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Did *New Public Management* matter? An empirical analysis of the outsourcing and decentralization effects on public sector size

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Abstract

This paper evaluates whether reforms associated with the New Public Management (NPM) doctrine led to a reduction in public sector expenditure and employees. Savings and downsizing the public sector were a major justification when the international movement of public sector reforms began in the 1980s. Since then, NPM has been the subject of extensive academic debate as to its successes and failures. However, empirical assessments of whether NPM reached its stated objectives are relatively scarce, mainly due to the difficulty of quantifying the impact of such reforms. This paper is an attempt to do this, especially looking at outsourcing and decentralization. We test a number of hypotheses related to the outsourcing and decentralization effects on public sector expenditure and employees through an econometric analysis using a panel data model for eighteen European Countries over the period 1980 to 2010. The results suggest a positive correlation between the degree of outsourcing in the provision of public services and government spending in the short term. On the other hand we find that decentralization tends to decrease the size of general government, particularly in the long-run.

Keywords: *New Public Management*, outsourcing, decentralization, public sector size.

JEL Classification: H10, H63, H77, L33

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1 Introduction

As a result of the ongoing global financial and economic crisis, most European countries are again considering what measures to take to cut public spending in order to reduce the deficit and public debt. Cutting public expenditure is back on the agenda. Across most of the twentieth century, particularly after World War II, a broad consensus was forged on how economic activity should be governed across the most of the Western world. In Europe, Keynesianism prevailed, and the role of the state was consolidated as a provider of public services and the Welfare State (Berkowitz and McQuaid, 1988; Comin and Diaz-Fuentes, 2004). But, from the seventies, a radically different consensus on the appropriate role of the State in the economy and the optimum way to manage economic activity took hold. First starting in the UK (Vickers and Yarrow, 1988), and then spreading to the rest of Europe over the next two decades, a deep reform of the public sector was set in place (Clifton, Comin, and Diaz-Fuentes, 2003, 2006). This included sweeping privatization, liberalization and deregulation programmes.

Where privatization was not feasible technically or politically, new ideas were developed about how those activities which would remain in the public sector could best be managed. These ideas were driven by the quest to introduce criteria from private sector management into traditional methods of public administration. Such ideas came to be labelled NPM. NPM emerged in response to a growing perception that the public sector was too inefficient, and its growth was getting out of control. In general terms, NPM aimed to correct some of the perceived pathologies associated with the public sector. As the NPM doctrine emerged during the 1980s, its proponents put great emphasis on strategies to minimize and downsize, with the aim of rendering government smaller (Pollitt and Bouckaert 2003, p.21; Van de Walle and Hammerschid, 2011, p.24).

It is of interest, therefore, to enquire whether, after two, and sometimes three, decades of reform, NPM can be found to be associated with reduced government spending and fewer public employees, as predicted by its proponents (Kettl, 2000, Osborne and Gaebler, 1992). This is the central question which this paper seeks to answer. Interestingly and, rather ironically, although one of the major drivers of NPM was to promote the improvement of the measurement and hence evaluation of public sector performance, scholars and government agencies have produced relatively little in the way of evaluating NPM itself (Clifton, Comin, and Diaz-Fuentes, 2005; Costas, 2007; Clifton and Diaz-Fuentes, 2010). In particular, only a small number of studies have attempted to evaluate the effects of NPM-style reforms on public sector size (Ferlie *et al.* 1996; Kettl, 2000; Pollitt and Bouckaert, 2004). However, these studies are limited in two main ways. Firstly, they examined changes in public sector size at the macro level but failed to establish a causal link between NPM reforms and public sector size¹. Secondly, they

¹One exception is O'Toole and Meier (2004) who find outsourcing did not led to more "efficient" spending in

cover a limited number of countries and time periods, largely due to the scarcity of key data (see Van de Walle and Hammerschmid, 2011, COCOPS Working Paper 1). Fortunately, this has improved recently, after considerable efforts were made here² by organizations such the European Commission (EC) and the Organization for Economic Cooperation and Development (OECD) to improve the quality of public sector statistics and facilitate cross-national comparability.

To evaluate the effect of NPM on public sector size, we selected two major policies associated with NPM for study, outsourcing and decentralization. The advantages of this selection are two-fold. Firstly, the effects of both policies can be measured quantitatively and, secondly, substantial theoretical literature exists which affirm that these policies may well affect public sector size, both expenditure and employees. In this way, we attempt to contribute to the NPM-related literature by using a methodology that, to the best of our knowledge, has not been previously used in the study of NPM reforms. Firstly, we use a static panel data model³ to assess whether there is any relationship between government spending and the NPM reforms under analysis. Next, we estimate both the long-term relationship between NPM reforms and public sector size, and an error correction model to distinguish between the short-term and long-term effects of the reforms.

After deriving five hypotheses about the relationship between outsourcing, decentralization and public sector size on the basis of the theoretical literature, we test the hypotheses with an econometric analysis using a panel data model for eighteen European Union members⁴, including Eastern European countries, over the period 1980 to 2010⁵.

Some of the limitations of this research should be stated at the outset. Firstly, this paper does not claim to evaluate the effects of a whole range of reforms associated with NPM on public sector size. As observed by many scholars, NPM is a wide-ranging and, sometimes, fuzzy concept, and it has been associated with multiple, distinct and even contradictory policies around the world. Some of the policies promoted by NPM are exceedingly difficult, if not impossible, to quantify. Our research is much more modest, seeking only to evaluate the effects of outsourcing and decentralization on public sector size. Secondly, this paper only seeks to answer whether outsourcing and decentralization led to a reduction in the size of the public sector. No

core activities and was connected to larger bureaucracies.

²Specifically Eurostat started using the new System of National Accounts from 1995, which helped greatly to standardize and make comparable statistical data in a reliable manner across countries.

³The advantages and disadvantages of using panel data over time series are discussed in a later section.

⁴The selected countries are Austria, Belgium, Denmark, Estonia, Italy, Finland, France, Germany, Greece, Hungary, Ireland, Luxembourg, Netherlands, Spain, Sweden, Portugal, Norway and the United Kingdom.

⁵The choice of these countries is justified on the basis that they have all introduced significant public sector reform over the last two or three decades and we assume a certain homogeneity among them since all are EU Member States, which is important for our estimates. Likewise, the availability of reliable data in an acceptable time period was a crucial point in making this selection. Finally, the selection was also influenced by the fact that this paper forms a contribution to the ongoing project *Coordinating for the Cohesion of the Public Sector of the Future*(COCOPS) within the *7th Framework Project*, and covers all of its participants.

conclusions are drawn as to whether a reduction or otherwise of government expenditure and employees led to greater public sector efficiency and effectiveness, whether the services provided were improved or worsened, or the effects on social welfare. Despite our limited aims, it is still worthwhile testing for the effects of outsourcing and decentralization on public sector size, since these remain a popular tool for governments around the world.

The rest of the paper is organized as follows. The second section briefly synthesizes the main policies associated with NPM reform, justifies the selection of outsourcing and decentralization, and develops hypotheses for testing. Section 3 describes the statistical model that is used for inference, the data, and then briefly discusses the main trends of public sector size in the countries under analysis. Section 4 reports the estimation results and interprets them. Section 5 concludes, summarizing our results, their limitations and possible directions for further research.

2 New Public Management: a framework for analysis

New Public Management, as a label, has become like an umbrella term covering a set of public sector reforms carried out from the eighties across most OECD countries (Hood, 1991; Pollitt, 1993; Pollitt and Dan, 2011). Most scholars coincide that NPM began as a phenomenon in Anglo-Saxon countries, and was then picked up and promoted by the OECD on a world-wide scale (Kettl, 2000). Today, NPM-style reforms have been implemented across most of the Western world and beyond. However, pinning down what NPM actually means, when translated into discrete policies, is very difficult (Dunleavy and Hood, 1994; Flynn, 2002; Barzelay, 2002), and it has an “hybrid” character (Christensen and Laegreid, 2002). Even Christopher Hood, widely acclaimed as one of the inventors of the label NPM has admitted the term has been over-used to the point of concept-overstretch (Hood, 2000). The consequence of this is that the assessment of the impact of NPM in general, and on public sector expenditure and employees in particular, is far from simple. To complicate matters further, it should be noted that, even if NPM has been presented as a global reform movement by some scholars (Kettl, 2000; Christensen and Laegreid, 2007), implementation of NPM-style reforms has differed substantially across countries (Ferlie *et al*, 1996; Hammersmichd *et al.*, 2007; Pollitt and Bouckaert, 2011). Torres and Pina (2004) argued that both the definition and implementation of NPM-style reforms are influenced by domestic culture, institutional settings and administrative law traditions. Despite these difficulties, in this section, we briefly synthesize some of the key literature which defines NPM, before justifying our focus on outsourcing and decentralization before proceeding to develop the hypotheses.

In general terms, there is broad consensus that NPM involves the “the attempt to implement management ideas from business and private sector into the public services” (Haynes, 2003).

Pollitt (2007, p.110) usefully argued that the NPM is a two-level phenomenon, including, on the top layer, a general motivation to improve the public sector, and, on the second-tier layer, a set of specific concepts, policies and practices which aim to reform the public sector. Remaining at this second-tier layer, a reading of key NPM literature would suggest ten major policy areas. These broadly coincide with interpretations of NPM by the OECD (2010) as well as a number of influential publications on the topic, including Hood (1991,1995), Dunleavy and Hood (1994), Pollitt (1993), Ferlie *et al* (1996), Borins (1994), Pollitt and Summa (1997), Kettl (2000), Barzelay (2001), Christensen and Laegreid (2001), and Flynn (2002).

