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Excessive public employment and rent-seeking traps ☆

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ABSTRACT

We propose a model where the size of the public sector and aggregate output are interrelated through the occupational choice of agents who differ in their skill level and degree of public-mindedness. When the public sector attracts bureaucrats with low degree of public service motivation, they will use their position to rent seek by employing an excessive number of unskilled workers. This leads to an equilibrium with relatively high unskilled wages, which lowers profits and deters entrepreneurship. Conversely, an equilibrium with a lean public sector and greater private economic activity arises when public service motivated agents populate the state bureaucracy. These agents exert high effort and employ a limited number of unskilled workers. Our model also shows that a bloated public sector with high wages may be supported by the unskilled agents.

1. Introduction

Low quality and oversized public sectors are often perceived as an inefficient use of budgetary resources that, if redressed, could improve public service delivery or help reduce poverty. It is no surprise then that two of the biggest institutional lenders to developing countries, The IMF and the World Bank, have actively promoted the inclusion of governance and corruption issues on the development agenda since the late 90s.[3] The concern with public sector mismanagement goes, however, deeper than just an issue of wasting budgetary resources: poor bureaucratic quality appears to be so important because it may also largely distort the operation of markets. Indeed, cross-country studies show that corruption and rent seeking in the public bureaucracies can severely hurt private investment and are associated with lower income per head, Keefer and Knack (1997), Knack and Keefer (1995) and Mauro (1995).[4]

In this paper, we argue that an oversized and inefficient public sector might also affect the economy's performance in a different way, by misallocating human resources through its participation in labor markets. In particular, we suggest that the quality of the public bureaucracy determines the demand of unskilled workers by the public sector, which in turn affects the equilibrium wage. When unskilled wages are inflated by excessive public sector demand, profits will be reduced and the private sector will lose attractiveness to potential entrepreneurs.

We focus on one particular aspect regarding the quality of bureaucrats that has attracted growing interest over the past few years: whether or not they exhibit the appropriate ethics or motivation for their jobs. [5] Commonplace in this literature is the presumption that monetary payoffs are not the only type of reward that individuals pursue and the idea that pro-social behavior cannot be perfectly monitored by monetary incentives. In such a context, it proves desirable that bureaucrats display a sense of mission and commitment towards the society they must serve. Such a sense of social mission has long been

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[3] See for example, "Good Governance: The IMF's Role" (1998).

[4] This negative relationship is also highlighted by comparative studies that look at different regions in Italy Alesina et al. (2001) and Putnam (1993).

[5] See Benabou and Tirole (2006), Besley and Ghatak (2005), Bond and Glode (2011), Delfgaauw and Dur (2008, 2010), Francois (2000), Ghatak and Mueller (2011), Macchiavello (2008), Murdock (2002) and Prendergast (2007).

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explored by the public administration literature, which refers to it as *public service motivation*, and a large number of survey-based studies provide evidence of its relevance in explaining the efficiency of public offices.[6]

In Sections 3 and 4, we propose an occupational choice model with heterogeneous agents and two different sectors: the *public sector* managed by bureaucrats and the *private sector* managed by entrepreneurs. There are two dimensions of heterogeneity among individuals. The first is the level of skills, which is assumed to be publicly observable (e.g. education). Only highly skilled individuals may become entrepreneurs or may be appointed state bureaucrats. The second source of heterogeneity is the individuals' intrinsic public service motivation, which is assumed to be private information. The advantage of filling the state bureaucracy with public service motivated agents is that they are less inclined to rent seek.

In our model, bureaucrats and entrepreneurs need unskilled workers to carry out their productive activities, and must compete for the same pool of workers in the (competitive) labor market. Entrepreneurial activities yield profits, which are a decreasing function of the labor cost. Bureaucrats earn a salary fixed by the central administration. In addition, bureaucrats enjoy (some) discretionary power over the public budget. As a result, they could find ways to abuse this power in order to extract rents from the society.

An important issue in our model is then *how* rent seeking materializes in the economy. In that regard, we argue that several among the main channels used by bureaucrats to generate and extract rents require somehow oversizing public employment. For example, bureaucrats may bloat the public sector with excessive workers so as to extract different kinds of perks from some of them. Alternatively, overemployment may be the result of the creation of (unnecessary) jobs as a mean to directly appropriate income from it or to channel transfers to certain desired groups of people. Indirect sources of rents may also lead to an oversized public sector: for example, overmanning may be the result of clientelistic practices by state bureaucrats, as public jobs are somehow exchanged for political support (Robinson and Verdier, 2002).

Within this framework, we show that markets might coordinate activities in two different types of equilibria, depending on who self-select into the state bureaucracy. First, there is an equilibrium in which *only* public service motivated agents become bureaucrats. These agents keep an efficient public sector, which employs the lowest possible number of workers, subject to providing all public goods demanded by the economy. In turn, a lean public sector disciplines wages in the labor market, sustaining high entrepreneurial profits, which attracts agents whose main concern is their own income (profit-driven agents) into entrepreneurship. A different equilibrium arises when profit-driven agents control high-rank positions in the public sector and use their discretionary power to extract rents by overhiring public workers. The ensuing bloated public sector inflates aggregate labor demand, pushing up the equilibrium wage. This situation becomes also self-sustained because low profits deter skilled profit-driven agents from entering the entrepreneurial sector.

Bureaucratic rent seeking is clearly inefficient in our model. A crucial question that arises is then whether individuals may put in place an institutional setup that precludes such rent seeking. At the end of Section 5 we argue against this possibility. In particular, we show that oversized public sectors may actually find the support of the unskilled fraction of the society. The reason for this is that unskilled workers *indirectly* benefit from bureaucratic rent seeking by seeing their (equilibrium) market wages inflated as a result of public sector overmanning.

There are a number of past articles that have embedded models of endogenous rent-seeking behavior into general equilibrium frameworks. Notable examples are Acemoglu and Verdier (1998, 2000) and Murphy et al. (1991). Murphy et al. (1991) studied how the choice between entrepreneurship and rent-seeking activities by the most talented individuals determines technical change and growth. Acemoglu and Verdier (1998) focused on the effects of property rights enforcement in a context of entrepreneurial opportunistic behavior. Acemoglu and Verdier (2000) dealt with the level of optimal bureaucratic intervention when the central (benevolent) government is confronted with both market failures and potential bureaucratic corruption. None of these articles has centered their attention on the interaction between the size, skill composition and efficiency of the public sector, together with its ensuing effects on the level of entrepreneurship, which are the main themes of our paper.

A closely related article is Macchiavello (2008), which also studies the possibility of multiple equilibria in an occupational choice model with public service motivated agents. His paper looks, however, at a public sector whose size and educational composition is exogenously fixed. Instead, our model highlights the importance of accounting for skills (or educational) differences, since the wage distortion becomes a crucial feature in explaining the following two phenomena: *i*) why a bloated public sector may adversely affect profits and entrepreneurship; *ii*) why a fraction of the society (the working class) may be willing to support rent-seeking bureaucrats who sustain a large and inefficient state apparatus. The latter point above contributes also to the political economy literature that has sought to endogenize the emergence and persistence of inefficient state institutions [e.g., Acemoglu et al. (2011) and Hassler et al. (2003)], by suggesting an additional channel that could generate political support for institutions that depress aggregate productivity.[7]

Our paper also relates to the growing literature on the quality of bureaucrats and politicians, e.g. Besley (2004), Bond (2008), Caselli and Morelli (2004), Matozzi and Merlo (2008) and Messner and Polborn (2004). A key aspect of all this literature is that it studies the process of self-selection into bureaucratic and political jobs within a partial equilibrium approach: in particular, it assumes that the returns in the private sector are exogenous and remain unaffected by who end up in the public sector. By contrast, in our model, the interplay between self-selection into public bureaucracy and the returns to private entrepreneurship lies at the heart of our theory and its main predictions.

