables (EDMC vs. ENIC) and the existence of a within-budget reference to measure incrementalism. Among the four approaches resulting from these criteria, two are used in a quantitative empirical application of incrementalist theory to Spain. This is the first study to quantitatively apply incrementalist theories to Spanish budgetary data. Our analysis distinguishes between budget-total incrementalism and within-budget incrementalism, and combines several statistical tools in order to avoid the shortcomings of the Davis, Dempster and Wildavsky's econometric method and its extensions.

Results at both levels suggest that, while incrementalism explains the movement of annual budget figure changes within relatively narrow bands, other variables are needed to explain: *i)* the dynamics of marginal change in the budget total, and *ii)* the non incremental changes within the budget. Both the



1985-2009 real budget growth rates and the 1997-2009 standardized, real growth rates disaggregated by spending policy show a distribution *tightly* concentrated around a *low* central tendency. Nevertheless, the dynamics of marginal change in the budget total can be better explained by a set of exogenous variables including government party ideology, inflation and population growth. Non incremental changes within the budget can be partially explained by non incremental changes in previous years, shares of each spending policy in the total budget, off-budget investment evolution, and elections.

Several suggestions for future research emerge from this paper. Beyond the analysis of Spanish national budgeting in a punctuated equilibrium framework mentioned above, additional institutional variables and revenue evolution can be explored in order to more fully explain budget behavior and incorporate simultaneous causality between revenues and expenditures. Longer time series data are needed to make a deeper and more reliable analysis of both budget-total incrementalism and within-budget incrementalism. Close study of definitive appropriations may show possible gaming behavior concerning supplementary and other in-year modifications of budgetary appropriations. Finally, while time consuming, we think that establishing a tighter link between features of the Spanish national budgetary process and the gathering of data for research purposes is an essential component in correctly analyzing country's within-budget incrementalism.



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## SÍNTESIS

### PRINCIPALES IMPLICACIONES DE POLÍTICA ECONÓMICA

Como teoría empírica del presupuesto público, el incrementalismo entró a finales de los ochenta en lo que parecía ser un inexorable declive. Sin embargo, en esta última década se percibe un cierto resurgir del interés en la teoría incrementalista como ingrediente de la investigación empírica sobre el presupuesto público. El presente trabajo se dirige, en primer término, a ofrecer un panorama de esa nueva literatura que discurre principalmente por estas cinco direcciones: *i)* superación de las limitaciones estadísticas de la investigación tradicional sobre incrementalismo; *ii)* establecimiento de un fundamento teórico formal empíricamente contrastado para el incrementalismo; *iii)* investigación de los determinantes del incrementalismo y del no incrementalismo; *iv)* examen de la variante que Reddick denomina *incrementalismo puntuado*; y *v)* comparación de los resultados del modelo incrementalista con los de otros modelos teóricos. Apoyándose en algunas contribuciones de dicha literatura, se tipifican cuatro aproximaciones metodológicas para combinar el incrementalismo y las variables exógenas en el análisis del presupuesto estatal, y se aplican luego dos de ellas al caso español.

En primer lugar, se aplica a las tasas anuales de variación del total consolidado de los Presupuestos Generales del Estado (PGE) del período 1985-2009 una *aproximación ITP-EDCM*, es decir, centrada en el Incrementalismo del Total del Presupuesto (ITP) y con variables exógenas encaminadas a Explicar la Dinámica del Cambio Marginal (EDCM). El análisis econométrico revela que, si bien dichas tasas tienden a permanecer en bandas relativamente estrechas (incrementalismo), la dinámica del cambio marginal se puede explicar mejor por el juego de variables exógenas como el color político del Gobierno, la inflación y el crecimiento poblacional.

En segundo lugar, se aplica a las tasas anuales de variación de los créditos iniciales por políticas de gasto de los PGE 1997-2009 una *aproximación IDP-ECNI*, es decir, centrada en el Incrementalismo Dentro del Presupuesto (IDP) y con variables exógenas orientadas a Explicar los Casos No Incrementales (ECNI). También en este análisis se pone de manifiesto la tendencia de las tasas de variación a mantenerse en bandas relativamente estrechas o, en otras palabras, a exhibir la distribución *altamente* concentrada en torno a una tendencia central *baja* que consideramos evidencia de incrementalismo. Pero también aquí se confirma la pertinencia de contar con variables exógenas, puesto que los cambios no incrementales pueden explicarse parcialmente por los cambios no incrementales en los años anteriores, las participaciones de cada política de gasto en el presupuesto total, la evolución de las inversiones fuera del presupuesto, y las elecciones.

Sin duda alguna, tanto el trabajo realizado como la línea de investigación que inicia tienen importantes implicaciones de política económica, aunque estas dependan en parte de la valoración normativa que se haga del incrementalismo presupuestario –cuestión

sobre la que deliberadamente hemos eludido pronunciarnos, al centrarse aquí nuestro interés de forma exclusiva en la vertiente empírica del incrementalismo—. Al margen de ello, la contrastación en las cifras presupuestarias de nuestra Administración central de ciertos patrones de comportamiento que persisten en el tiempo, ayuda tanto a los *policy makers* como a los agentes económicos a hacerse una idea más cabal de lo que puede esperarse de un proceso presupuestario como el tradicionalmente aplicado en España. Dicho de otro modo, les permite anticipar los márgenes dentro de los que previsiblemente se moverán las variaciones presupuestarias anuales. Además, la metodología empleada abre la puerta al planteamiento de preguntas y la realización de análisis de máxima relevancia para la política económica. ¿Qué influencias exógenas son acomodables en la pauta incrementalista del total presupuestado y qué otras tienden a quebrarla? ¿Por qué determinadas políticas de gasto son más proclives a sufrir cambios no incrementales? ¿Se debe a sus niveles de inercia burocrática, tolerancia al conflicto, exposición al entorno...? ¿Por qué mientras ciertos shocks exógenos provocan cambios no incrementales en el total de gasto, otros sólo los provocan dentro del presupuesto? Únicamente merced a indagaciones de tal índole podrá alcanzarse una comprensión profunda de cómo el proceso presupuestario condiciona la política fiscal, así como diseñarse reformas de aquél que contribuyan al éxito de ésta.



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***Junto al original del Papel de Trabajo se entregará también un resumen de un máximo de dos folios que contenga las principales implicaciones de política económica que se deriven de la investigación realizada.***



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This serie of *Papeles de Trabajo* (working papers) aims to provide those having an interest in Public Economics with a vehicle to publicize their ideas. The rules governing submission and selection of papers are the following:

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