Public sector bureaucracies and economic growth

La burocracia del sector público y el crecimiento económico

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Abstract

Public sector bureaucracies are key players in advanced economies, as in the case of European Union countries, for the smooth functioning of the roles assigned to the governments (to provide welfare state services and benefits, public infrastructures, and to design the legal and economic institutional framework). From this perspective, a proper functioning of bureaucratic bodies is crucial for potential growth. Thus, cross-country differences in the quality of bureaucracies can explain differences in economic growth among them. Accordingly, the operation of self-interested bureaucracies can lead to inappropriate fiscal policies, regulatory capture, and labor market misallocation, damaging incentives and causing large efficiency costs. The aim of this paper is twofold. Firstly, we review the extant literature, focusing on the main channels of the bureaucracy-growth relationship. And secondly, we provide an empirical exercise that illustrates the links between bureaucratic/institutional quality and economic growth.

Keywords: Public Sector Bureaucracies; Economic Growth; Institutional Quality; Public-private Wage Gap.

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Resumen

Las burocracias del sector público son actores clave en las economías avanzadas, como en el caso de los países de la Unión Europea, para el buen funcionamiento de los papeles asignados a los gobiernos (proporcionar servicios y prestaciones del Estado de Bienestar, infraestructuras públicas y diseño del marco jurídico y económico institucional). Desde esta perspectiva, el buen funcionamiento de la burocracia pública es crucial para el crecimiento potencial. Por lo tanto, las diferencias entre países en la calidad de las burocracias pueden explicar las diferencias en el crecimiento económico. En consecuencia, la existencia de "burocracias con intereses propios" puede llevar a políticas fiscales inadecuadas, a la captura regulatoria o al mal funcionamiento del mercado laboral, dañando los incentivos y generando importantes costes de eficiencia. Dos son los objetivos de este artículo. En primer lugar, revisamos la literatura existente, centrándonos en los principales canales de la relación entre burocracia y crecimiento. Y en segundo, ofrecemos un ejercicio empírico que ilustra los vínculos entre la calidad burocrática/institucional y el crecimiento económico.

Palabras clave: burocracias del sector público; crecimiento económico; calidad institucional; brecha salarial público-privada.

JEL Classification: H11; H41; H83.

1. Introduction[2]

Almost one hundred years after the publication of Weber's work on bureaucracies (Weber, 1922), the debate about what should be its role in improving the welfare of societies still deserves a wide attention from the literature. There are currently two approaches, quite dichotomous, when analyzing the role played by bureaucracies in modern advanced economies.

On the one hand, as Rosen and Gayer (2014) point out, any modern government simply cannot function without bureaucracy, since bureaucrats provide essential technical expertise in the design and execution of public programs. In addition, its permanence over time provides an essential institutional memory, in the face of the transience of politicians, while its recruitment based on merit guarantees an impartial treatment of citizens and prevents corruption. Consequently, from this perspective, a proper functioning of bureaucratic bodies is essential for the institutional framework to act correctly, and therefore, crucial for the economic and social functioning of a society.

However, on the other hand, it would be very naïve to accept that bureaucrats do not have more interests and objectives than those revealed by citizens to the political representatives in the electoral processes (Rosen and Gayer, 2014). In the late sixties of the 20th century, faced with the Weberian vision of the bureaucracy, a new interpretation of bureaucratic behavior emerged, and became the predominant approach within the Theory of Public Choice: self-interested bureaucracies (versus common-interest-based), in which civil servants, at every level of hierarchy, act rationally to pursue their own interests.

The economic growth implications of both families of theories are dramatically different. Thus, cross-country differences in the quality of bureaucracies can explain, to a large extent, differences in economic growth among countries. And certainly, proxy measures of "bureaucratic quality" show significant heterogeneity among countries world-wide (see Figure 1 [3,4]).