Finally, occupational choice models in the development literature have so far mostly studied the long-run consequences of financial markets imperfections.[8] In particular, Ghatak et al. (2007), Aney et al. (2011) and Jaimovich (2011) have focused on how financial markets imperfections may interact with the inability of markets to allocate agents to the occupations for which they are comparatively best suited. Our paper sheds light on how imperfections in the sorting of bureaucrats may also result in market distortions which preclude full development of the entrepreneurial sector, even in the absence of credit market imperfections.

2. Public sector overmanning and rent seeking

The mechanism we propose in this paper mostly applies to urbanized developing countries, regions or even cities, where labor markets are not fragmented and state capacity has somewhat developed. Anecdotal evidence of public sector overmanning in developing regions is

[6] See discussion in Francois (2000) and references therein (pp. 275 and 276).

[7] More recently, an interesting political economy mechanism complementary to our story has been proposed by Aney et al. (2011) within an occupational choice framework with credit market frictions. Their model leads to a class structure that distorts institutions by removing incentives to vote for surplus-maximizing policies.

[8] E.g., Aghion and Bolton (1997), Banerjee and Newman (1993), Ghatak et al. (2001) and Lloyd-Ellis and Bernhardt (2000).

Table 1
Public sector employment and income per capita — regional variation.

	(1)	(2)	(3)	(4)	(5)	(6)
	Log regional income per capita					
	Italy	Spain	US	Brazil	Sweden	Denmark
Log regional public Sector employment (%)	−1.01 (7.69)***	−0.62 (4.06)***	−0.50 (3.04)***	−0.79 (2.97)***	−0.19 (1.34)	0.15 (0.54)
Number of regions	19	16	48	26	21	10
Year	1996	2004	2007	1991	2007	2007
R-squared	0.67	0.45	0.59	0.27	0.69	0.27

Robust absolute t-statistics in parenthesis. Regressions exclude regions that consist only (or mainly) on the capital city, i.e. Lazio (Italy), Madrid (Spain), DC (US — Hawaii and Alaska are also excluded), Brasilia (Brazil), Stockholm (Sweden) and Copenhagen (Denmark).
*** Significant at 1%.

indeed overwhelming [see, for example, Gelb et al. (1991), Heller and Tait (1983) and Kikeri (1998)].[9]

Interestingly, this phenomenon can also be found in poorer regions of developed economies with large degrees of cross-regional inequality. For example, Alesina et al. (2001) report huge differences in size and productivity of postal offices across Italian regions: while in the relatively richer North 179 postal workers are needed to deliver 100,000 units of correspondence, the number rises to 566 in the center, and to 1783 in the relatively poorer South.[10]

The link between regional inequality, public employment and development goes beyond pure anecdotal evidence. Table 1 reports some correlations between public employment and income per capita. We look at three developed economies (Italy, Spain and US) which exhibit the largest degree of regional inequality among the 11 industrialized economies reported in Barro and Sala-i-Martin (1995). We also look at Brazil, a federal developing country with high regional inequality and around 85% urban population. Table 1 shows that the public sector is consistently larger in poorer regions for these four economies.[11]

The above phenomenon can find several explanations; the simplest probably being that the public sector steps in to provide employment in the absence of a vigorous private sector. Even though this is empirically plausible (and we do not dispute the validity of this argument), we propose a theory where the lack of opportunities in the private sector arises as an equilibrium result due to excessive public employment. In addition, the presumption that follows from the public sector acting as the employer of last resort is that its size would dwindle as new opportunities in the private sector arise for workers. Our model would instead suggest that the likelihood of a private sector resurgence is not ensured because its profitability may be kept low precisely by the presence of a bloated public sector. In that respect, unless there is an important shock (e.g. a sudden rise in private sector productivity) a region would not (spontaneously) undo a configuration with a bloated public sector and little private activity.

Another important feature in our theory is the notion that an oversized public sector is somehow a symptom of underlying bureaucratic opportunistic behavior. One of the first studies to propose a theoretical link between rent seeking and the size of the public sector is Niskanen (1971), which describes bureaucrats as self-interested agents whose objective is increasing the size of the budgets they manage as much as possible. In our model, such self-interested attitude by a fraction of the society leads to expanding public employment well beyond the level required to efficiently produce the public goods demanded by the society. A similar view is present in Gelb et al. (1991) who maintain that public employment is usually seen in less developed economies as a rent-extraction device rather than as an input to produce public goods.[12] As mentioned before, a number of different motives, such as featherbedding, nepotism, or clientelistic practices, may all lead state bureaucrats to expand public employment as a channel to generate and extract rents.[13]

A distinctive feature in our theory is that dysfunctional public sectors are not strictly defined by their overall size, but actually by the more nuanced understanding of which type of public employment grows. In particular, our theory suggests that lower public sector quality is associated with a greater proportion of unskilled workers. Table 2 looks at this correlation, using the 5-year average share of unskilled workers for a cross-section of countries for the period 2002–2006, and standard measures of public sector quality (from Transparency International and The World Bank, see details at the bottom of the table). We can observe that the simple correlation holds (column 1), and that it also remains strong even when controlling for regional dummies, the share of skilled workers in the economy, the level of GDP per capita and size of the public sector (columns 2–4). That suggests that alternative mechanisms, that could be correlated with both phenomena such as the general level of development or the availability of skills in the economy, are not driving this correlation. Similarly, the result does not reflect the scale of the public sector.

In the remainder of the paper we introduce an occupational choice model that aims at rationalizing the above correlations. Our model will link together bureaucratic rent-seeking and the bloating of the public sector with unskilled workers as an equilibrium outcome. Such correlation turns out to be the counterpart of an economy with low income and scant entrepreneurship, as the wage distortion caused by the public sector bloatedness ultimately discourages private activity.

[9] As an illustrative example, a New York Times article (April 15, 1987) entitled 'In Brazil, Battle of the Bloated Bureaucracy' recounts various examples of overmanned public offices in different states of Brazil, to the point that one Governor claimed 'that he could administer the state with only 30% of the current employees'.

[10] The same regional pattern holds for the fraction of postal workers among the total number of workers, and for similar measures of productivity among police officers, tax inspectors and railway workers (see Table 3, therein).

[11] For illustrative purposes, Table 1 also shows that this correlation does not hold for Sweden and Denmark, two developed economies with relatively low inter-regional inequality.

[12] Even in the cases of developed economies, the size of public employment seems to raise suspicion of opportunistic behavior. For example, Durden (1990) measures rent-seeking behavior across US states by the share of workers employed in federal and state government jobs.