Synthetically, the ten practices most commonly associated with NPM are: **(i) introducing greater competition into the public sector** (Hood, 1991; Dunleavy and Hodd, 1994), **(ii) downsizing** (Ferlie *et al*, 1996; Pollitt and Bouckaert, 2003), **(iii) introducing private-sector styles of management practises** (Hood, 1991; Osborne and Gaebler, 1992), **(iv) replacing input control by output control** (Hood, 1991; Dunleavy and Hodd, 1994; Osborne and Gaebler, 1992), **(v) decentralization** (Pollitt, 1993,1994; Ferlie *et al*, 1996; Osborne and Gaebler, 1992; Kettl, 2000) , **(vi) disaggregating centralized bureaucracies into agencies** (Pollitt, 1993,2007a), **(vii) outsourcing** (Kettl, 2000; Pollitt, 2007a; OECD, 2010), **(viii) separating purchaser/provider** (Pollitt, 1993, 2007a), **(ix) customer orientation** (Osborne and Gaebler, 1992; Pollitt, 1993; Borins, 1994; Kettl, 2000) and **(x) separating political decision-making from the direct management of public services** (Osborne and McLaughlin, 2002). To organise these practices, they can be grouped into three overall categories: market-type mechanisms, which refers to the increasing use of markets and competition in the provision of public services; managerialism or managerial improvement and organizational restructuring; and customer orientation. Table 1 visualizes the ten practices and three policy areas supported by selected authors.

Quantifying NPM / outsourcing and decentralization

Our aim is to determine whether NPM-style reforms rendered the public sector smaller. Clearly, a full-scale, comprehensive response would require, at least, quantification of all the ten major practices associated with NPM. The problem here, as noted by the OECD (2010, p.22) is two-fold. Firstly, some of the NPM-related policies are difficult, if not impossible, to quantify. Take, for instance, the question of public sector league tables. Assembling a league table of the public sector would be controversial enough in one country, but would cause an outcry if implemented at a regional or international level, as each government would state the purpose of its public sector differed to that of its peers, making comparison futile. For many of the other policies, the main problem is the lack of data. For instance, it would be interesting to quantify the effect of the use of “performance related pay”, “performance budgeting”, or “agentification”. The

Table 1: Main NPM components and key authors

Topic	NPM component	Authors
Market-type mechanisms	Shift to greater competition in the public sector	Hood, 1991 Dunleavy and Hood, 1994
	Outsourcing	Osborne and Gaebler, 1992
	Performance related pay	Borins, 1994
	Competitive tendering	Pollitt, 2007a
	Public sector league tables	
Managerialism	Decentralizing	Hood, 1991
	Hands on professional management	Dunleavy and Hood, 1994 Osborne and Gaebler, 1992
	Purchaser/provider split	Pollitt, 1993, 2007a
	Output control	Ferlie et al, 1996
	Disaggregation of organizational forms	Kettl, 2000
Customer orientation	Improve service quality	Pollitt, 1993, 1995, 2007
	Use of service Charters	Borins, 1994 Ferlie et al, 1996 Kettl, 2000

Source: Authors

problem is that, currently, there is only limited available data for short periods of time, such a couple of years (see OECD, 2009, 2011). Unfortunately, therefore, this prohibits the use of assessing temporal patterns or using panel data or time series methods to analyze the effect of the reforms. For these reasons, we have selected to use just two major practices, associated with NPM: outsourcing and decentralization. This is justified by the fact that, firstly, reliable, high-quality data is available on both and, secondly, because, according to a body of theoretical literature, both these practices may affect public sector size.

Government outsourcing can be defined as the delivery of public services by agents other than government employees (Minicucci and Donahue, 2004). Governments can outsource the provision of public services in two main ways: they can either purchase goods and services from the private sector or non-governmental organizations in order to include them in their own production chain (termed in the *System of National Accounts* (SNA) “intermediate consumption”), or they can hire a company to directly provide public goods and services to the final consumer or citizen, termed in the SNA “social transfers in kind via market producers” (OECD, 2011).

Outsourcing public service delivery has become commonplace across most EU countries. Despite its prevalence, there is still a lack of consensus in the theoretical literature as to whether or when this will result in government savings (for a comprehensive overview, see Jensen and Stonecash, 2005). Many of those promoting outsourcing were influenced by the public choice

literature. This theory critiques the former arrangements for providing public services by governments because it assumes that politicians and government bureaucrats behave according to the typical neoclassical individual (Niskanen, 1971), who seek to maximize his or her profit and personal interests whilst neglecting the citizens they purportedly serve. As a result, public services will be over-supplied, since politicians and bureaucrats use their provision as a tool to maximise their own individual personal utility or political power (Savas, 1987). To avoid such a situation, it is argued, outsourcing is a highly effective policy instrument to reduce public sector expenditure and employees, whilst also improving government efficiency. Outsourcing forces activities previously guarded in-house by bureaucrats are subjected to new, positive incentives provided by market discipline (see Osborne and Gaebler, 1992, and Kettl 2000, among others). Competition amongst potential public service suppliers will reduce costs and increase efficiencies, whilst eliminating public service provision of political interference (Jensen and Stonecash, 2005). Thus, in consequence, we would expect that outsourcing reduces costs for government whilst, and diminishes the resources upon which bureaucracy can expand. Our first hypothesis is: *outsourcing policies lead to a reduction in public expenditure and public employees.*

As an aside, it is important to note that a body of scholars have pointed out that, even if outsourcing produces cost savings, it is of vital importance to detect where these savings have been made. If outsourcing leads to savings due to a deterioration of working conditions (Quiggin, 2002) and / or a reduction in the quality of the service provided to citizens (Hart et al, 1997), which may lead in turn to a negative consequence for social welfare, this should be pointed out as such, and not confused with efficiency improvements (for further discussion on this topic see Jensen and Stonecash, 2005).

Skepticism about the consequences of outsourcing on public sector size has been expressed by scholars using the lens of transaction costs economics. Ronald Coase (1937) is credited with first introducing the transaction cost concept to economic theory, which was later developed by Oliver Williamson (1979, 1989, 1998). According to Coase, transaction costs are those costs associated with the calculation and utilization of market pricing mechanisms, that is, the costs incurred by an organization when, instead of using their own resources, it goes to the market. Hence, contracting costs, such as asymmetric information, and the management and supervision of contracts, may eventually outweigh the cost advantages first expected when outsourcing. In his examination of public bureaucracy, Williamson (1999) pointed out that public bureaucracy is better suited to some transactions and poorly suited to others depending on a range of circumstances. In contrast to the public choice school, therefore, Williams claims that public bureaucracy may be well advised to continue the direct provision of some goods and services. Warner and Hefetz (2008) stress that many public services are activities where markets are not competitive or markets do not exist, so transaction costs particularly high. Hence, *Hypothesis two claims that the outsourcing of public services does not necessarily entail a reduction in*

public spending due to high transaction costs associated with market imperfections.

Following from this, some authors have suggested that, even if outsourcing is associated with a reduction in public sector expenditure in the first instance, over the long-term, these positive effects may be reversed due to the dynamic nature of contractual relationships between governments and those private companies which provide the outsourced services. The potential cost savings from outsourcing may diminish or disappear over time by rising prices of the private sector companies (Williamson, 1979; Schmalensee, 1979). Due to the complexity of anticipating every possible contingency when drafting a contract between the government and the private sector, and the high associated costs, if an unforeseen event occurs, governments may be in the position of having to renegotiate the initial contract. The private sector companies - with their incentives to maximize profits - may thus increase the price they charge to the government for the provision to citizens of certain services during the course of this renegotiation. This phenomenon is referred to in the literature as “hold-up” (Jensen and Stonecash, 2005). Thus, it is possible that *even if outsourcing reduces expenditures in the short term, in the long-run this effect is negligible or even opposite, increasing government spending (third hypothesis).*

The fourth and fifth hypotheses refer to decentralization. Decentralization is a very broad concept that has been defined by different scholars in a variety of ways. In this paper, we follow Falletti (2005, p. 328), who defines decentralization as a process or reform consisting of a number of public policies that transfer responsibility, resources or authority from a higher to a lower level of government. Depending the type of authority devolved, there are three types of decentralization: administrative, fiscal and political (Falletti, 2005; Schneider, 2003; Treisman, 2007).

Administrative decentralization involves the transferring autonomy for the provision of certain public services to lower levels of government. The lower level assumes autonomy for public policy management, personnel control and control over public finances (Rondinelli *et al*, 1984). Fiscal decentralization refers to transferring down fiscal autonomy to sub-national levels of government (Schneider, 2003; Falletti, 2005), while political decentralization means transferring political authority or electoral power to sub-national actors (Falletti, 2005; Pollitt, 2007b). In this paper, we focus on the effects of two types of decentralization mentioned: administrative and fiscal ⁶.

Scholars have intensely debated the advantages and disadvantages of decentralization. The NPM doctrine, with its focus on government savings, efficiency, effectiveness and customer orientation, saw decentralization as an essential practice in its tool kit in its quest to render government more efficient and effective (Osborne and Gaebler, 1992). NPM advocates, again influenced by public choice, argued that administrative decentralization would facilitate the pro-

⁶Although the effect of political decentralization would also be interesting to quantify, the available indicators for its measurement are time invariant so cannot therefore be included in our model.

vision of public goods and services from different levels of government, making it more likely that citizens' needs would be known and satisfied, whilst rendering these bureaucrats more directly accountable to citizens (Treisman, 2007). Red tape could be diminished, coordination and control could be enhanced (Tullock, 1965; Downs, 1967; Niskanen, 1971) and, as a consequence, costs would be lowered (Brennan and Buchanan, 1980).