[3] Quality of government: the mean value of the ICRG variables "Corruption", "Law and Order", and "Bureaucracy Quality", where higher values indicate higher quality of government. Corruption is an assessment of corruption in the political system. Law and Order assesses the strength and impartiality of the legal system as well as the popular observance of the law. Bureaucratic Quality measures the institutional strength and quality of the bureaucracy.
[4] Government effectiveness (Worldwide Governance Indicators): Government effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.

Figure 1: Cross-country heterogeneity in the quality and effectiveness of governments

Quality of government   Government effectiveness
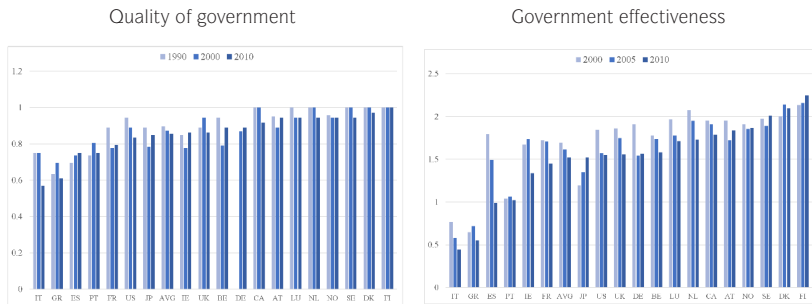
SOURCE: Quality of government: International Country Risk Guide (ICRG) and Teorell et al. (2015). Government effectiveness: Worldwide Governance Indicators.

The aim of this note is to review the main channels through which the "quality of bureaucracies" affect economic growth. We do so in section 2 (review of the literature, including by zooming-in a particular model). Then, in Section 3 we provide some (suggestive) evidence on the positive relationship between better bureaucratic/institutional quality and more robust medium-run economic growth. Finally, Section 4 concludes.

2. Literature review

2.1 Bureaucracies as institutional promoters of economic growth

The literature on economic growth has traditionally paid a great deal of attention to the role played by institutions, especially focusing, in recent years, on its quality. A significant number of papers conclude that, in general, the positive impact of "good" institutions on economic growth increases with its quality. See, among others, North (1989, 1990), Hall and Jones (1999), Acemoglu et al. (2001), Easterly and Levine (2003), Dollar and Kraay (2003), Glaeser et al. (2004), Rodrik et al. (2004), Helpman (2008), Butkiewicz and Yanikkaya (2006), or Knutsen (2013).

The economic concept of institutions, though, is quite broad (see North, 1989, 1990, for the definition usually followed in economics), and certainly broader than that of "bureaucratic quality". A concept related to the later, as mentioned above, is that of "quality of government" (on the determinants of the latter, see for example La Porta et al. (1999). Focusing on the functioning of bureaucracies as economic institutions, Rauch and Evans (2000), in a study for 35 public sectors corresponding to less developed countries, find that meritocratic recruitment is a statistically significant determinant of bureaucratic performance. Instead, the influence of competitive salaries, internal promotion and career stability cannot be clearly contrasted. These results were ob-

tained controlling for country income, level of education, and ethnolinguistic diversity. From another perspective, but on related grounds, Savoia and Sen (2015) review the strengths and limitations in current empirical research on the measurement of state capacity, starting from the idea, increasingly widespread, that this capacity is essential for effective governance, and a crucial element of long-run economic development. Indeed, they find significant empirical evidence supporting these claims. State capacity, following Besley and Persson (2011) is defined as "the institutional capability of the state to carry out various policies that deliver benefits and services to households and firms". A reasonable list of state capacities would include the following: bureaucratic and administrative capacity; legal capacity; infrastructural capacity; fiscal capacity, understood as the state's ability to raise revenues from taxes; and military capacity. As determinants of the state capacity, the overview conducted identifies the following: length of statehood; external conflicts; legal origins; colonization strategy; inequality; structure of the economy; economies foreign aid-dependent; fractionalization, understood as social divisions along ethnic, linguistic and religious lines; incentives and type of recruitment of the bureaucracy; and political democracy.