[13] A good summary of how we approach this phenomenon is provided by Geddes (1994, page 27) with reference to Latin America: 'and politicians under traditional arrangements have the power to decide who will be hired to fill government posts. These officials have the choice of hiring the people who will contribute most to the officials' personal welfare (usually members of their own families); hiring the people who will contribute most to consolidating political support for themselves or their parties; or hiring the people who will contribute most to administrative effectiveness (the most technically qualified applicants). For the administrator or politician involved, choosing the applicant most likely to contribute to improving the administration often involves a certain and immediate loss of either personal or political benefits'.

Table 2
Quality and composition of the public sector — cross country evidence.

	(1)	(2)	(3)	(4)
	Log share unskilled workers in the public sector			
Corruption perception index	−0.041 (2.72)***	−0.072 (3.46)***		
Log share public sector employment		0.127 (2.16)**	0.163 (3.42)***	0.178 (3.61)***
Log share skilled workers		−0.311 (4.56)***	−0.316 (4.50)***	−0.308 (4.28)***
Log GDP pc		0.189 (2.89)***	0.156 (2.85)***	0.115 (2.06)**
Government effectiveness			−0.168 (3.15)***	
Regulatory quality				−0.141 (2.76)***
Region fixed effects	No	Yes	Yes	Yes
Observations	62	62	62	62
R-squared	0.11	0.57	0.58	0.57

Absolute values of robust t-statistics in parentheses. Corruption perception index (from transparency international), government effectiveness and regulatory quality (from the World Bank) are indices whose value increase the better the perception of government performance. We define unskilled labor d according to ISCO88 classification and we include clerks, service workers, machine operators, etc. (codes 4 to 9). Skilled correspond to codes 1 to 3 and includes managers, professionals and technicians. Public sector comprises public administration and defense. Using these definitions, "Log Share Unskilled Workers in the Public Sector" is the log of unskilled workers in the public sector over total workers in the public sector. "Log Share Public Sector Employment" is the log of employees in the public sector over total workers. "Log share skilled workers" is the log of skilled workers over total workers in the economy. Regions include all continents and a category for industrialized countries. All data are averaged for the period 2002–2006.
** Significant at 5%.
*** Significant at 1%.

3. Setup of the model

3.1. Environment

We consider a single-period economy with two productive sectors: *i*) the public sector, and *ii*) the private sector. The economy is inhabited by a continuum of risk-neutral individuals with mass equal to 2. A mass 1 of the individuals are unskilled; the remainder unit mass are skilled. Individuals' skills are publicly observable. Every individual (regardless of his skill) is endowed with an initial monetary income $x > 0$ and with one unit of unskilled labor time, which he could supply in the labor market.

3.1.1. The private sector

Private firms produce a *private good* using two types of inputs: one unit of entrepreneurial skills and unskilled labor (in variable amount). Entrepreneurial skills are possessed *only* by skilled agents, who are all identically endowed with one unit of these skills.

A firm owned by a skilled agent produces output (the private good) according to the following production function, where l denotes the amount of labor employed by the entrepreneur[14]:

$$y(l) = Al^{\alpha}, \quad \text{where } 0<\alpha\leq\frac{1}{2}. \tag{1}$$

Henceforth we normalize the price of the private good to unity. The optimization problem of the entrepreneurs then yields the following labor demand and entrepreneurial profits, both functions of w:

$$l(w) = (\alpha A/w)^{\frac{1}{1-\alpha}} \text{ and } \Pi(w) = A^{\frac{1}{1-\alpha}}(1-\alpha)\alpha^{\frac{\alpha}{1-\alpha}}w^{-\frac{\alpha}{1-\alpha}}. \tag{2}$$

[14] Setting the upper-bound at $\alpha = 0.5$, rather than the usual restriction $\alpha \in (0,1)$, allows an easier (and speedier) exposition of our main results. However, we should stress here that relatively low values of α are instrumental for our proposed wage mechanism, so some of our results will not straightforwardly extend to cases in which α is sufficiently close to 1 (see footnote to Proposition 2 later on). Intuitively, a smaller α implies a less elastic labor demand function, which in turn means a stronger response by equilibrium wages to a bloating public sector.

3.1.2. The public sector

The public sector is composed by a continuum of public offices with mass $b \in (0,1)$. Each office is managed by a bureaucrat. Bureaucrats are appointed by the central administration with the mandate to ensure that *one* unit of the public good is produced in their offices. Bureaucrats receive a fixed salary $B > 0$ provided they fulfill their mandate; otherwise they receive no payment. Only skilled agents may be appointed bureaucrats. Once an individual accepts a bureaucratic job, he cannot resign.

Bureaucrats organize the production of public goods in each office; without them public offices cannot produce any public goods. In addition, bureaucrats decide the number of unskilled workers to hire for their offices. Throughout the paper, we assume that the entire public sector is fully financed by lump-sum taxes collected by the central administration and distributed among the public offices according to their needs. In addition, we assume that x is large enough to ensure that individual lump-sum taxes are always affordable to all agents in the economy.[15]

Denote by g_i the amount of public good produced in office i. We assume the following production function in the public sector:

$$g_i(e_i, n_i) = \theta_i(e_i + n_i)/2, \tag{3}$$

where $e_i = \{0,1\}$ is the level of bureaucratic effort and n_i equals the amount of labor hired by office i. Bureaucratic effort is publicly unobservable. The variable θ_i is an idiosyncratic office-productivity shock that can take two possible values, namely: $\theta_i = \{1,2\}$, each with probability one-half. The realization of θ_i is learned by the bureaucrat only *after* he has accepted the job in office i. The bureaucrat i is the only agent who is able to observe the realization of θ_i. After observing the value taken by θ_i, the bureaucrat announces $\widetilde{\theta}_i = \{1,2\}$ to the central administration in order to ask for the needed funds to meet the production target $g_i(\cdot) = 1$.

Bureaucrats may try to lie to the central administration: they may wish to announce $\widetilde{\theta}_i = 1$ when actually $\theta_i = 2$, so as to receive funds to hire $n_i = 1$ while putting $e_i = 0$. For that reason, we assume that the central administration will audit offices for which $\widetilde{\theta}_i = 1$. In order not to be caught misrepresenting θ_i, a bureaucrat has got to spend some *unproductive* effort to hide his misdeeds. In particular, we suppose that if a bureaucrat spends an amount of unproductive effort ε_i, he will be able to avoid being caught understating the actual θ_i with probability $3\varepsilon_i$. Finally, we assume that if auditors find out that $\theta_i = 2$ after an announcement $\widetilde{\theta}_i = 1$, they force the bureaucrat to set $e_i = 1$.

3.1.3. Preferences: public service motivation

Skilled agents differ in terms of their level of public service motivation. A fraction $\mu \in (0,1)$ among those individuals are *public service motivated* agents (henceforth, PSM). The remainder, $1 - \mu$, are referred to as *profit-driven* agents (henceforth, PD). We assume agents' preferences (i.e., whether an agent is PSM or PD) are private information. In addition, henceforth, we assume that there exist enough PSM agents in the economy to (possibly) manage all the public offices; that is, we impose[16]:

Assumption 1. $\mu \geq b$.