Similarly, scholars argued that fiscal decentralization led to greater efficiency and a smaller public sector (Tiebout, 1956; Oates, 1972). One of the most extreme exponents of this is perhaps the Brennan and Buchanan Leviathan model (1980). According to Tiebout (1956), the closer the provision of public goods to each citizen's preferences, the higher the public or social welfare. This is because fiscal autonomy leads to greater territorial competition that limits public sector growth whilst increasing efficiency. According to Brennan and Buchanan (1980), the decentralization of expenses (revenues) can create a "market-like solution", limiting the taxing power of the different government levels. Moreover, in line with the Tiebout model, individuals seeking to maximize their tax benefits can generate competitive behaviour between jurisdictions, which will encourage more efficient production of public goods and services, restricting the growth of sub-national governments and therefore the aggregate public sector. Based on these theories, *the fourth hypothesis argues that the greater the degree of decentralization, the lower the cost incurred by governments.*

Finally, in contrast, scholars such as Prud'homme (1995), argued that, although the effect of economies of scale in the provision of local public services may appear minimal, economies of scope may exist. Central bureaucratic providers may be more efficient than local ones, primarily due to their greater investment capacity in technology, research, development, promotion and innovation. Moreover, Prud'homme observed that because national government bureaucracies are more likely to offer good careers and better promotion opportunities, they tend to attract more qualified staff, to the detriment of sub-national governments. This may also dilute the potential benefits of decentralization. Likewise, decentralization can lead to a loss of coordination between different levels of government, not only in relation to policies but also to programs (Peters and Savoie, 1996), with the associated costs that a lack of coordination can produce. Furthermore, from a fiscal standpoint, if decentralization is based on intergovernmental transfers and not in a meaningful transfer of fiscal autonomy, such a decentralization can significantly increase the costs of sub-national government (Oates, 1985), which may result in the so-called "problem of the commons", arising when there is disconnection between public service beneficiaries and who pays for them, that is, revenues remain centralized while expenditures are decentralized (Jin and Zou, 2002). *Hypothesis five claims that the greater the degree of decentralization, the greater the expenses incurred by governments.*

3 Empirical analysis

The five hypotheses are tested using panel data techniques. The use of panel data techniques instead of a country-by-country analysis is justified by the advantages of using these techniques over the pure time series method. As a brief summary, Hsiao (2003) lists several benefits of this method including: the control for individual heterogeneity, obtaining higher quality data, greater freedom and more efficiency. A particularly important advantage is that panel data techniques facilitate the identification and measurement of effects that are not always detectable using pure time series data. Our empirical analysis aims to evaluate the short and long-run relationships between the variables measuring the NPM-style reforms and two independent variables measuring public sector size at the general government level (expenditure and public employment). We attempt to examine the combined short and long-run dynamics of those relationships.

3.1 Econometric specification

The first single-equation model is formulated from a variable relative to the size of the public sector which depends on a linear combination of a number of explanatory variables, the basic model to estimate being the following two-way error component regression model:

$$y_{it} = \alpha + \beta_1 NPM_{it} + \beta_2 Z_{it} + \nu_{it} \quad (1)$$

$$\nu_{it} = \mu_i + \delta_t + \epsilon_{it}$$

where y_{it} is a measure of the public sector size in country i at time t , α is an scalar, NPM_{it} is the it th observation on K New Public Management indicators⁷, Z_{it} the it th observation on P control variables, β_1, β_2 , are the $K \times 1$ and $P \times 1$ coefficients vectors respectively, μ_i denotes the unobservable country specific effect, δ_t represents the unobservable specific time effect (common to all countries) and ϵ_{it} the remainder stochastic disturbance term.

We can derive different models according to different assumptions about the unobserved country and time effects. Assuming that all μ_i and δ_t are equal, we have the Pooled Ordinary Least Squares (POLS) model. Allowing μ_i and δ_t to differ, but assuming they are fixed numbers, we have the Fixed Effects (FE), as called the Least Square Dummy Variable (LSDV) model. It is important to note that by introducing country and time specific variables into the model specification it is possible to reduce or avoid the omitted-variable bias (Hsiao, 2003). Finally, assuming that both unobserved effects are random variables we have the Random Effects (RE) model.

⁷Outsourcing and decentralization.

Our analysis covers the period from 1980 to 2010, so having a moderately large T implies that we should be concerned with non-stationary time series that define the panel data, because using non-stationary variables implies it is possible to engage in spurious relationships. Kao (1999) examined the spurious regression in panel data, showing that the Least Squares Dummy Variable (LSDV) estimator is consistent for its true value but not the t-statistic, so inference about the regression coefficients could be incorrect. Following Wooldridge (2003,p.447), when T is large and N small (less than 20) and we suspect non-stationarity problems in our data, the use of first differences is a good way to avoid the problems signalled by Kao(1999). Taking first differences on equation (1) we get:

$$\Delta y_{it} = \beta_1 \Delta NPM_{it} + \beta_2 \Delta Z_{it} + \Delta \delta_t + \Delta \epsilon_{it} \quad (2)$$

This transformation should convert our suspected non-stationary variables in stationary ones (if they are I(1)) and eliminates the country fixed effect μ_i . Model (2) can be estimated with a LSDV estimator including fixed time effects to control for common or cyclical trends in government expenditures. Homoskedasticity and no serial correlation are critical assumptions to obtain unbiased standard errors estimates of the true parameters of our model so, if we detect heteroskedasticity or autocorrelation, we will use a Feasible Generalized Least Squares (FGLS) estimator or a LSDV estimator with panel corrected standard errors (PCSE).

Once we have analyzed the short-term effects of our variables under analysis we will turn to long-term effects. To estimate the long-run relationship, the literature proposes different estimators including POLS, Fully Modified Ordinary Least Squares (FMOLS) or Dynamic Ordinary Least Squares (DOLS). Although for a single equation, POLS is a consistent estimator of the cointegrating vector, it has a non-negligible bias in finite samples (Kao and Chiang, 2000). To overcome this problem, Phillips and Moon (1999) and Pedroni (2000) proposed the FMOLS estimator, while Kao and Chiang(2000) proposed an alternative approach based on a DOLS estimator (Baltagi, 2008). Kao and Chiang also examined the properties of FMOLS in relation to DOLS, proving that the DOLS estimator is preferable over FMOLS. Moreover, Mark and Sul (2003) proved that time and country specific effects could be include in the panel DOLS regression without affecting the asymptotic variance of the estimator. Due to the advantages previously mentioned of the DOLS estimator and its simpler computation we will use the DOLS technique. Let us consider our long-run regression as follows:

$$\begin{aligned} y_{it} &= \mu_i + \delta_t + \gamma X_{it} + \epsilon_{it} \\ X_{it} &= X_{it-1} + v_{it} \end{aligned} \quad (3)$$

where X_{it} is the it th observation of L cointegrated regressors and ϵ_{it} and v_{it} are stationary error terms. The DOLS estimator is based on the following error decomposition:

$$\epsilon_{it} = \sum_{j=-q}^q \omega_{ij} \Delta X_{it-j} + \varphi_{it} \quad (4)$$

where q represents the number of leads and lags and φ_{it} is a stationary error term. Combining equations (3) and (4) we get:

$$y_{it} = \mu_i + \delta_t + \gamma X_{it} + \sum_{j=-q}^q \omega_{ij} \Delta X_{it-j} + \varphi_{it} \quad (5)$$

where the panel DOLS estimator of γ are our long-run coefficients of interest which, according to Mark and Sul (2003), are consistent and normally distributed in the limit, so hypothesis testing can be conducted as usual.

In addition, to assess properly the effects of different types of NPM reforms, we perform a combined short and long-run analysis. Thus, we convert model (1) into an autoregressive distributive lag (ARDL) dynamic panel specification of the form:

$$y_{it} = \lambda y_{i,t-1} + \beta_1 NPM_{it} + \beta_2 NPM_{i,t-1} + \beta_3 Z_{it} + \beta_3 Z_{i,t-1} + \mu_i + \delta_t + \epsilon_{it} \quad (6)$$

To analyze short and long-run effects we can specify an error correction model (ECM). The error correction reparameterization of (6) is:

$$\Delta y_{it} = \Delta \theta_1 NPM_{it} + \Delta \theta_2 Z_{it} + ecm_{t-1} + \delta_t + \epsilon_{it} \quad (7)$$

$$ecm_{t-1} = \phi(y_{i,t-1} - \gamma X_{i,t-1}) \quad (8)$$

where ecm_{t-1} is the error correction term, $X_{i,t-1}$ is the it -1th observation of L cointegrated regressors, ϕ is the error correction speed of adjustment and γ is the $L \times 1$ vector of long run parameters, which are of primary interest. Our approach to estimate this model is similar to the one followed by Ashworth *et al* (2007), through an Engle-Granger two-step procedure. Firstly, we can assess the long-run effects by estimating the cointegrating vector, next we include the lagged residuals as the error correction term in (7) to assess how the short-run relationship varies from the long-run one.

3.2 The data

We use in this paper an unbalanced panel data of 18 European countries⁸ from 1980 to 2010, and classified the main variables into three categories: public sector size indicators, NPM indicators and control variables. The following is a description of the variables used in the analysis and table 13. Appendix A sets out the data sources and descriptive statistics.

Public sector size

The aim of this paper is to analyze the NPM effects on government expenditure and public sector employment. Our first dependent variable is an aggregate indicator of general government expenses (EXP), which consists of the ratio of total general government expenses as a share of Gross Domestic Product (GDP), while our second dependent variable, public sector employment, is measured using the ratio public administration and defence employees (Group L of the ISIC classification) as a share of total population (PADMIN). This proxy is used instead of the amount of public employees for two reasons: first, because the analysis of government efficiency regarding administrative employment is a point of major interest (OECD, 2010) and second, due to the lack of cross-country comparable data on public sector employment⁹.

NPM indicators

Our analysis is focused on two NPM-related elements, outsourcing and decentralization (both fiscal and administrative). A measure for government outsourcing (OUTS) is the sum of intermediate consumption plus social transfers in kind via market producers¹⁰ (OECD, 2011) as a share of final government consumption. Fiscal decentralization is measured in this paper as the share of sub-national public expenditure in consolidated national public expenditures¹¹, named here expenditure decentralization (EXPDEC). The use of this indicator is very common in the literature, but it is not exempt from criticism. Stegarescu (2005) pointed out that the measure of expenditure decentralization often tends to overestimate the degree of decentralization in most countries, since this does not take into account the degree of fiscal autonomy of sub-national levels of government, which could bias our results. To partly overcome this problem, we omit from our indicator all transfers between levels of government and Social Security

⁸When analyzing the effects of NPM reforms on administrative public employment we have excluded Austria and the United Kingdom due to lack of comparable data.