Another line of research in this area examines how, and to what extent, well-functioning governments promote economic growth, in particular, by focusing on the quality of the institutional design that governs the functioning of the public sector. Governance may influence economic performance through different channels. One key channel is the functioning of bureaucracy. As Rauch (1995) points out, bureaucracy encourages investment in public infrastructure with long-term payoffs rather than present consumption. Behind this result lies the professionalization of bureaucracy, which contributes to making the professional careers of bureaucrats more stable and predictable, facilitating the adoption of decisions consistent with long-term objectives. Evans and Rauch (1999) also find that processes based on systematic rules used in bureaucratic decision-making should increase the effectiveness of infrastructure projects, especially those more complex, involving different departments responsible for public policy. Moreover, on the side of private investment, these authors establish that a stable bureaucracy significantly reduces the risks associated with the uncertainty that would be expected from a highly changing public policy management.

At the same time, authors such as Shleifer and Vishny (1993), Mauro (1995), Campos et al. (1999), or Dahlström et al. (2012), highlight that bureaucracy and its professionalization mitigate opportunities for corruption which, in turn, stimulates private investment. Dahlström et al. (2012) find that meritocratic recruitment is a key factor in explaining the reduction of corruption, using a sample of fifty two countries. Instead, other allegedly relevant bureaucratic factors, such as public employees' competitive salaries, career stability, or internal promotion, would not have a significant impact. Hence, as they say, the use of a recruitment process based on the skills of the candidates is the most important bureaucratic feature for deterring corruption.

2.2 Self-interested bureaucracies might be detrimental to economic growth

In opposition to the instrumental vision of the bureaucracy as an engine to economic growth and social welfare, a part of the Public Choice literature offers a more negative view. The main idea behind the latter view is that self-interested bureaucracies induce an excessive supply of public activity, oversizing the public sector. According to Mueller (2003), the premise of self-interest rules out direct concern for the welfare of others. Possibly, the most well-known contribution in this field is Niskanen's theory of the bureaucrat as "budget maximizer" (Niskanen, 1968, 1971). According to the seminal formulation of this theory, based on the budget process, acting in their capacity as monopolists, bureaucrats try to maximize the size of the budgets allocated to their departments, agencies or management units. Behind this behavior would be the target level of remuneration, professional promotion, prestige, or simply the quest for a greater power of action. All these targets are positively linked to the amount of the budget managed by a specific group of bureaucrats. The informational advantage of bureaucrats, derived from their professional expertise and knowledge of production technology, allows them to propose to the policy-makers projects with budgets that are oversized compared to the ones that would results from the optimization of social welfare.

This "dark side" of the bureaucratic power has been analyzed from a principal-agent approach by Döhler (2018). This article concludes that the informative advantages that characterize the moral hazard scenario in which the conventional model of self-interested bureaucracies is developed, not only affect the bureaucrats (the agent of the relationship), but also the political leaders who approve the proposals of those (the principal of the relationship). Then, principal's moral hazard should also be considered as a potential explanation for political-bureaucratic interactions. Empirical evidence for three German regulatory agencies, responsible for drug control, financial services and rail safety, is founded: the political principal acted negligently to suppressing crucial information. The author identifies this situation as the dark side of power because the intention is to shift blame or to dodge political responsibility.

In the field of economics, in addition, recent developments in the theory of bureaucracy have evolved towards the postulates of the economic theory of organizations, especially towards the analysis of the problems of incentives existing in public provision, including those of their financing and regulation (González-Páramo and Onrubia, 2003). Tirole (1994) and Martimort (1996) have analyzed the multi-principal nature of the public sectors, determining its consequences on organizational behaviour. Laffont (2000) extends this analysis to the design of the basic institutions that structure democratic systems, taking into account the separation of powers and mechanisms of check and balances. Among the results of this new approach, stand out those that conclude that the limitation of the power of bureaucrats to approve ineffective and overfunded projects involves the design of independent institutions in charge of the control, supervision and monitoring of public spending.