Bureaucrats derive utility from their income and disutility from the effort they exert at work. We assume that disutility of bureaucratic effort is decreasing in the degree of public mindedness. In particular,

[15] All our main results remain in place if we replaced lump-sum taxation by a proportional income tax. With a proportional income tax, we would not need the additional assumption of $x > 0$. However, in addition to increasing the algebraic complexity of the model, income taxes introduce an additional source of distortion on occupational choices (on top of that of inflated unskilled wages). In that respect, the choice of lump-sum taxation is essentially driven by the desire to present our proposed mechanism as cleanly as possible.

[16] The only reason why we impose Assumption 1 is to allow the model to possibly yield an equilibrium in which all public offices are managed by motivated agents. If this condition did not hold, then the model would always need that some unmotivated agents become bureaucrats, leading thus quite mechanically to equilibria with rent-seeking behavior.

conditional on having met the production target, the (ex-post) payoff function of bureaucrat i is given by[17]

$$U_i = B - \frac{3}{2}\left(\frac{e_i}{1+\lambda_i} + \varepsilon_i\right) \quad (4)$$

$$\text{where}: \ \lambda_i = \begin{cases} 0 & \text{if i is a PD agent,} \\ \lambda > 0 & \text{if i is a PSM agent.} \end{cases}$$

In order for the allocation of public mindedness to noticeably influence the operation of the economy, not only we need a sufficient mass of PSM agents relative to the size of the public sector (Assumption 1), but also that their intrinsic motivation is sufficiently strong relative to that of PD agents. The following assumption deals with this issue.

Assumption 2. $\lambda > 2$.

A bureaucrat who runs an office where $\theta_i = 1$ will optimally announce $\widetilde{\theta}_i = 1$; otherwise he will fail to comply with the production target $g(\cdot) = 1$ and, consequently, lose his salary B. However, truth-telling is not guaranteed if a bureaucrat finds out that $\theta_i = 2$. In this case, the bureaucrat may wish to announce $\widetilde{\theta}_i = 1$, so as to give himself room to shirk with probability $3\varepsilon_i$, by spending ε_i units of unproductive effort to cover up his misdeeds. The following lemma states the optimal announcements and ε_i, by each type of bureaucrat.

Lemma 1.

(i) PD bureaucrats always announce $\widetilde{\theta}_i = 1$, setting $\varepsilon_i = 1/3$ when $\theta_i = 2$, and $\varepsilon_i = 0$ when $\theta_i = 1$.
(ii) If Assumption 2 holds, PSM bureaucrats always announce $\widetilde{\theta}_i = \theta_i$, setting always $\varepsilon_i = 0$.

Proof. In Appendix A. ■

The result in Lemma 1 is, admittedly, a mechanical implication of the parametric assumptions in (4) and Assumption 2. However, the essence of the lemma is somewhat more general: since PSM agents are more willing to exert bureaucratic effort, they are in general also less prone to cheat about θ_i so as to extract rents by overmanning their offices with unnecessary workers.

From the previous discussion and Lemma 1, it follows that the amount of employment in each of the public offices will depend both on the productivity shock and on the bureaucrat's type. In particular, a PSM bureaucrat will hire public workers according to:

$$n_{PSM} = \begin{cases} 0 & \text{if } \theta_i = 2, \\ 1 & \text{if } \theta_i = 1. \end{cases} \quad (5)$$

On the other hand, PD bureaucrats will hire public workers according to:

$$n_{PD} = 1, \ \text{always}. \quad (6)$$

PSM bureaucrats always exert effort $e_{PSM} = 1$, whereas PD bureaucrats put $e_{PD} = 1$ only if $\theta_i = 1$, setting instead $e_{PD} = 0$ when $\theta_i = 2$. By using these results and Lemma 1, we can write down the level of (expected) utility achieved by each type of bureaucrat:

$$U_{PSM} = B - \gamma, \quad (7)$$

where $\gamma \equiv 3/[2(1+\lambda)]$, and

$$U_{PD} = B - 1. \quad (8)$$

Notice that Assumption 2 implies $\gamma < 1$, hence $U_{PSM} > U_{PD}$.[18]

3.2. Timing of the events

The events in the model occur in six different stages, according to the following sequence:

1. *Bureaucrats salary decision*: the central administration fixes B once-and-for-all.
2. *First-stage occupational choice of skilled agents*: Each skilled agent decides whether or not to apply for a bureaucratic job. Applying for a bureaucratic post is costless.
3. *Allocation of bureaucratic posts*: If the total mass of applicants to bureaucratic jobs is no larger than b, all the applicants obtain the job. Otherwise, the mass b of bureaucratic posts is assigned by a draw among all the applicants.
4. *Second-stage occupational choice of skilled agents*: Each skilled agent who did not apply (in stage 2) or did not get (in stage 3) a bureaucratic job decides whether or not to start a private entrepreneurial project.
5. *Announcements, assignment of public funds, and labor market transactions*: Each bureaucrat i observes $\theta_i \in \{1,2\}$ and announces $\widetilde{\theta}_i \in \{1,2\}$. The central administration audits offices announcing $\widetilde{\theta}_i = 1$ and, subsequently, distributes the required funds to each office. Bureaucrats and entrepreneurs hire workers in the labor market. All remaining agents supply their unit-time labor endowment in the market.
6. *Production stage*: Production takes place and all payments are made.

4. Market equilibrium analysis

In this section, we study the joint determination of the individuals' optimal occupational choices and the unskilled workers market-clearing wage, for a given bureaucratic salary B.

4.1. Optimal occupational choice

Before proceeding to study the general equilibrium results of the model, it proves instructive to first characterize the optimal occupational choice of the individuals, given the wage w (and the bureaucrats salary B). From now on, and without any loss of generality, we assume that whenever agents are indifferent between a bureaucratic job and any other occupation, they always choose the former.

In order to facilitate the exposition, for the remainder of Section 5, we will often let $B > \widetilde{A} + 1$, where $\widetilde{A} \equiv \alpha^{\alpha}(1-\alpha)^{1-\alpha}A$. This condition implies that there exists a wage threshold, $\hat{w}$, where $0 < \hat{w} < \widetilde{A}$, such that: if $w < \hat{w}$, PD agents choose not to apply for a bureaucratic post since they are better off as private entrepreneurs; whereas, if $w \geq \hat{w}$, these agents actually prefer a bureaucratic job to running a firm. In other words, $\hat{w}$ is the wage level at which $\Pi(\hat{w}) \equiv B - 1$. It is easy to observe that:

$$\hat{w} \equiv \alpha A^{\frac{1}{\alpha}}\left(\frac{1-\alpha}{B-1}\right)^{\frac{1-\alpha}{\alpha}}. \quad (9)$$

(Notice that if $B < \widetilde{A} + 1$, PD agents would never choose bureaucracy as an occupation, switching from entrepreneurial activities to supplying unskilled labor when the market wage rises above $\widetilde{A}$.)