⁹Currently, the International Labour Organization (ILO) and the OECD are working to construct a joint database on public employment and finance, but this will not be available until the end of 2011, as discussed during the Public Finance and Employment Database experts' committee held in July 2011 at the OECD, Paris.

¹⁰Social transfers in kind via market producers consist of individual goods and services provided as transfers in kind to individual households by government units, purchased on the market.

¹¹Excluding transfers between levels of government and Social Security funds.

funds. To measure administrative decentralization, we include in our regressions two indicators; public employment decentralization (EMPDEC) and a measure of sub-national autonomy (AUT). Public employment decentralization is measured as the share of sub-national compensation of public employees in compensation of general government employees. The use of the compensation of public employees as a proxy instead of the real number of public employees is justified by the fact that there is not sufficient available cross-country comparable data on the number of civil servants at different levels of government, as pointed in the previous subsection. Sub-national autonomy is measured as the percentage of total sub-national revenues not accounted for by transfers (see Schneider, 2003), ie the share of central government transfers to state and local governments in the total sub-national government revenues. It should be noted that the simple correlation coefficient between the expenditure decentralization and the decentralization of public employment indicators is high and statistically significant¹², so we do not include them simultaneously in the regressions to avoid multi-collinearity problems.

Control variables

Following the fiscal federalism literature (Levine and Renelt,1992; Rodden, 2003; Fiva,2006; Cassette and Paty, 2010), which traditionally has been concerned about the effect of certain policies on the size of public sector, we also include in our model a set of control variables which could affect government expenditure: two macrovariables; GDP per capita (GDPCAP) and the unemployment rate (UNEMP); and two demographic variables, population density (DENS) and the old-age dependency ratio (POP65), which is the population over 65 years old as a share of the population between 15 and 64 years old. The first two control variables, GDP per capita and unemployment rate, can be used to identify the economic cycle, while the other two should be positively associated with government expenditure, unless there are economies of scale, in which case the coefficient associated with the population density ratio should be negative. Different authors propose the inclusion of additional control variables, such as degree of trade openness (Rodrick, 1998), rural population versus urban population (Fiva, 2006), political variables (Rodden, 2003; Fiva, 2006) and self-employed population (Cassette and Paty, 2010). Due to the contradictory results found in previous studies about the statistical significance and relevance of some of these variables, we decided not to include in our models more control variables than those mentioned to avoid losing degrees of freedom and time periods.

As a corollary to this subsection, we must not overlook two important limitations of the data. The first is the use of GDP as the denominator in the public expenditure indicator, because the evolution of this ratio may be strongly influenced by changes in GDP. The second is the limited time series dimension in the case of some countries, which may introduce some bias into our

¹²See table 14 on Appendix A.

results in the long-term analysis.

3.3 Government outlays, outsourcing and decentralization trends

Government outlays and administrative public employment

Here we examine the evolution of our first variable of interest, the share of general government expenses in GDP (see table 2 and figure 1 in Appendix B). For 7 countries (Austria, Belgium, Finland, France, Italy, the Netherlands and the UK) our data is complete, stretching across 1980-2010 whilst, between 1990-2010, we have data for 11 countries and between 1995-2010 for all 18. Looking at this group of 7 countries, three were first-movers to cut outlays: the Netherlands (11 % from 1980-2000), the UK (8.5 %) and Belgium (over 7 %). Austria, Finland, France and Italy continued to grow at that time. Across the period 1985-2010, these first-movers saw sustained reductions: Netherlands (13 %), Belgium (11 %) and the UK (nearly 10 %), whilst Austria, France and Italy reduced expenditure only by small % ages, and outlays in Finland grew slightly. Looking now at the 18 countries across 1995 to 2010, we can see that all countries, except Greece, reduced outlays from 1995 to 2000. Greatest reductions occurred in: Finland, the Netherlands, Sweden, Ireland, Germany, Hungary and Norway. However, between 2000 and 2010, outlays grew in all countries except Sweden, led by Ireland, at nearly 36 %, followed by the UK (nearly 12 %) and Portugal (nearly 10 %).

Table 2: General government outlays

Country	1980	1985	1990	1995	2000	2005	2010
Austria	50.00	53.50	51.50	56.50	52.20	50.30	53.00
Belgium	56.50	60.10	53.80	52.20	49.10	52.30	53.10
Germany				54.80	45.10	46.80	46.60
Denmark			55.40	59.30	53.70	52.80	58.20
Estonia				41.30	36.10	33.60	40.00
Spain				44.40	39.10	38.40	45.00
Finland	40.20	46.50	48.20	61.40	48.30	50.20	55.10
France	45.70	51.80	49.50	54.40	51.60	53.40	56.20
Greece				45.70	46.70	44.00	49.50
Hungary				55.70	46.80	50.20	50.30
Ireland				41.10	31.30	34.00	67.00
Italy	40.80	49.80	52.90	52.50	46.20	48.20	48.90
Luxembourg			43.20	39.70	37.60	41.50	41.20
Netherlands	55.20	57.30	54.90	56.40	44.20	44.80	51.20
Norway			53.30	50.90	42.30	42.10	45.90
Portugal				41.50	41.10	45.80	50.70
Sweden				64.90	55.10	53.90	53.00
UK	47.60	48.70	41.10	43.90	39.10	44.10	50.90

Source: Eurostat

Notes: Government expenditure is measured as the share of general government expenses to GDP.

As regards public administration and defence employment, data includes 5 countries from 1980 to 2009, 6 from 1990-2009, 14 from 1995-2009 and 16 from 2000-9. Of this first group of 5 countries, employment fell across this period except in Finland. Across the period 1995 to 2009, employment fell in all countries except for Ireland and Estonia¹³(see table 3 and figure 2 in Appendix B).

Table 3: Public administration employees

Country	1980	1985	1990	1995	2000	2005	2009
Belgium				11.6	11.4	11.8	11.6
Germany				8.9	8.1	7.7	7.4
Denmark	7.2	7.4	6.9	7.4	6.5	6.3	5.8
Estonia				6.4	7.1	7.1	7.4
Spain				10.7	9.1	8.1	8.6
Finland	7.3	7.6	7.6	8.8	8.2	8.3	7.9
France			10.7	11.2	10.6	10.3	
Greece					14	13.6	13.7
Hungary				8.5	8.6	8.3	8.3
Ireland					5.7	5.7	6.3
Italy	8.4	9	9.2	9.3	8.7	7.6	7
Luxembourg				5.9	5.6	5.9	5.5
Netherlands	9.3	10	9.1	7.9	6.9	7	6.6
Norway	8.5	8.9	9.2	8.9	7.6	6.8	6.7
Portugal				8.4	8.3	8.7	
Sweden				7.9	6.8	6.1	5.8

Source: Eurostat

Notes: *Public Administration Employees* reports the ratio between general government public administration and defence employees and the total population.

Outsourcing

Table 4 and figure 3 in Appendix C show the main trends related to government outsourcing. Data is available for 10 countries from 1980 to 2010, 14 countries from 1990 and all 18 from 1995 onwards. Of the group of 10 countries, the rate of outsourcing increased in all countries, led by the Netherlands, Finland, Portugal, the UK, Germany and Belgium. Between 1995 and 2010, outsourcing increased across all countries - except Estonia and Norway - at an average of 4.6 %age points reaching an average ratio of 48.61% of final government consumption. The weight of final government consumption varied considerably, ranging from nearly 32% in Greece to nearly 69% in the Netherlands. Countries with the highest outsourcing ratios in 2010 were: the Netherlands, Germany, Finland, UK, Belgium and Luxembourg, with ratios above 50% of the final government consumption, whilst Greece and Denmark had the lowest ratios, below 40%.

¹³There is only available 2010 data for Denmark, Luxembourg and Norway, so we do not include 2010 in the discussion.

Table 4: Government outsourcing trends

Country	1980	1985	1990	1995	2000	2005	2010
Austria	46.42	46.27	47.33	49.26	52.14	52.45	52.78
Belgium	38.38	40.92	41.56	42.28	44.44	47.24	49.22
Germany	54.02	55.84	56.74	58.91	60.05	62.64	65.85
Denmark	31.95	30.73	32.26	35.36	36.16	38.44	39.68
Estonia				50.23	49.62	47.85	44.75
Spain				36.61	38.66	41.89	40.73
Finland	39.80	39.68	40.44	44.40	46.35	50.25	55.80
France	40.93	42.68	44.48	43.68	44.24	45.44	47.28
Greece			23.35	31.54	36.17	30.96	31.79
Hungary				44.52	43.65	42.76	48.82
Ireland		45.53	42.34	42.20	45.08	41.13	42.62
Italy	33.23	36.77	37.62	37.59	39.77	40.86	41.69
Luxembourg			40.36	46.19	48.63	51.35	52.31
Netherlands	42.19	49.34	55.05	58.97	61.46	63.97	68.62
Norway			43.38	43.07	41.59	42.05	41.54
Portugal	32.48	29.98	27.07	32.83	33.07	36.99	46.69
Sweden				47.61	45.78	44.97	48.30
UK	43.62	46.36	41.97	47.01	50.97	53.55	56.55

Source: Eurostat

Note: Government outsourcing is measured as the share of general government intermediate consumption plus social transfers in kind via market producers on final general government consumption.

Decentralization

The key decentralization explanatory variables for our empirical analysis are EXPDEC, EMPDEC y AUT, as discussed in subsection 3.2. Regarding to the expenditure decentralization Data is available for 5 countries 1980-2010, 9 countries 1990-2010, 17 countries from 1995 and all 18 from 2000(see table 5 and figure 4 in Appendix C). Looking at this group of 5 countries, decentralization grew strongly only in Belgium from the 1990s onwards, mainly as result of the federalization of this country, but remained relatively stable in Finland, Italy, the Netherlands and Portugal. Turning to the group of 17 countries, increased ratios of expenditure decentralization between 1995 and 2010 were found in Spain (nearly 23 %), Italy (nearly 12 %), Sweden, Denmark and Finland, at around 10 %. Smaller increases were found in Belgium, Germany, France, Greece, Hungary, Portugal and the UK whilst reversals of decentralization occurred in Ireland (23 %) and the Netherlands (nearly 11 %) and, to a lesser extent, Luxembourg, Estonia and Austria.