Finally, a recent literature that distinguish between public and private employment, focusing on public-private wage determination, also provides a framework in which the strategic behavior of an insider group within the public administration extract a rent by benefit from some form of market power. For example, in some papers (see, e.g. Fernández-de-Córdoba et al., 2012, and the references quoted therein) wages in the public sector are determined as the outcome of a non-cooperative game between the union of public sector employees and a government that cares about total employment. If the public sector union or control group derive monopoly power from a tighter control of the production of public goods/services, then a public sector wage premium emerges, and employment (public and private) is lower that otherwise. Along the same lines, the notion of a "fragmented government", whereby the government consists of a variety of independent firms is also present in Kollintzas et al. (2018a) (see also the references quoted therein). The later authors, in particular, develop an insiders-outsiders theory whereby those groups of agents work for public (cartel) and private (competitive) sector firms, respectively, while the government is influenced by insiders in setting public policies. Kollintzas et al. (2018b) provide empirical support to these theories, in particular for the case of Greece. Moreover, the existence of a premium of public over private wages, that emerges even when controlling for individual characteristics, is by now an empirical regularity (see Giordano et al., 2015, and the references quoted therein). In addition, a number of studies find that the emergence of a wage premium can partly be rationalized by political-economy variables, including the degree of "bureaucratic quality" (see Campos et al., 2017; Kollintzas et al., 2018b; and the references quoted therein).

The economic growth and employment implications of such a wage gap, when not explained by economic factors, are significant. An increase in vacancies in the public sector causes labor flows from the private sector if a positive public-private wage gap exists, which leads to an increase in private sector wages and a potential reduction of private sector employment. At the same time, the strength of the crowding-out increases with the degree of substitutability in the provision of goods and services by the public and the private sectors (see e.g. Maley and Moutos, 1996). The increase of public jobs to produce highly substitutable products can directly displace private jobs. However, if public and private products are complements, there exists the possibility of crowding-in if the public service improves the marginal product of labor in the private sector.

Some policy proposals have been recently put forward to reduce the wage gap. Some theoretical papers (see e.g. Economides et al., 2015; Gomes, 2018; Ujhelyi, 2014) show that establishing parity between work conditions in the public and the private sectors can be welfare-improving under certain conditions, and/or inspect the benefits of civil service rules, exploring the conditions under which the existence of tenured "bureaucrats" raises or decreases overall economy welfare.

2.3 A focus on some theoretical channels

in this section we provide a discussion using the model of Fernández-de-Córdoba et al. (2012). The aim is to illustrate how output ("economic growth") and employment behave after a given macroeconomic shock in economies that differ in their "bureaucratic" structure, along the lines discussed in the previous section. In particular, we want to illustrate the output and employment implications in economies with different "public-private wage gaps" and different degrees of public-private sector complementarity/substitutability.

As mentioned in the previous subsection, the key element of the model is that those authors consider an objective function for the government that results from a bargaining process between the government and a public sector union ("bureaucrats"), leading to a public sector objective function that encompasses the maximization of public wages and public employment. The inclusion of the union is necessary for the existence of a wage premium in that set-up. In addition, the model considers a production function that relates output with three inputs: private and public employment, and the capital stock. The choice of the production function implies that a positive level of taxes is necessary to finance the public sector wage bill. The government raises taxes to finance the public sector wage bill, and selects unilaterally public employment and public employees' wages. As for the rest, the model is a quite standard neoclassical, dynamic general equilibrium piece, to be solved to obtain the competitive equilibrium. The model economy has three agents: Households, firms, and the government. The behavior of households is modeled in a standard fashion. Firms have access to a technology that encompasses, as mentioned before, three inputs: capital, private employment, and public employment. Thus, labor supply is divided into a private and a public workforce.