We can also define the threshold $\underline{w}$, such that when $w < \underline{w}$ entrepreneurial profits are also greater than $B - \gamma$, implying that not even PSM agents wish to apply to bureaucratic jobs. Namely:

$$\underline{w} \equiv \alpha A^{\frac{1}{\alpha}}\left(\frac{1-\alpha}{B-\gamma}\right)^{\frac{1-\alpha}{\alpha}}. \quad (10)$$

[17] Also, for completeness, payoff functions (2) and (4) should also include two additional terms: (i) a positive term capturing the utility derived from public goods consumption, (ii) a negative term equal to the lump-sum taxes paid by each individual. Given that both (i) and (ii) will affect all agents equally, for the time being, there is no harm to our results by not explicitly including any of these two terms in the payoff functions, as neither (i) nor (ii) will have any impact on the optimal occupational choices of the individuals.

[18] Notice that the parameter λ in Eq. (4) could encompass as well an alternative interpretation in terms of relative skills for managerial activities in the public sector. From this perspective, agents with large λ would exhibit a comparative advantage as bureaucrats. Assuming that the value of λ is publicly unobservable, the issue in this case would be whether the economy is able to fill the state bureaucracy only with agents with high λ.

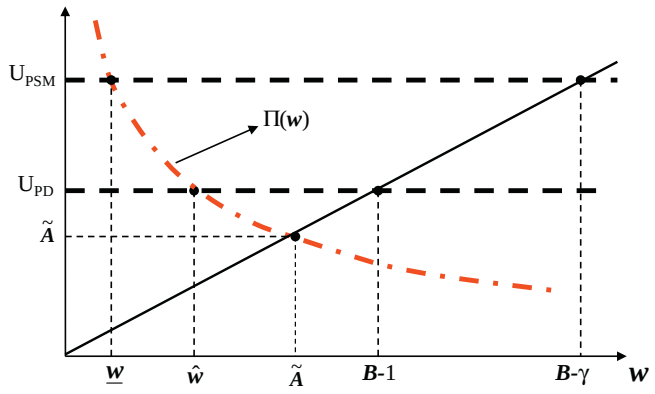

Fig. 1. Payoff functions by different occupations.

Fig. 1 plots the payoff functions of bureaucrats, entrepreneurs and workers, for a varying w, given Assumption 2 and $B>\tilde{A}+1$. These payoff functions correspond to those elicited before in Eq. (2) for the entrepreneurs, Eq. (7) for PSM bureaucrats, and Eq. (8) for PD bureaucrats; the w-line portrays the payoff of any agent in the economy who becomes a worker.

- For all $0\leq w<\underline{w}$: No agent applies for a bureaucratic post. All skilled agents in the economy become entrepreneurs.
- For all $\underline{w}\leq w<\hat{w}$: Only PSM agents apply for a bureaucratic post. All the skilled agents that did not apply or get a bureaucratic job become entrepreneurs.
- For all $\hat{w}\leq w\leq\tilde{A}$: Both PSM and PD agents apply for a bureaucratic post. If $\hat{w}\leq w<\tilde{A}$, all the skilled agents that did not get a bureaucratic job become entrepreneurs; if $w=\tilde{A}$, they choose indifferently between becoming either entrepreneurs or workers.
- For all $\tilde{A}<w\leq B-1$: Both PSM and PD agents apply for a bureaucratic post. All the skilled agents that did not get a bureaucratic job become workers.
- For all $B-1<w\leq B-\gamma$: Only PSM agents apply for a bureaucratic post. All the skilled agents that did not apply or get a bureaucratic job become workers.
- For all $w>B-\gamma$: No agent applies for a bureaucratic post. Everyone becomes a worker.

The main result that we wish to stress here is the existence of a wage threshold, $\hat{w}$, at which PD agents change their minds regarding their most desired occupation. Below $\hat{w}$, PD agents optimally self-select away from the public sector, since they are better off making profits in the private sector, which are relatively high due to low labor cost. However, for $\hat{w}\leq w$, profits are not high enough to attract PD agents, who turn out to be better off as (rent-seeking) bureaucrats.

4.2. General equilibrium analysis

Two additional conditions must be satisfied in the general equilibrium analysis: first, the labor market must clear; second, no bureaucratic post must remain unfilled. More formally:

Definition 1. (Market General Equilibrium) A market general equilibrium is characterized by: i) a market wage, w, ii) a bureaucrats salary, B, and iii) an occupational choice by each agent in the economy; such that the following three conditions are simultaneously satisfied:

1. All individuals choose their occupations optimally.
2. The labor market clears.
3. All bureaucratic posts are filled.

Condition 1 has been illustrated in the previous subsection. Condition 2 stipulates the labor market clearing condition. Condition 3 simply requires that, in equilibrium, there must be enough applicants to fill all bureaucratic positions in the public sector. Regarding this last condition, one additional remark applies: it will somehow restrict the range of values that B may possibly take. In that respect, notice that Condition 3 implies neither $0\leq w<\underline{w}=\alpha A^{\frac{1}{\alpha}}[(1-\alpha)/(B-\gamma)]^{\frac{1-\alpha}{\alpha}}$ nor $w>B-\gamma$ may hold in equilibrium, as they would both lead to a situation in which no one applies to bureaucratic jobs. For this reason, we will carry on with the rest of our analysis letting $\underline{w}\leq w\leq B-\gamma$.

Our main focus here is on the interplay between the optimal occupational choice of the skilled and the equilibrium wage in the labor market. Bearing in mind the results in Section 4.1, and using the Eqs. (5) and (6), we can write down the analytical expressions for the (aggregate) labor demand and labor supply functions, respectively:

$$L^D(w)=\begin{cases}(1-b)(\alpha A/w)^{\frac{1}{1-\alpha}}+b/2 & \text{if } \underline{w}\leq w<\hat{w},\\ (1-b)(\alpha A/w)^{\frac{1}{1-\alpha}}+b(1-\mu/2) & \text{if } \hat{w}\leq w<\tilde{A},\\ \left[b(1-\mu/2),(1-b)\dfrac{\alpha}{1-\alpha}+b(1-\mu/2)\right] & \text{if } w=\tilde{A},\\ b(1-\mu/2) & \text{if } \tilde{A}<w\leq B-1\\ b/2 & \text{if } B-1<w\leq B-\lambda\end{cases} \tag{11}$$

$$L^S(w)=\begin{cases}1 & \text{if } w<\tilde{A},\\ [1,2-b] & \text{if } w=\tilde{A},\\ 2-b & \text{if } \tilde{A}<w\leq B-\lambda\end{cases}. \tag{12}$$

From Eq. (11), we can observe that the labor demand function is non-monotonic in w. In particular, $L^D(w)$ jumps at $w=\hat{w}$ by the strictly positive amount $b(1-\mu)/2$. This happens because at $w=\hat{w}$, PD agents' most desired occupation switches from entrepreneurship to state bureaucracy. Whenever $w<\hat{w}$ all the public offices end up managed by PSM bureaucrats, who properly fulfill their tasks and keep their offices lean, without any unnecessary workers. Instead, just above $w=\hat{w}$, a fraction $(1-\mu)$ of bureaucratic jobs end up in the hands of PD agents, who (whenever they are able to) abuse their positions to extract rents by hiring more workers per office than really needed.