Table 6 shows data on the ratio of public employment decentralization while figure 5 in Appendix C shows the main trends. The evolution of public employment decentralization mirrors closely that of expenditure decentralization, which is unsurprising, given the high degree of correlation found between the two variables. Data includes 7 countries from 1980 to 2010, 13 from 1990 and 18 from 1995. As seen in expenditure decentralization, of the first group of 7 countries, only Belgium witnesses a dramatic increase in administrative decentralization,

occurring largely early on, during the 1980s. Between 1995 and 2010, Spain led the way in administrative decentralization, increasing by over 24 %. Ireland, as previously, saw the biggest reversal (nearly 28 %), followed by Norway, at nearly 14 %. Overall, the average ratio for administrative decentralization remained steady between 1995 and 2010, at around 50 %.

Table 5: Expenditure decentralization

Country	1980	1985	1990	1995	2000	2005	2010
Austria				40.46	42.47	39.41	39.89
Belgium	19.92	16.13	38.80	46.17	48.74	48.93	50.87
Germany				50.83	65.51	58.53	57.57
Denmark			53.62	54.00	57.93	62.92	63.53
Estonia				27.71	24.75	29.86	26.62
Spain				42.16	52.69	67.58	64.92
Finland	50.48	51.69	52.38	40.67	45.07	48.92	50.90
France				29.82	31.70	34.18	36.68
Greece				5.04	6.27	7.49	6.76
Hungary				29.11	31.58	31.34	30.68
Ireland			31.46	34.32	43.01	20.41	10.92
Italy	37.75	32.34	32.36	29.84	40.60	42.94	41.54
Luxembourg			19.67	18.41	16.57	15.61	14.69
Netherlands	50.12	51.78	45.29	57.12	51.65	49.67	46.51
Norway					37.70	30.90	33.49
Portugal	13.08	11.29	14.62	13.87	16.96	16.46	14.96
Sweden				41.20	46.32	46.90	51.06
UK			28.06	26.66	29.11	28.87	27.89

Source: Eurostat

Note: Expenditure decentralization is measured as the share of sub-national government expenses in general government expenses excluding transfers and social security funds.

As regards the degree of autonomy of the countries analyzed, measured as the share of transfers in sub-national revenues (see table 7), we observe that countries with lower ratios, ie those with greater autonomy as measured here, are Austria and Germany, both of which are federal countries. The cases of Spain and Belgium are interesting because, whilst being federal countries, the degree of autonomy of decentral units as measured by this indicator is not very high; indeed, Belgium's shares is actually higher than the average of the 18 countries. This may indicate that, in this case, revenues of regions are dominated by transfers from the federal or central government. Regarding the evolution of the degree of autonomy, different patterns can be seen. On the one hand, there is a group of countries whose autonomy measured by this indicator increases between 1995 and 2010, particularly, Italy, Ireland and Austria. There is another group of countries where the autonomy of sub-central governments decreased in the same period: Norway, Denmark, France and Luxembourg. The other countries remained quite stable during this period. Figure 6 in Appendix C shows these trends.

Table 6: Public employment decentralization

Country	1980	1985	1990	1995	2000	2005	2010
Austria			54.94	54.45	51.48	45.78	45.39
Belgium	29.79	29.20	69.40	72.47	73.80	76.01	77.05
Germany	76.41	75.76	75.65	78.41	77.88	77.53	76.80
Denmark			71.65	70.72	71.90	73.71	71.60
Estonia				34.93	28.63	41.49	38.78
Spain				53.96	66.90	76.97	78.20
Finland	66.92	68.98	69.86	71.02	71.76	72.95	73.28
France	14.65	16.74	19.15	19.77	21.76	23.33	26.33
Greece				6.67	8.09	9.15	10.33
Hungary				54.41	50.43	51.61	49.83
Ireland			40.97	43.77	50.78	16.37	15.82
Italy	37.02	37.67	36.97	40.78	41.72	41.77	42.43
Luxembourg			23.06	23.69	23.11	23.46	21.45
Netherlands	60.76	60.11	59.15	63.69	65.04	65.63	66.40
Norway			68.11	70.59	71.62	56.63	56.99
Portugal	8.93	11.00	13.65	12.30	12.58	13.80	17.40
Sweden				76.62	76.27	76.65	76.68
UK			47.84	44.10	48.18	46.10	44.38

Source: Eurostat

Note: Public employment decentralization is measured as the share of sub-national compensation of public employees in compensation of general government employees.

Table 7: Autonomy degree indicator

Country	1980	1985	1990	1995	2000	2005	2010
Austria				20.62	18.97	21.67	12.86
Belgium	53.51	49.87	56.12	54.73	56.15	50.66	50.29
Germany				9.09	8.51	8.61	9.79
Denmark			42.76	42.80	37.36	38.27	56.23
Estonia				21.00	25.28	32.34	26.69
Spain				32.66	31.60	26.64	35.21
Finland	32.20	32.62	35.28	33.25	21.38	28.22	29.52
France				28.49	25.96	27.04	38.88
Greece				55.04	57.06	58.67	56.97
Hungary				45.45	34.64	35.86	45.61
Ireland			67.46	71.25	76.30	56.91	59.44
Italy	81.00	79.19	72.64	62.16	40.35	42.24	47.22
Luxembourg			40.72	40.82	39.55	44.12	48.88
Netherlands	71.05	70.25	67.68	73.49	65.80	66.69	70.21
Norway					39.62	35.04	40.90
Portugal	65.35	54.32	38.14	31.92	35.71	35.57	33.96
Sweden				20.89	20.45	20.85	23.73
UK			63.49	72.78	68.98	70.09	71.31

Source: Eurostat

Note: Autonomy degree is measured as the share of transfers on total sub-national revenues.

4 Results

4.1 Short-term analysis

Because the time dimension of the time series used in this analysis is considerable, it is necessary to assess if they are stationary¹⁴ or not, to avoid misspecifications in the regression models. In recent years, time series methods have been applied to large T and large N panels (Baltagi, 2008). Here, we use the Levin-Lin-Chu (LLC) test, whose null hypothesis assumes a common unit root process¹⁵, the Im-Peasaran-Shin test, and the Fisher-type test of Maddala and Wu (1999) and Choi (2001) using Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) type individual unit root test, whose null hypotheses assume the existence of individual unit root processes. Table 8 reports the unit root test results. In most cases, we cannot reject the null hypothesis of the presence of unit root, the exception being the variables related to the old age dependency ratio (POP65) and population density (DENS), rejecting in both cases the null. Unit root tests were conducted for all the non-stationary variables transformed in first differences, the test indicating that the non-stationary problems are eliminated when transforming the data. In summary, we can conclude with all due caution because of the power of this type of test (see Maddala and Wu, 1999; Baltagi and Kao, 2000; Baltagi, 2008) that the presence of unit roots cannot be excluded from our data, most of our variables being $I(1)$ except for POP65 and DENS which look like $I(0)$.

Table 8: Unit root tests

Variable	LLC (t.stat)	IPS (w-stat)	Fisher-ADF (Chi-Square)	Fisher-PP (Chi-square)
EXP	0.50 (0.6923)	1.10 (0.8633)	36.51 (0.4452)	52.27 (0.0392)
P.ADMIN	-0.95 (0.1735)	0.64 (0.7380)	24.40 (0.8296)	21.54 (0.9191)
OUTS	-0.68 (0.2482)	0.80 (0.7895)	39.38 (0.3208)	26.52 (0.8756)
EMPDEC	0.33 (0.6307)	0.74 (0.7717)	28.61 (0.8049)	21.65 (0.9716)
EXPDEC	-0.47 (0.3185)	0.83 (0.7967)	32.62 (0.6299)	32.37 (0.6419)
GDPCAP	3.85 (0.9999)	0.43 (0.6679)	42.43 (0.2135)	23.84 (0.9400)
UNEMP	-2.04 (0.0207)	-1.96 (0.0251)	61.05 (0.0057)	16.32 (0.9980)
POP65	-3.29 (0.0005)	-2.50 (0.0062)	74.43 (0.0002)	39.59 (0.3127)
DENS	-4.77 (0.0000)	-1.92 (0.0272)	79.58 (0.0000)	7.96 (1.0000)

Note: P-values reported in parentheses. Unit root tests computed with Eviews 6, including in all cases an individual intercept and trend, user specified lags at 1. Newey-West bandwidth selection using Bartlett kernel.

Due to the detected non-stationarity of most of our variables, the first step to attempt to test

¹⁴A stationary process is a time series process where the marginal and all joint distributions are invariant across time (Wooldridge, 2003).

¹⁵A unit root process is a highly persistent time series process where the current value equals last periods value, plus a weakly dependent disturbance(Wooldridge, 2003).

the proposed hypotheses is to analyze the static model by estimating equation (2). To analyze the static effect of NPM-style reforms on government outlays we estimate two different specifications of equation (2): (i) uses general government expenditures as the dependent variable and (ii) uses the public employment indicator as a dependent variable.

We now examine which of the estimators is most appropriate. We run a F test to determine the joint significance of the temporal dummies in our model. In both cases we reject the null hypothesis that all the unobserved time effects are equal, suggesting that POLS estimates are not accurate. Using the Hausman test, we reject in all cases the null hypothesis that the regressors and effects are uncorrelated. As this result suggests that the random effects estimator is inconsistent, we use the fixed effects estimator (LSDV) to estimate equation (2). We cannot reject the null hypothesis of no autocorrelation at a significance level of 1 % using the Wooldridge test (2002) in both specifications, ie (i) and (ii). We also reject in both cases the hypothesis of homoscedasticity using the modified Wald test for group-wise heteroskedasticity in fixed effect regression model. Based on these tests we use both, a LSDV estimator with panel-corrected standard errors (PCSE), and the FGLS estimator, to check our results' robustness¹⁶. Estimation results are reported in table 9.