As to some details on the more relevant elements of the model for our purposes, first let us pose the production function. In Fernández-de-Córdoba et al. (2012)'s framework, the technology is given by

$$Y_t = A_t K_t^{\alpha} \left[\mu B_t^{\eta} L_{p,t}^{\eta} + (1 - \mu) L_{g,t}^{\eta} \right]^{\frac{(1-\alpha)}{\eta}} \tag{1}$$

where Y_t is aggregate output, K_t is capital, $L_{p,t}$ private employment, $L_{g,t}$ public employment, A_t is a measure of total factor productivity (modeled in a standard way as an AR(1) process), α is the physical capital share of output, μ measures the weight of public employment relative to private employment and $\sigma = 1/(1-\eta)$ is a measure of the elasticity of substitution between public and private labor inputs. The parameter η indicates the elasticity of technical substitution between private and public labor. B_t is the relative efficiency level of private labour.

The second element of relevance for our purposes is the description of the public sector and its interactions with the private sector. The government levies discretionary taxes to finance spending, pays the public sector wage bill $W_{g,t}$

$L_{g,t}$ and balances its budget period-by-period. The authors posit an objective function for the government as the solution of a game between a public sector union, that cares about the wage of public sector employees ("the insiders"), and a government which cares about the level of public employment given its budget constraint. Thus, the government chooses employment and wages to minimize the following objective function, subject to its budget constraint:

$$\min\left[\omega W_{g,t} + (1 - \omega)L_{g,t}\right] \tag{2}$$

Where ω is the weight given to wages. If ω is close to zero, then the main goal of the government is to maximize public employment, whereas if ω is close to one, the main goal of the government is to maximize public wages (the insiders / public sector union's preferred option). This function implies that the government maximizes both public wages and employment.

In this framework, the output response to a TFP shock (a 1-standard-deviation shock to the AR(1) process of A_t) is completely standard, overall, as in a standard real business cycle model without the distinction between private and public sector employment: the shock raises output on impact, as more output is produced for given factor inputs. Hours worked also increase as the return to work increases, raising output further. Additionally, due to the direct effect of the shock on output, private labor productivity increases on impact. The capital stock also increases given the rise in its productivity.

But the distinction between public and private labor is instrumental to elaborate on the crowding-out induced by the "bureaucrat" (public trade union). Private labor increases, as a result of the increase in productivity. At the same time, the shock increases tax revenues and, therefore, the government can increase the total public wage bill by raising the number of employees and their average wages. The effect on public employment is larger than the one on private employment. Thus, the TFP shock produces a "crowding-out" effect as there is a substitution of private employment by public employment. The extent of the "crowding-out" depends on the value of ω, the weight that the government attaches to wages per employee: in the limit, if $\omega = 1$, incumbent public employees gets and increase in wages, causing an increase in the wage premium, while public employment does not react to the shock.

As regards the dynamics of wages, private wages go up as a result of the increase in productivity. Given the increase in tax revenues and the objective function of the government, public wages also increase. Nonetheless, given the existence of public-private pay gap, the flow of employees from the private sector to the public sector cause a larger effect on private wages than on public wages, leading to a gradual reduction of the transitory change in the relative prices of labor between the private and the public sectors.

3. SOME EMPIRICAL EVIDENCE

In this Section we turn to providing empirical evidence on the linkage between "bureaucracy" and economic growth, to complement the discussion in the previous sections. In particular, we estimate regressions in which we link measures of bureaucracy with economic growth. From the previous analysis, some proxy measures of "bureaucratic quality" stand out: (i) the public sector pay premium over the private sector, discussed in depth in the previous sections; (ii) the indicator of government effectiveness; (iii) the indicator of government quality. The latter two variables have been described in the Introduction. The next section deals with the empirical measures of the pay premium.

3.1 THE "WAGE GAP" DATA

We use aggregate data to compute measures of the "public-private pay gap". In line with the extant literature (see, e.g. Lamo et al., 2012; Campos et al., 2017), we use a standard Eurostat and OECD data for the 19 countries selected to build up a consistent dataset for the period 1970-2014. The countries in our sample are: Austria, Belgium, Canada, Germany, Denmark, Spain, Finland, France, Greece, Ireland, Italy, Japan, Luxembourg, the Netherlands, Norway, Portugal, Sweden, UK, and the USA. The main disadvantage of using macro pay gaps is that one cannot control for the individual characteristics of the labor force. Given that public sector employees tend to be more educated or present more experience on average (among other characteristics, see e.g. Campos et al., 2017), macro pay premiums tend to be larger than micro ones. We will address this bias in line with the previous literature, by performing our subsequent regressions in first differences, hence removing this bias in levels. Despite the presence of this shortcut, in our case, macro wage gaps have the advantage of being available for long time periods, which is what we need to capture slow-moving institutional features of the countries at hand.