Proposition 1. *Suppose Assumptions 1 and 2 hold. Then:*

(i) *An equilibrium in which only PSM agents become bureaucrats exists if and only if:*

$$\hat{B}\equiv A(1-\alpha)\left(\frac{1-b/2}{1-b}\right)^{\alpha}+\gamma\leq B<A(1-\alpha)\left(\frac{1-b/2}{1-b}\right)^{\alpha}+1\equiv\overline{B}. \tag{13}$$

(ii) *An equilibrium in which a fraction μ of the bureaucratic jobs go to PSM agents, while the remaining fraction $(1-\mu)$ go to PD agents exists if and only if:*

$$B\geq A(1-\alpha)\left[\frac{1-b(1-\mu/2)}{1-b}\right]^{\alpha}+1\equiv\underline{B}(\mu). \tag{14}$$

Proof. In Appendix A. ■

Proposition 1(i) shows that a *necessary* condition for keeping PD agents away from the state bureaucracy is that the bureaucrats salary is not too large ($B<\overline{B}$). However, as shown in part (ii), $B<\overline{B}$ is actually not *sufficient* to ensure such a goal is achieved. In particular, when $B\geq\underline{B}(\mu)$, an equilibrium (possibly not unique) exists in which *all* skilled agents in the economy apply for a bureaucratic job. Notice that $\underline{B}'(\mu)>0$, implying that an economy with a larger fraction of PSM agents exhibits a smaller range of values of B for which such an equilibrium exists.

From Eqs. (13) and (14), we can immediately observe that $\underline{B}(\mu)<\overline{B}$. However, nothing guarantees that $\underline{B}(\mu)>\hat{B}$. In fact, none of our parametric restrictions imposed so far ensures that a unique equilibrium where *only* PSM agents apply for bureaucratic jobs actually exists. For $\underline{B}(\mu)$ to

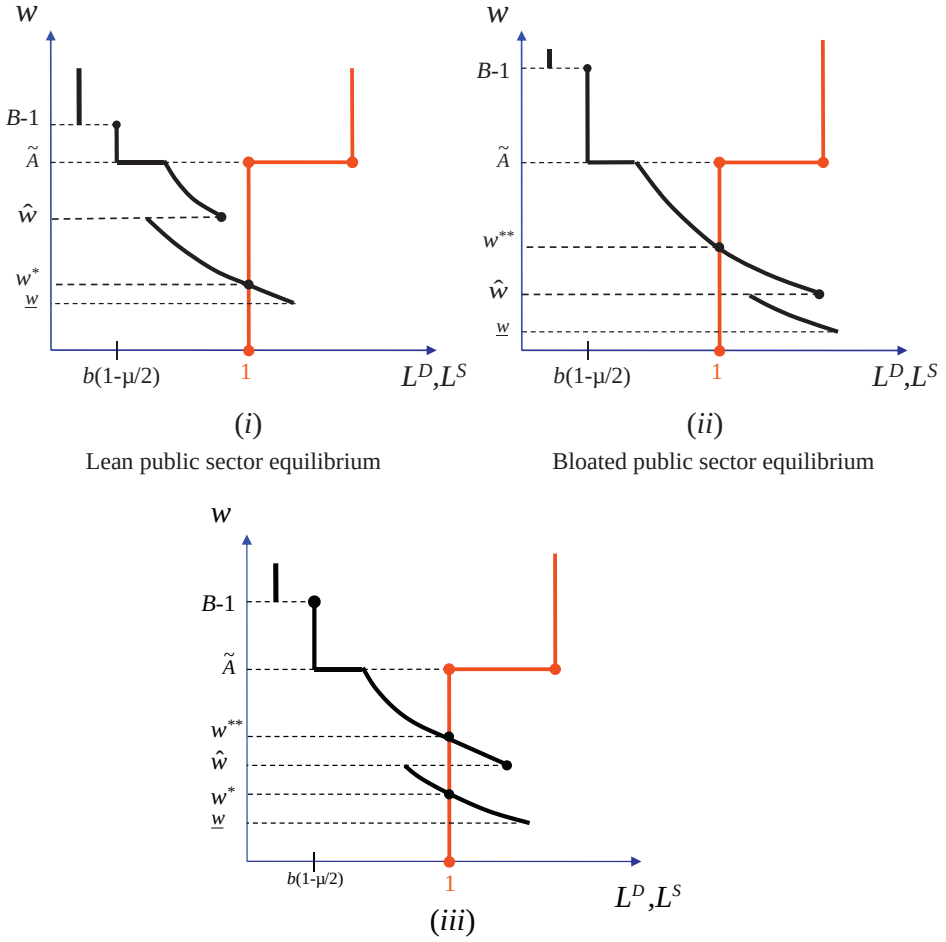

Fig. 2. Labor Market Equilibria - three different cases.

be greater than $\hat{B}$ (so that there exists a feasible range where B is low enough that it only attracts PSM agents to the state bureaucracy while it is also consistent with a general equilibrium) preferences of PSM and PD agents must be sufficiently different. It turns out that, for values of A which are not too large, there always exists a value of λ large enough (implying a value of γ sufficiently close to zero) such that $\underline{B}(\mu)>\hat{B}$ holds:

Lemma 2. *If* $1-\gamma > A(1-\alpha)\Gamma$, *then* $\underline{B}(\mu)>\hat{B}$, *where*

$$\Gamma \equiv \frac{(1-b/2)^{\alpha}-(1-b+b\mu/2)^{\alpha}}{(1-b)^{\alpha}} \tag{15}$$

features a positively valued function with an upper-bound $\overline{\Gamma}(\alpha)<1$. *Moreover,* $\overline{\Gamma}(\alpha)$ *decreases as* α *gets smaller, and in the limit equals zero, that is:* $\overline{\Gamma}'(\alpha)>0$ *and* $\lim_{\alpha\to 0}\overline{\Gamma}(\alpha)=0$.

Proof. In Appendix A. ■

Notice that since Γ in Eq. (15) is bounded above at $\overline{\Gamma}(\alpha)<1$, then when A is not too large so that $A(1-\alpha)\overline{\Gamma}(\alpha)<1$, there will always exist a λ large enough leading to $\underline{B}(\mu)>\hat{B}$. The following corollary combines the previous results in Proposition 1 and Lemma 2, and describes the different types of equilibria that may arise in the model. Fig. 2 illustrates each of the three cases when the parametric condition $1-\gamma > A(1-\alpha)\Gamma$ actually holds.

Corollary 1. *If* $1-\gamma > A(1-\alpha)\Gamma$, *three different equilibrium cases are possible depending on B:*

(i) *Lean public sector unique equilibrium: If* $\hat{B}\le B<\underline{B}(\mu)$, *the equilibrium is unique. In the equilibrium, only PSM agents apply for (and obtain) bureaucratic jobs, the mass of unskilled public employees equals b/2, and the wage of unskilled workers is*

$$w^{*}=\alpha A\left(\frac{1-b}{1-b/2}\right)^{1-\alpha}. \tag{16}$$

(ii) *Bloated public sector unique equilibrium: If* $B\ge\overline{B}$, *the equilibrium is unique. In the equilibrium, both PSM and PD agents apply for bureaucratic jobs, a fraction* μ *of these jobs go to PSM agents, a fraction* $1-\mu$ *go to PD agents, the mass of unskilled public employees equals* $b(1-\mu/2)$, *and the wage of unskilled workers is*

$$w^{**}=\alpha A\left(\frac{1-b}{1-b(1-\mu/2)}\right)^{1-\alpha}. \tag{17}$$

(iii) *Multiple equilibria: If* $\underline{B}(\mu)\le B<\overline{B}$, *there exist two equilibria in the model. One of the equilibria features a 'lean public sector equilibrium', with identical characteristics as that of case (i) above. The other equilibrium features a 'bloated public sector equilibrium', with identical characteristics as that of case (ii) above.*

If $1-\gamma < A(1-\alpha)\Gamma$, then $\underline{B}(\mu) \leq \hat{B}$, and only cases (ii) and (iii) above are feasible.