What is the impact of the variables of interest? Our empirical results are ambiguous regarding the effect on government outlays of the NPM-style reforms analyzed. With respect to the impact of outsourcing, the positive (and statistically significant) correlation between the outsourcing and the public expenditure ratio could indicate that the outsourcing of public service delivery to private or non-profit sectors did not end up translating into a most cost-effective provision of public services. This would seem to confirm the second hypothesis, that outsourcing does not necessarily lead to reductions in public expenditure because of the existence of transaction costs. Theoretically, according to Hypothesis 1, an increase in outsourcing should lead to fewer public employees; however, we found that there was a negative and not statistically significant relationship between public employment and the outsourcing ratio, again, providing evidence for hypothesis 2.¹⁷

Turning now to decentralization, we find no significant evidence of a short-term relationship between expenditure decentralization and public employment, both effects being negative but statistically not different from zero. We do not find, therefore, empirical evidence to support

¹⁶There has been some discussion about which estimator is preferred (see Beck and Katz, (1995) and Chen, Lin and Reed (2010)). Both are acceptable estimators given the panel-heteroskedasticity assumption. If the assumption holds, FGLS estimates are more efficient and should be preferred over PCSE. If the assumption is not true, FGLS will be inefficient and standard errors will be incorrect. PCSE estimates are, in both cases, consistent but never fully efficient. However, because the PCSE estimator is considered the most "conservative" approach in finite samples, we will restrict our discussions to those results obtained using it. Moreover, the results of both estimates are very similar in all cases which may indicate the robustness of our results.

¹⁷It should be noted here that this result may be highly influenced by the proxy used to measure public sector employment, group L of the ISIC classification, which includes employment in the public administration and defense, but not in public enterprises.

either hypothesis 4 or 5.

Taking the public employment decentralization ratio as an indicator for administrative decentralization, we find a negative and statistically significant effect on government expenditure. Although the value of the coefficient associated with our variable of interest is not very high, there is evidence confirming the fourth hypothesis which predicts that decentralization will reduce costs. Once more, as occurred in the case of the ratio of expenditure decentralization, no significant evidence of a short-run relationship between public employment decentralization and public employment is found, the effect is statistically not different from zero. Finally, consistent with previous results, the variable measuring the degree of autonomy of sub-central governments has a statistically significant positive effect on government spending, so that the lower the autonomy of sub-central governments, the higher is aggregate government expenditure. This would seem to confirm again the fourth hypothesis in relation to administrative decentralization. The effect of the degree of autonomy of sub-central governments in the number of employees appears to be statistically insignificant.

What is the effect of our control variables? In line with previous studies, the unemployment rate has a positive and statistically significant correlation with the increase of public expenditure and public employees. An increase in the rate of unemployment tends to lead to increased spending on passive and active employment policies which may generate more public expenditure and public employment respectively. These results suggest a counter-cyclical public expending policy pattern may exist. GDP per capita is negatively correlated with public expenditures but is not statistically significant. However, this result may be a statistical artifact due to the presence of GDP in the denominator of the dependent variable in the numerator of the GDP per capita ratio. While the influence of GDP per capita is not particularly relevant in this research, it could bias other results. For this reason, we conducted some robustness tests, to exclude this variable from our estimates¹⁸. The results of these tests confirm that our variables of interest are not affected by the presence of GDP per capita ratio. Regarding the demographic variables, the results indicate that the population density ratio is not significant, while the old age dependency ratio has a significant positive effect on public sector size and the amount of public employees.

¹⁸Not reported. Available on request from authors.

Table 9: *New Public Management* and Government Outlays. First differences model estimates.

Explanatory variables	(i) Government expenditure ΔEXP				(ii) Public employment $\Delta PADMIN$			
	PCSE	FGLS	PCSE	FGLS	PCSE	FGLS	PCSE	FGLS
$\Delta OUTS$	.2307** (.0924)	.1867** (.0785)	.2505*** (.0935)	.2010** (.0805)	-.0245 (.0183)	-.0127 (.0133)	-.0275 (.0188)	-.0173 (.0134)
$\Delta EXPDEC$	-.2366*** (.0336)	-.2291*** (.0381)			.0016 (.0045)	.0012 (.0042)		
$\Delta EMPDEC$			-.0571* (.0323)	-.0643* (.0331)			.0061 (.0042)	.0078* (.0039)
ΔAUT	.0941*** (.0290)	.0597** (.0282)	.0386 (.0304)	.0578** (.0289)	-.0042 (.0044)	-.0033 (.0040)	-.0058 (.0045)	-.0058 (.0040)
$\Delta GDPCAP$	-.0000 (.0000)	-.0000 (.0000)	-.0000 (.0000)	-.0000 (.0000)	.0000 (.0000)	.0000 (.0000)	.0000 (.0001)	.0000 (.0000)
$\Delta UNEMP$	.2762** (.1165)	.1737** (.0890)	.3449*** (.1190)	.2423*** (.0845)	.0686*** (.0121)	.0738*** (.0115)	.0687*** (.0120)	.0742*** (.0114)
$\Delta POP65$	.5078* (.3062)	.4235 (.3064)	.4678* (.2807)	.4594 (.3261)	.0866** (.0398)	.0183 (.0399)	.0810** (.0382)	.0157 (.0394)
$\Delta DENS$	.0352 (.0657)	.1407 (.1073)	.0345 (.0711)	.0901 (.1058)	-.0080 (.0156)	-.0118 (.0118)	-.0080 (.0153)	-.0110 (.0117)
R-squared	0.46		0.41		0.40		0.40	
Wald-chi2	1493.46	427.33	1338.66	395.01	430.73	211.39	540.78	217.75
AR(1) test	0.209	0.209	0.007	0.007	1.193	1.193	1.058	1.058
Heteroskedasticity test	8716.95	8716.95	4708.97	4708.97	480.67	480.67	509.25	509.25
Number of countries	18	18	18	18	16	16	16	16
Number of observations	317	317	317	317	251	251	251	251

Notes: Period fixed effects are included in all the models (not reported). The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. AR(1) test computed after first differences estimation and heteroskedasticity tests computed after first differences-GLS estimations. Corrected standard errors reported in parentheses. Standard errors corrected for heteroskedasticity and contemporaneous correlation.

4.2 Long-run analysis

We now turn our attention to the short and long-run dynamics analysis of the relationship between the selected NPM-style reforms and government outlays and employees. In addition to the unit root test reported in table 8, cointegration¹⁹ of our I(1) variables should be verified. In the empirical literature which uses panel data, different methodologies have been applied to test for cointegration issues, the most popular cointegration tests following Pedroni (2000,2004), constructed under the null hypothesis of no cointegration²⁰. Here we use three of Pedroni's tests applying the ADF principle²¹ and the Maddala and Wu(1999) Fisher-type test (Johansen-Fisher test). Table 10 report the cointegration tests. From the results, we conclude that it seems that the public expenditure indicator and the non-stationary variables that measure NPM reforms are cointegrated²², rejecting in almost all cases the null hypothesis of no cointegration at a 5% significance level. In relation to the variable measuring public employment and our variables of interest, we find no clear evidence of cointegration²³, so the results regarding the long-term effect of outsourcing and decentralization on the amount of public employees will be discussed with caution.

We estimate the cointegrating vector, ie the long-run relationship established in equation (5), with DOLS. The basic idea behind the single equation DOLS estimator is to remove the endogeneity bias by adding lead and lags of the different explanatory variables. The choice of the appropriate number of leads and lags is not trivial, since an arbitrary choice can bias our estimates. In this paper, the choice of the number of leads and lags is based on a data dependent determination²⁴, selecting the highest order of leads and lags significant at a 10% level. According to this rule, we use three leads and three lags in specification (i), and one lead and one lag in (ii). Due to the detected heteroskedasticity and autocorrelation we use panel corrected standard errors (PCSE) to estimate equation (5).

Table 11 reports the results of the long-run relationship between the public sector size measurements and the NPM variables. We find that, in the long-run, outsourcing is positively correlated with public expenditure but this effect is not statistically significant. This tends to lend support to hypothesis three, that, in the long-run, the effects of outsourcing on public expenditures may be negligible or even positive. As regards the long-term effect of outsourcing

¹⁹Cointegration means that there is a long-term relationship between the variables. More technically, cointegration means that a linear combination of two series, each of which is integrated of order one, is integrated of order zero.

²⁰For further discussion about these types of tests see Baltagi, 2008.

²¹Wagner and Hlouskova(2007) proved that ADF Pedroni's test perform better than non-ADF Pedroni's tests.

²²We do not report the tests with the autonomy index (AUT) because we do not find any evidence of cointegration when including the autonomy indicator, thus we do not include AUT in our long-run estimations.

²³The null of no cointegration is not rejected in five out of six Pedroni ADF test for OUTS, EXPDEC and four out of six Pedroni tests for OUTS, EMPDEC.

²⁴See Westerlund (2003) for further discussion.