The measure of wages chosen for our analysis is compensation per employee in nominal terms. The selection of total compensation, rather than wages, is related to data availability: the information available on wages is quite limited in terms of both sample size and coverage of the countries in our sample. We compute compensation per employee using employee compensation and employment data. Private-sector employee compensation of private sector employees is defined as total economy employee compensation minus the compensation of government employees. Compensation per private employee is defined as private employee compensation divided by total economy employment. In turn, the compensation and employment of government employees do refer to the General Government definition. The latter is a more accurate definition of the government sector than the standard approach in many studies that focus on micro data of using non-market activities (NACE

sectors O, P, and Q). So-called non-market activities do incorporate private sector employees, in particular in sectors P and Q (Health and Education).

The literature has shown that public-private wage gaps can partly be explained by other institutional features, such as the quality of the government or its efficiency (see the discussion of the previous sections). Given that the aim of the empirical exercise is to test, in an agnostic way, different proxy measures of "bureaucratic quality", we purge the measures of pay gap from other, related, institutional factors. To do so, we proceed in two steps. In the first step we identify the long-run determinants of the dynamics of the public pay gap, by running the following regression (in this step we replicate Campos et al., 2017):

$$\Delta \text{WageGap}_{ct} = \beta' \Delta X'_{ct} + \sum_t \lambda_t + \epsilon_{ct} \tag{3}$$

where is the change in the public-private pay gap between *t* and *t-1*; are changes in possible determinants of the dynamics of the wage gap namely, percentage of public employees, openness of the economy to trade, the share of public employees in Public Administration (core measure, NACE O classification, used as a proxy of "insider's" monopoly power), the proxy for the quality of government, and the variable measuring government effectiveness. In turn, are period fixed-effects. The estimation is carried out by pooled OLS. As in the literature on long-term economic growth, in order to remove the effects of the business cycle, each period is a five-year average. The results are displayed in Table 1. The different sample length in each regression is due to individual country and variable availability.

In a second step, using the models estimated in columns (1) to (4) of Table 1 we compute , from each model:

$$\hat{\epsilon}_{ct} \equiv \Delta \text{WageGap}_{ct} - \hat{\beta}' \Delta X'_{ct} - \sum_t \hat{\lambda}_t \tag{4}$$

The calculated are the "purged" versions of the wage gap that we will use in the model of the next subsection. Beyond the usefulness for the calculation of these residuals, the results in Table 1 show two relevant elements for the aims of the current paper, that are in line with the insights of the literature and the theoretical model of the previous section: (i) in our pool of countries and sample, an increase in the quality of government is associated with a lower pay gap, controlling for other factors; (ii) the same happens with government effectiveness.

3.2 Empirical exercise

We run the following regression linking the long-run evolution of economic growth and a number of measures of bureaucratic quality (in turn each one), controlling for some macroeconomic factors (unemployment rate, openness, government debt):

$$\Delta \text{Real GDP per capita}_{ct} = \gamma \Delta \text{Bureaucratic quality}_{ct} + \beta' \Delta X'_{ct} + \sum_t \lambda_t + \epsilon_{ct} \qquad (5)$$