Henceforth, for brevity, we will often refer to each of the two types of equilibria described above, respectively, as *lean equilibrium* and *bloated equilibrium*.[19]

The lean equilibrium is characterized by an *efficient* allocation of agents to activities, in the sense that all bureaucratic jobs end up in the hands of the agents who display a comparative advantage for these jobs: the PSM agents. PSM bureaucrats manage their offices ethically. More precisely, the do not abuse their power in order to bloat their offices with excessive workers as a mean to extract rents. This disciplines wages in the labor market, which in turn means that entrepreneurial profits remain attractive enough to keep PD agents away from rent seeking in the public sector.

However, the economy may well fail to coordinate the allocation of agents correctly, ending up in a bloated equilibrium, as those where the market wage is $w^{**} \geq \hat{w}$. In such cases, it becomes optimal for *all* skilled agents (both PSM and PD) to try to get a bureaucratic job in the public sector. As a result, in a bloated equilibrium, a fraction $1-\mu$ of the public offices end up managed by PD bureaucrats who abuse their discretionary power, and extract rents by hiring an excessive number of public workers. This (mis-)allocation of agents is self-sustaining since a bloated public sector inflates aggregate labor demand, pushing up the equilibrium wage, which in turn lowers profits and discourages the PD agents from exercising their skills in the private sector.

Finally, notice that when $1-\gamma < A(1-\alpha)\Gamma$, the lean equilibrium does not exist as a unique equilibrium. This implies that in such cases the efficient allocation of skills in the public sector cannot be ensured even if bureaucrat salaries were set sufficiently low, which would be the way to screen skilled agents with heterogeneous levels of public service motivation.[20]

5. Total output and welfare analysis

In this section we compare, first, the level of aggregate output and, second, individuals' welfare, across the different types of equilibria that may arise in the model.

5.1. Aggregate output

Let us first look at the case where multiple equilibria are feasible. Aggregate output in the lean equilibrium (Y^*) is strictly larger than in the bloated equilibrium (Y^{**}). In equilibrium, total output is given by

$$Y = \int_0^b g_i \, di + \int_b^1 y(l(w))di = b + (1-b)A^{\frac{1}{1-\alpha}}(\alpha/w)^{\frac{\alpha}{1-\alpha}}, \tag{18}$$

where to obtain Eq. (18) we are using the expressions in Eqs. (1) and (2). From Eq. (18), it immediately follows that the output gap, Y^*-Y^{**}, is strictly positive due to $w^* < w^{**}$. Also, it can be readily observed that the output gap is solely explained by lower private output in the bloated equilibrium, as aggregate public output equals, by construction, b in both equilibria. Yet, the underlying *cause* why $Y^* > Y^{**}$ actually rests on the public sector behavior. Intuitively, PD bureaucrats tend to expand public employment (relative to PSM bureaucrats), which reduces the labor supply left available for other activities in the economy and thus (partly) crowds out the private sector. However, PD bureaucrats expand the size of the public sector workforce as a mean to extract rents from it; hence, although public employment is higher, public output remains constant, implying that aggregate output is smaller in an equilibrium with a fraction $(1-\mu)$ of PD bureaucrats than in one where all bureaucrats are PSM.

The previous paragraph compares aggregate output in situations where multiple equilibria are feasible for a specific economy. We show below that the result can be extended to any equilibrium that may arise.

Corollary 2. *Take an economy with a given set of parameters: A, μ, α, λ and b, and which satisfies Assumptions 1 and 2. Depending on the specific level of B, two broad types of equilibria may arise in the economy: (i) equilibria in which only PSM agents apply for bureaucratic jobs; (ii) equilibria where both PSM and PD agents apply for bureaucratic jobs.*

In (i), aggregate output is given by: $Y^* = b + A(1-b)^{1-\alpha}(1-b/2)^{\alpha}$.

In (ii), aggregate output is given by: $Y^{**} = b + A(1-b)^{1-\alpha}[1-b(1-\mu/2)]^{\alpha}$

Corollary 2 then states that, given a specific parametric configuration of the economy, aggregate output is always larger in an equilibrium without rent-seeking bureaucrats (where it equals Y^*) than in one where a certain fraction of the bureaucrats take opportunity of the public sector to extract rents (where it equals Y^{**}). [21]

5.2. Welfare analysis

.Let us focus again first on the case in which multiple equilibria are feasible — i.e., Fig. 2(*iii*). Although under multiple equilibria output is higher in the lean equilibrium, it turns out that this equilibrium does not Pareto dominate the bloated one. As a consequence, an aggregate welfare assessment would require postulating some specific social welfare function. However, with the model as it stands, welfare comparisons *within* groups of individuals are still feasible, and moreover they yield some further interesting insights.

Before proceeding to such analysis, one issue that we need to take properly into account now is the fact that the total amount of (lump-sum) taxes levied on individuals will differ across the two equilibria. Let T^* and T^{**} denote the tax on each individual in the lean and in the bloated equilibrium, respectively. It is straightforward to notice that $T^* < T^{**}$.[22]

5.2.1. PSM agents

In the lean equilibrium, a fraction b/μ become bureaucrats and get utility equal to $U_{PSM} - T^*$; the remaining fraction $(1-b/\mu)$ start a private firm and their payoff equals $\Pi(w^*) - T^*$, where $\Pi(w^*) < U_{PSM}$. In the bloated equilibrium, only a fraction b manage to obtain a bureaucratic job, which yields $U_{PSM} - T^{**}$ as a payoff; the remainder fraction $(1-b)$ receive a payoff equal to $\Pi(w^{**}) - T^{**}$, where $\Pi(w^{**}) < \Pi(w^*)$ due to $w^{**} > w^*$. Therefore, all PSM agents are (in expectation) better off in a lean public sector equilibrium.

[19] Notice that $\alpha < 0.5$ ensures that both w^* and w^{**} are always strictly smaller than $\widetilde{A}$. We should stress here that $w^* < \widetilde{A}$ is crucial for our results, as otherwise a bloated the public sector would fail to push the equilibrium wage above w^*. For values of α larger than $(2-b)/(4-3b)$ the model would actually deliver $w^* = \widetilde{A}$, removing the possibility of bloated equilibrium to exist. However, this upper-bound on α could easily be relaxed by letting the mass of unskilled agents rise above one.

[20] Our model focuses on the effect of B on the self-selection into bureaucracy, and rules out (by construction) any effect B might have on incentives once an agent accepts a bureaucratic job. Notwithstanding, even if a higher B carries some efficiency-wage component, as long as PSM agents are intrinsically more attracted to bureaucratic jobs than PD agents are, our self-selection mechanism should remain at play. Furthermore, empirical evidence on the incentive-effect suggests this effect may in fact be quite weak: see for example Rauch and Evans (2000) and Van Rijckeghem and Weder (2001).