Table 10: Cointegration tests

Explanatory variables	(i) Government expenditure <i>EXP</i>		(ii) Public employment <i>PADMIN</i>	
	<i>OUTS,EXPDEC</i>	<i>OUTS,EMPDEC</i>	<i>OUTS,EXPDEC</i>	<i>OUTS,EMPDEC</i>
Pedroni Panel ADF stat. ^a	-2.87 (0.0020)	-1.60 (0.0541)	0.01 (0.5009)	-0.56 (0.2888)
Pedroni Panel ADF w-stat. ^a	-3.07 (0.0011)	-3.23 (0.0006)	-0.25 (0.4001)	-1.03 (0.1507)
Pedroni Group ADF stat. ^a	-4.09 (0.0000)	-4.31 (0.0000)	-0.72 (0.2355)	-3.62 (0.0001)
Pedroni Panel ADF stat. ^b	-1.86 (0.0314)	-1.14 (0.1275)	0.24 (0.5964)	0.85 (0.8021)
Pedroni Panel ADF w-stat. ^b	-2.71 (0.0034)	-3.94 (0.0000)	-1.16 (0.1233)	0.24 (0.5985)
Pedroni Group ADF stat. ^b	-3.77 (0.0001)	-4.82 (0.0000)	-3.05 (0.0011)	-1.96 (0.0249)
Johansen- Fisher test				
None Cointegration relationship	111.8 (0.0000)	119.9 (0.000)	131.6 (0.0000)	169.1 (0.0000)
At most 1	63.68 (0.0030)	55.03 (0.0220)	64.28 (0.0003)	50.30 (0.0025)
At most 2	54.91 (0.0226)	60.01 (0.0073)	52.23 (0.0072)	49.52 (0.0139)

Notes: ^a Individual intercept included. ^b Individual intercept and individual trend included. Lag length Schwartz criterion automatic selection with a maximum number of lags of 3. Newey-West bandwidth selection using Bartlett kernel. P-values in parentheses.

for public employment, we find a negative and statistically significant correlation, indicating that, in the long-run, outsourcing leads to a small reduction in public administration employees. We must interpret this last finding with caution, due to the ambiguous results of cointegration tests on the relationship between the variable measuring the number of employees in public administration and the NPM variables.

Coinciding with the results obtained in the short-term, it seems that expenditure decentralization has a significant and negative correlation with total public spending, supporting hypothesis four in the long-term. The long-term effect of expenditure decentralization on employment is negative but barely significant. The results are similar when using ratio of public employment decentralization as an indicator for administrative decentralization; the empirical findings again support hypothesis four in the long-run. So, we find that decentralization of expenditure and administration tend to lead to a reduction in government expenditures over the long-term. However, care must be taken when interpreting these results due to the numerous criticisms regarding the use of time series methods applied to panels, particularly in regard to unit roots and cointegration tests. Moreover, Breitung (2005) showed, through a series of Monte Carlo simulations, that DOLS estimator, although preferred to FMOLS and POLS, may be biased if T is small. Moreover, much of the literature argues that the estimators that assume homogeneity among the cross sections may be inconsistent if these cross sections are heterogeneous (Pesaran and Smith, 1995), and we erroneously assume the absence of cross-section cointegration.

Table 11: Dynamic Ordinary Least Squares estimates

Explanatory variables	(i) Government expenditure <i>EXP</i>		(ii) Public employment <i>PADMIN</i>	
	DOLS	DOLS	DOLS	DOLS
<i>OUTS</i>	.0718 (.1027)	.1176 (.0964)	-.0600*** (.0164)	-.0508*** (.0166)
<i>EXPDEC</i>	-.2436*** (.0394)		-.0197*** (.0074)	
<i>EMPDEC</i>		-.1256*** (.0315)		.0014 (.0046)
R-squared	0.95	0.93	0.96	0.96
Number of countries	18	18	16	16
Number of observations	252	285	264	277

Notes: A constant term, country and period fixed effects are included in all the models (not reported). The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. (i) Three leads and three lags included. (ii) One lead and one lag included. Standard errors corrected for heteroskedasticity, contemporaneous correlation and common panel AR(1). Standard errors reported in parentheses.

4.3 Error correction model estimates

In addition to estimating the long-run relationship between the NPM variables and government outlays, we further analyze whether short-run decisions cause deviations from the long-run target, assuming that governments establish a desired ratio for expenditure and public employment in order to maximize a country's welfare, prosperity and growth. For this purpose, we estimate the panel error correction model defined in equation (7), including all the original variables and a fixed time effects, and where ecm_{t-1} are the lagged residuals of the estimated long-run relationship²⁵, without including leads and lags. We estimate the parameters of equation (7) using a Feasible Generalized Least Squares estimator and a LSDV estimator with panel corrected standard errors.

The long-run dynamics can be studied by analyzing the coefficient and statistical significance of the parameter ϕ from equation (8), ie the error correction speed of adjustment of the model. The results are shown in table 12. We can see that the values of the coefficients and parameters associated with the different variables of interest and their statistical significance do not differ too much from those obtained in estimating equation (2), ie the static model in first differences, which may indicate the robustness of our results. Adjustment coefficients in specification (i) have the expected sign and are significant at the 1% level, their values being quite low, which indicates that the adjustment speed at which public spending goes back to the desired position or balance after a "shock" occurs in the economy is relatively slow. ϕ values in

²⁵As proposed by Asworth et al. (2006) and Beckmann et al. (2011), among others.

specification (ii) are never statistically significant, which may indicate that public administration employment does not respond to deviations from long-term equilibrium or balance.

Table 12: Error correction model estimates.

Explanatory variables	(i) Government expenditure ΔEXP				(ii) Public employment $\Delta PADMIN$			
	PCSE	FGLS	PCSE	FGLS	PCSE	FGLS	PCSE	FGLS
$\Delta OUTS$	.2397*** (.0912)	.1704** (.0774)	.2586*** (.0922)	.1861** (.0792)	-.0247 (.0183)	-.0125 (.0134)	-.0275 (.0188)	-.0170 (.0135)
$\Delta EXPDEC$	-.2264*** (.0341)	-.2167*** (.0369)			.0014 (.0045)	.0006 (.0040)		
$\Delta EMPDEC$			-.0543* (.0326)	-.0630** (.0319)			.0059 (.0042)	.0074* (.0040)
ΔAUT	.0900*** (.0281)	.0576** (.0280)	.0359 (.0296)	.0567** (.0289)	-.0041 (.0044)	-.0032 (.0040)	-.0057 (.0046)	-.0056 (.0040)
$\Delta GDPCAP$	-.0000 (.0000)	-.0000 (.0000)	-.0000 (.000)	.0000 (.0000)	.0000 (.0000)	.0000 (.0000)	.0000 (.0000)	.0000 (.0000)
$\Delta UNEMP$	.2630** (.1077)	.1413 (.0868)	.3268*** (.1098)	.2189*** (.0843)	.0691*** (.0120)	.0749*** (.0116)	.0692*** (.0119)	.0752*** (.0115)
$\Delta POP65$	.4095 (.3035)	.2435 (.3078)	.3223 (.2836)	.3129 (.3263)	.0783* (.0410)	.0113 (.0398)	.0747** (.0396)	.0110 (.0393)
$\Delta DENS$	.0028 (.0656)	.0687 (.1074)	.0013 (.0709)	.0433 (.1041)	-.0086 (.0161)	-.0122 (.0118)	-.0084 (.0156)	-.0108 (.0117)
ecm_{t-1}	-0.0321*** (.0085)	-0.0328*** (.0095)	-0.0388*** (.0091)	-.0336*** (.0097)	.0053 (.0071)	.0078 (.0053)	.0045 (.0071)	.0066 (.0053)
R-squared	0.47		0.43		0.40		0.40	
Wald chi2	1154.97	454.78	1090.87	418.56	738.28	231.08	539.33	218.11
Number of countries	18	18	18	18	16	16	16	16
Number of observations	317	317	317	317	251	251	251	251

Notes: Period fixed effects are included in all the models (not reported). The asterisks ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. Standard errors corrected for heteroskedasticity and contemporaneous correlation. Standard errors reported in parentheses.

5 Conclusion

The ongoing economic and financial crisis that began in 2008 is providing a new scenario whereby governments are again looking to introduce reform in the direction of reducing the size of the public sector. Though outsourcing and decentralization were introduced as part of a broader NPM movement from the 1980s, purportedly to reduce the size of the public sector, little work has been done since then to quantify to what extent these policies really resulted in a smaller public sector. Reducing the size of the public sector is not necessarily a route to greater efficiency, as cost savings may be due to many reasons, including service quality or labour condition deterioration (Jensen and Stonechash, 2005). However, this paper focuses on quantifying the effects of outsourcing and decentralization for the public sector size in 18 countries over the last two or three decades.

We find that outsourcing was not associated with a reduction in the public sector size as

regards expenditure and employment either in the short or long-term. In contrast, fiscal and administrative decentralization, measured as the ratio of expenditure and public employment decentralization, as well as the autonomy of the sub-central government, do seem to lead to a smaller public sector as regards expenditure, both in the short and long-term. We do not find, however, that decentralization led to a reduction in public sector employment. These results may indicate that the observed decline in public spending in the late 1980s and 1990s may not necessarily be truly associated with NPM-style reforms but, rather, simple cost-cutting reform.

As a caveat, this paper modestly sought to assess the consequences of NPM-style reforms on public sector size. This is not to forget that NPM pursued not only a slimmer public sector, but also, a more efficient and effective public sector, aimed at increasing consumer satisfaction and choice. Clearly, though outsourcing did not lead to a smaller public sector, if public sector working conditions, service quality improved, and/or social welfare was strengthened, this could be interpreted as a benefit of such a policy. If, however, the increase in government spending was not accompanied by such improvement, this could suggest the existence of high transaction and coordination costs and the appropriation of social income by the private sector (the so-called “hold up” effect), or, that the private provision of public goods does not necessarily entail efficiency gains.

Finally, though we have presented sets of correlations between NPM reform and public sector size, these conclusions must be interpreted with caution. Even if the results are robust to different specifications, as is this case, the empirical specification does not allow for the establishment of a strong causal relationships, mainly due to a possible problem of endogeneity of the regressors. Though this can be corrected by using panel cointegration techniques, as we have performed, this methodology has been subject to criticism. Likewise, as discussed by Pollitt and Bouchaert (2003), the ratios using GDP as the denominator may be very influenced by the use of this indicator. For example, during 1990-2000, a period of strong economic growth, the steady growth of GDP could mask increases in public spending and debt and the opposite in times of recession

A major task for future research is, on the one hand, to include in the model further indicators for NPM-style reforms, such as the use of “performance related pay” or “performance budgeting” and, on the other hand, the use of reliable data on the total employment in both central and sub-central public sector levels. Another challenge is to investigate the net effect of the policies under analysis as regards social welfare effects.