TABLE 1: LONG-RUN DETERMINANTS OF THE PUBLIC PAY GAP

	(1)	(2)	(3)	(4)
Dependent Variable: Δ General Government Sector Wage Gap $_{ct}$				
Δ% Public Employees $_{ct}$	-0.0178**	-0.0087	-0.018**	-0.034**
	(0.0068)	(0.0183)	(0.0089)	(0.0162)
Δ Openness $_{ct}$	-0.0016**	-0.0021**	-0.0016**	-0.002**
	(0.0007)	(0.0010)	(0.0008)	(0.0006)
Δ% Public Administration Employees $_{ct}$		1.4048		
		(1.3675)		
Δ Quality of Government $_{ct}$			-0.2457**	
			(0.1320)	
Δ Government Effectiveness $_{ct}$				-0.1631**
				(0.0630)
Five-Years Dummies	Yes	Yes	Yes	Yes
Time Period	1975-2014	1980-2014	1985-2014	2000-2014
Observations	146	56	110	57
Adjusted R-squared	0.281	0.134	0.206	0.36

Notes: This table is a partial replication of Table 5 in Campos et al. (2017) (own elaboration). The table shows the regression of five-years changes in the public-private wage gap on five-year changes of some of its long run determinants. Robust standard errors are in parenthesis. Significance levels: *: 10%; **: 5%; ***: 1%.

As before, the estimation is carried out by pooled OLS and, in order to remove the effects of the business cycle, each period is a five-year average.

The results are shown in Table 2. Some results are worth highlighting: (i) the measures of public-private pay gap (computed from equation 4) present the expected negative sign (see columns (1) to (4)), i.e. a medium-run increase in the monopoly power of bureaucrats (as measure by the pay gap), net of other institutional elements, is associated to a reduction of the growth rate of real per capita GDP; (ii) the estimates are computed with high uncertainty, in part probably due to the short sample, and are statistically significant only in 2 out of 4 cases; (iii) the other two measures of bureaucratic quality (columns (5) and (6)) also display the correct, ex-ante, sign: an increase in government efficiency goes hand-in-hand with an increase in medium-run economic growth, and the same applies to the indicator or government quality; nonetheless, both coef-

ficients are estimated with significant noise, and are not statistically significant at the usual confidence levels.

Table 2: Long-run link between Economic Growth and Quality of Bureaucracy Measures

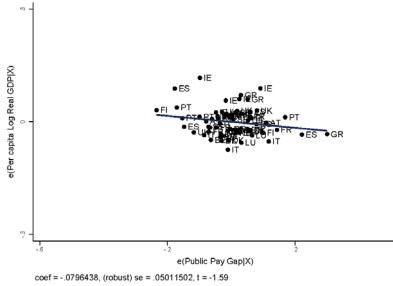|	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable: Δ Per capita Log Real GDP $_{ct}$						
Δ Bureaucracy $_{ct}$	-0.0796	-0.1309**	-0.0937*	-0.0708	0.0015	0.1231
	(0.0501)	(0.0608)	(0.0522)	(0.1049)	(0.0483)	(0.1274)
Δ Openness $_{ct}$	0.0015**	-0.0001	0.0015**	0.0003	0.001**	0.0015**
	(0.0005)	(0.0008)	(0.0005)	(0.0004)	(0.0004)	(0.0005)
Δ Unemployment rate $_{ct}$	-0.0103**	-0.0095**	-0.0108**	-0.009**	-0.0097**	-0.0104**
	(0.0028)	(0.0033)	(0.0029)	(0.0041)	(0.0039)	(0.0032)
Δ Debt $_{ct}$	-0.0011*	-0.0004	-0.0009	-0.0003	-0.0004	-0.0009*
	(0.0005)	(0.0006)	(0.0006)	(0.0007)	(0.0006)	(0.0005)
Five-Years Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Time Period	1994-2014	1995-2014	1994-2014	1996-2014	1994-2014	1996-2014
Observations	66	33	62	30	45	66
Adjusted R-squared	0.881	0.826	0.879	0.766	0.839	0.878

Notes: This table shows the regression of five-years changes in real per capita GDP on five-year changes of country characteristics linked to indicators of bureaucracy. Robust standard errors are in parenthesis. Significance levels: *: 10%; **: 5%; ***: 1%.

Overall, thus, we find suggestive, though weak evidence, of the association between our measures of bureaucratic quality and economic growth. It is worth mentioning that the results are robust to the inclusion of country fixed effects as an additional control (not shown).[5] In addition, Figure 2 shows that the association of each variable of interest with real per capita GDP growth is not driven by outliers, although the estimation in each case comprises only a few periods (three 5-year periods). On the contrary, in the case of government effectiveness, one observation (ES, to the left) determines the lack of statistical significant of the result.
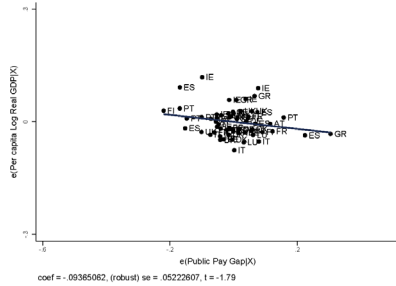
[5] Instead of using country fixed effects, we preferred to include in our baseline scenario some explanatory variables regarding socioeconomic and institutional framework for our selection of countries.

FIGURE 2: PARTIAL CORRELATION BETWEEN PROXY MEASURES OF BUREAUCRATIC QUALITY AND ECONOMIC GROWTH
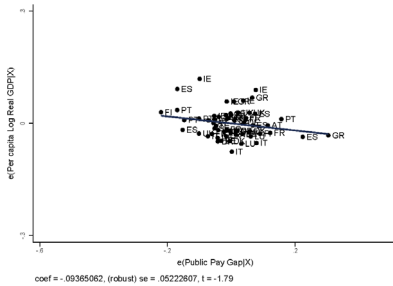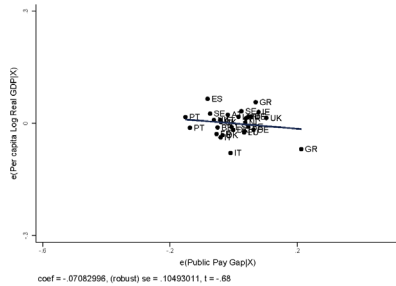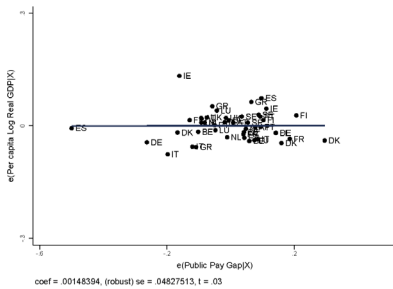
Public-private wage gap: residual (1)

coef = -.0796438, (robust) se = .05011502, t = -1.59

Public-private wage gap: residual (2)

coef = -.09385062, (robust) se = .05222607, t = -1.79

Public-private wage gap: residual (3)

coef = -.09385062, (robust) se = .05222607, t = -1.79

Public-private wage gap: residual (4)

coef = -.07082996, (robust) se = .10493011, t = -.68

Government Effectiveness

coef = .00148394, (robust) se = .04827513, t = .03

Quality of Government

coef = .12311096, (robust) se = .12738924, t = .97
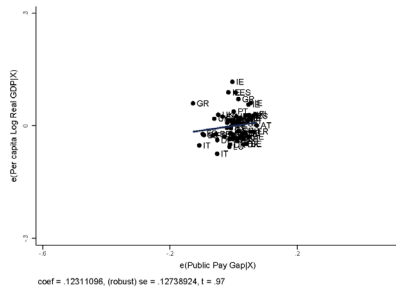
4. CONCLUSIONS

We review the main channels through which the "quality of bureaucracies" affect economic growth. The literature shows that public sector bureaucracies are key players in modern advanced economies, in particular for the smooth functioning of the roles assigned to the government sector, such as the provi-

sion and organization of welfare state services, and the implementation of the (economic) institutional framework, including as regards the tax code and the guarantees of legal certainty for economic agents. From this perspective, a better quality of bureaucracy is favorable for potential economic growth. Thus, cross-country differences in the quality of bureaucracies can explain, to a large extent, differences in economic growth among them.

In our paper we also provide some (suggestive) evidence on the positive relationship between bureaucratic/institutional quality and economic growth.

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