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A Descriptive statistics and data sources

Table 13: Data sources and descriptive statistics

Variable	Source	Mean	Std. Dev.	Min.	Max.
EXP	Eurostat	48.67	6.75	31.3	71.7
P.ADMIN	Eurostat	8.30	1.82	5.3	14.2
OUTS	Eurostat	44.32	8.43	23.35	68.62
EMPDEC	Eurostat	49.25	22.64	6.67	78.40
EXPDEC	Eurostat	37.04	15.47	5.04	68.91
AUT	Eurostat	43.68	18.80	7.36	81.00
GDPCAP	Eurostat	22904.25	9921.30	2900	61200
UNEMP	Eurostat	7.67	3.54	1.6	20.1
POP65	Eurostat	22.28	3.07	15.80	31.04
DENS	Eurostat	130.88	102.25	12.57	399.13

Note: all the variables in %age except GDP per capita (euro per inhabitant) and population density (total population/km²).

Table 14: Cross-correlation table

Variables	EXP	PADMIN	OUTS	EXPDEC	EMPDEC	AUT	UNEMP	GDPCAP	DENS	POP65
EXP	1.000									
PADMIN	0.287 (0.000)	1.000								
OUTS	0.016 (0.746)	-0.185 (0.001)	1.000							
EXPDEC	0.226 (0.000)	-0.140 (0.017)	0.415 (0.000)	1.000						
EMPDEC	0.260 (0.000)	-0.180 (0.002)	0.454 (0.000)	0.904 (0.000)	1.000					
AUT	-0.097 (0.063)	0.127 (0.031)	-0.149 (0.003)	-0.255 (0.000)	-0.234 (0.000)	1.000				
UNEMP	0.184 (0.000)	0.508 (0.000)	-0.180 (0.000)	0.035 (0.514)	-0.025 (0.629)	-0.051 (0.331)	1.000			
GDPCAP	0.038 (0.448)	-0.410 (0.000)	0.241 (0.000)	0.109 (0.037)	0.191 (0.000)	-0.042 (0.426)	-0.519 (0.000)	1.000		
DENS	0.134 (0.006)	0.183 (0.001)	0.399 (0.000)	0.151 (0.003)	0.132 (0.006)	0.458 (0.000)	-0.131 (0.007)	-0.006 (0.907)	1.000	
POP65	0.134 (0.007)	0.285 (0.000)	0.024 (0.608)	0.108 (0.033)	0.081 (0.099)	-0.411 (0.000)	0.013 (0.800)	-0.000 (0.999)	-0.025 (0.560)	1.000

Note: P-values reported in parentheses.

B Evolution of general government outlays

Figure 1: General Government Expenditures as a share of GDP trends

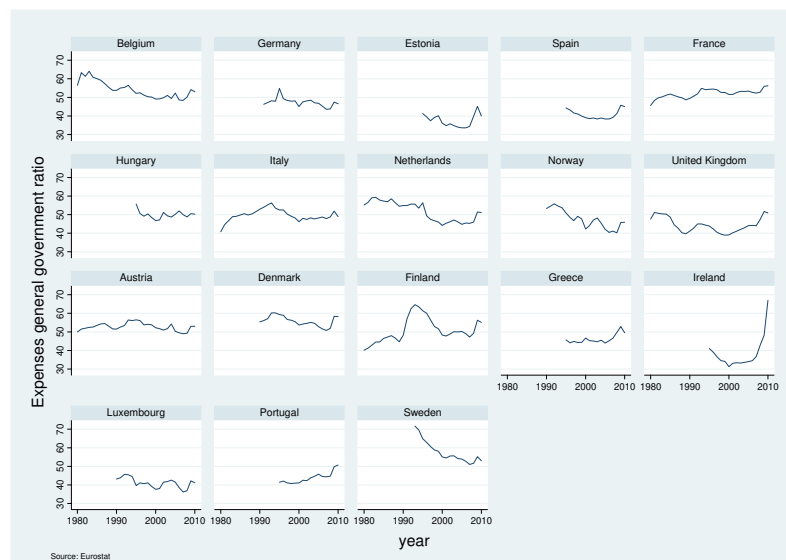
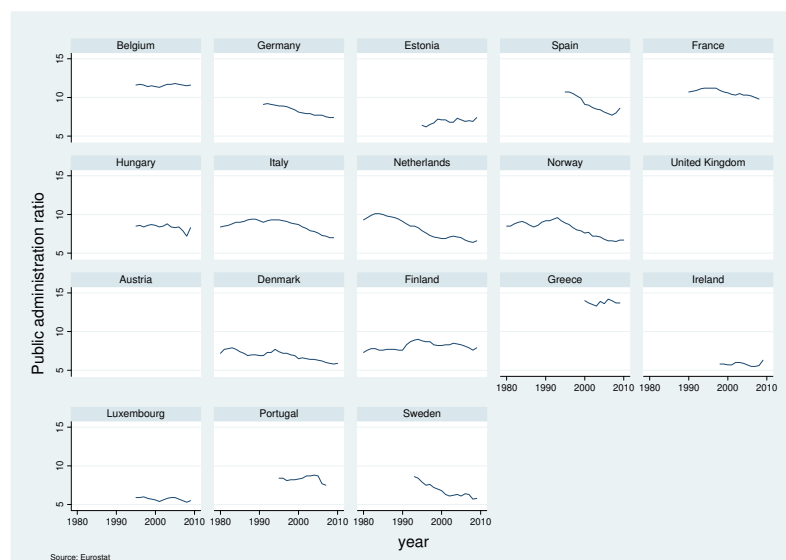


Figure 2: General Government Public Administration Employees as a share of total population



C Evolution of NPM-style reforms variables

Figure 3: Outsourcing ratio trends

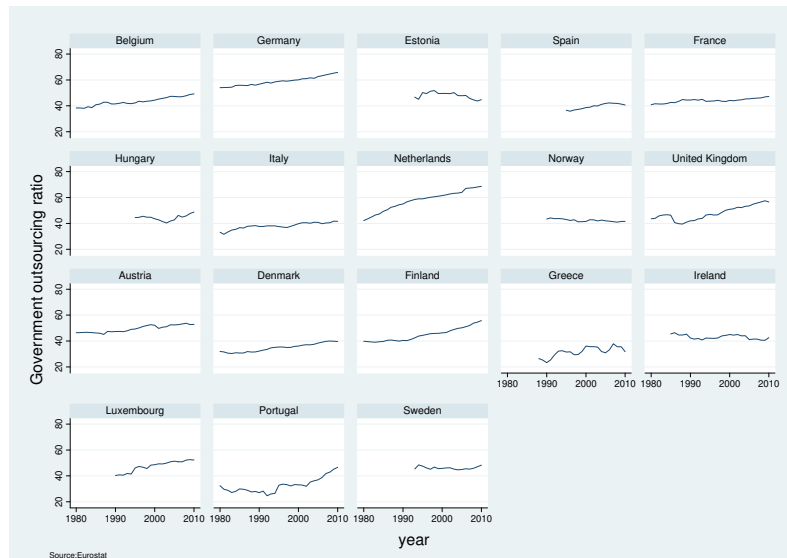


Figure 4: Decentralization of expenses

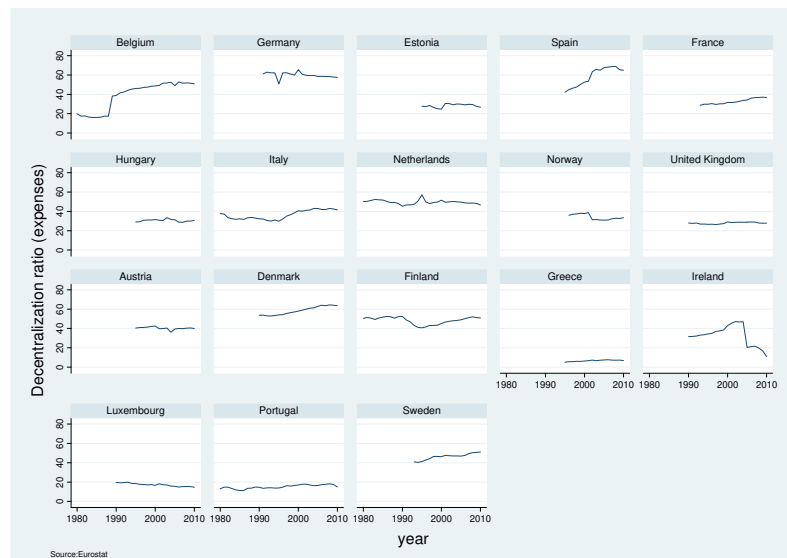


Figure 5: Decentralization of employment

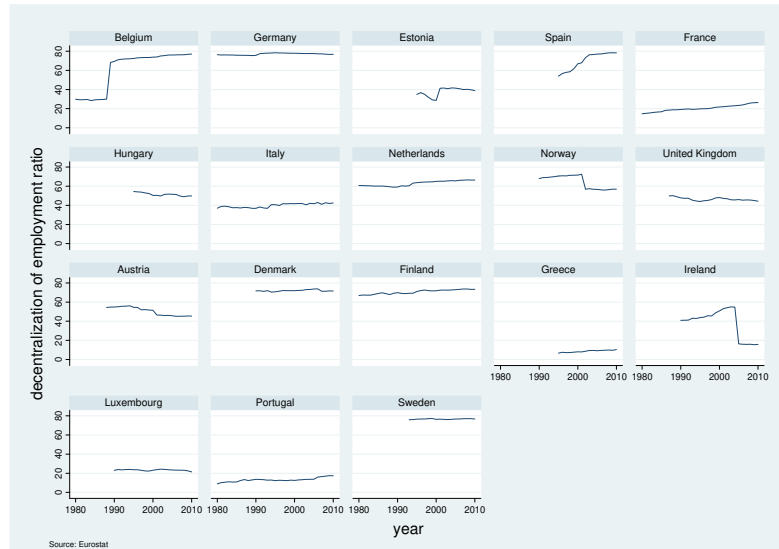


Figure 6: Sub-national governments autonomy