[21] Notice that although wages in a bloated equilibrium are larger than in a lean equilibrium ($w^* > w^{**}$), equilibrium wages are still a function of several other parameters in the economy; in particular, they are increasing in the technological parameter A. For this reason, our model should not be read as saying that wages in a poorer region with a bloated public sector will be larger than in a richer region with a lean public sector, as the technology (and other factors) may vary as well between those two regions. Quite differently, our model only implies that to avoid the inefficiencies brought about by the bloated equilibrium, the market wage in the poorer region should be lower than it actually is.

[22] This is the case because of two (related) reasons. In the bloated equilibrium: (*i*) the number of unskilled workers in the public sector is larger, and (*ii*) their wages are higher.

5.2.2. PD agents

In the lean equilibrium, all PD agents become entrepreneurs and receive a payoff equal to $\Pi(w^*) - T^*$. In the bloated equilibrium, a fraction b of them obtain a bureaucratic job, which yields utility $U_{PD} - T^{**} < \Pi(w^*) - T^*$; the remainder fraction $(1-b)$ receive a payoff equal to $\Pi(w^{**}) - T^{**}$. Therefore, all PD agents are better off in a lean equilibrium.

5.2.3. Unskilled agents

In this case the welfare comparison is less straightforward than before. On the one hand, the excessive labor demand resulting from PD bureaucrats rent-seeking behavior drives up the wage, which is beneficial to the those agents whose only choice is to supply their labor endowment.[23] On the other hand, like anybody else in the economy, they must pay higher taxes. Proposition 2 shows that, given our parametric restrictions, for any bureaucratic salary $B \in (\underline{B}(\mu), \overline{B})$ the former effect dominates the latter, hence: $w^{**} - T^{**} > w^* - T^*$.

Proposition 2. *Suppose Assumptions 1 and 2 hold and $\underline{B}(\mu) < B < \overline{B}$, implying that there exist two equilibria in the economy: one in which the wage equals w^* (the lean equilibrium), and one in which it equals w^{**} (the bloated equilibrium). Let T denote the amount of (lump-sum) taxes that each individual must pay in order to finance public sector expenditures. Then, $w^{**} - T^{**} > w^* - T^*$ holds for any $b \in (0,1)$ and any $\alpha \in (0, \frac{1}{2})$.*[24]

Proof. In Appendix A. ■

The fact that the unskilled receive higher wages when there are rent-seeking bureaucrats is actually a general result, as can be readily observed from Corollary 1. The welfare comparison across the different cases described in Corollary 1 is, though, more complex than that between the two possible equilibria within the multiple equilibria case presented in Proposition 2. The reason being that comparing different cases involves comparing welfare in situations where the bureaucrats salary B also differs, which in turn affects the total amount of taxes in the economy too. Nevertheless, the fact that larger B tend to give room to equilibria with rent-seeking bureaucrats and, consequently, higher wages means that the unskilled might be sympathetic to paying higher salaries to the bureaucrats, even if that involves higher taxes. We now proceed to study this particular trade-off.

Given that Proposition 2 deals with the cases in which $\underline{B}(\mu) < B < \overline{B}$, we focus our attention now on the cases in which the equilibrium is unique. The following proposition stipulates conditions under which, even if a unique lean equilibrium exists in the economy (that is, even when conditions in Lemma 2 hold and, thus, $\underline{B}(\mu) > \hat{B}$), the unskilled may turn out to be better off in a unique bloated equilibrium with $B = \overline{B}$.

Proposition 3. *There exist thresholds $\overline{b} \geq 2 - \sqrt{2} \approx 0.586$ and $\overline{\alpha} > 0$, such that when $0 < b < \overline{b}$ and $0 < \alpha < \overline{\alpha}$, there are feasible parametric configurations for which: $\underline{B}(\mu) > \hat{B}$, hence a unique lean equilibrium exists when $\hat{B} \leq B < \underline{B}(\mu)$ and, nonetheless, the utility obtained by the unskilled workers in a lean equilibrium with $\hat{B} \leq B < \underline{B}(\mu)$ is smaller than the utility they obtain in the unique bloated equilibrium that arises when $B = \overline{B}$.*

Proof. In Appendix A. ■

The unskilled may prefer a bloated public sector paying high bureaucratic salaries to a lean public sector with lower B when b is not too large and α is sufficiently small. Regarding b, notice that the cost per taxpayer of all bureaucratic salaries equals $bB/2$, thus a sufficiently large b turns the cost of inducing PD agents to apply to bureaucracy too high for the unskilled to be willing to bear it. Concerning α, the intuition is analogous to that in Proposition 2: the smaller α, the stronger upwards pressure on unskilled wages by a bloating public sector.

Both Proposition 2 and Proposition 3 deal with the unskilled workers welfare comparison across lean and bloated equilibria. In the former, we compare their utility for a given B within the range in which multiple equilibria are feasible. In the latter, we do so for different levels of B consistent with a unique equilibrium (either bloated or lean). Pinning down which of all possible cases is the most preferred one from the unskilled viewpoint would require modeling how expectations about aggregate behaviors are formed. This goes beyond the scope of the paper. Yet, it is straightforward to note that, if for some $\underline{B}(\mu) \leq B < \overline{B}$ the probability assigned by the unskilled that PD agents will coordinate their actions on a bloated equilibrium is sufficiently high, then the unskilled workers expected utility will turn out be highest at such intermediate level of B.

In summary, this section shows that the unskilled workers may be willing to support rentseeking bureaucrats, since the former indirectly benefit from the actions perpetrated by the latter in the form of inflated market wages. In that regard, our model may then shed light on the underlying reasons that have made oversized and inefficiently run public sectors so successful in some countries.[25]

6. Concluding remarks

We have proposed a model in which the quality of the state bureaucracy crucially affects the level of aggregate output and private entrepreneurship. The key mechanism at work rests on the idea that rent-seeking behaviors lead to an oversized public sector, bloated with unskilled workers. When the public sector expands its demand of unskilled workers in order to create and extract rents, not only it wastes scarce budgetary resources, but it also stifles entrepreneurial incentives. In particular, an oversized public sector pushes up the wage of unskilled workers above the level that would prevail under an efficiently-run public sector, which in turn squeezes profits and deters potential entrepreneurs from allocating their skills in the private sector.

An alternative argument to ours is that poorer regions exhibit higher public employment shares as the result of income transfers from richer regions, or simply because there is too little private activity in the first place and the public sector steps in as an employer of last resort. We do not intend to downplay any of these two arguments, which are certainly very relevant from an empirical viewpoint. In fact, we see our theory as complementary (rather than a competing one), shedding new insights concerning the interaction between the public and entrepreneurial sectors. In that regard, some of the correlations presented in Section 2 would not straightforwardly follow from a simple model of cross-regional transfers. More precisely, it does not seem obvious that the level of perceived public sector quality should correlate negatively with the fraction of unskilled workers in the public sector, as revealed by Table 2; especially after controlling for level of income and stock of skills in the economy.

Similarly, we have worked with a frictionless labor market that assumes away unemployment. Generally, (short-term) unemployment

[23] This is clearly a very specific type of rent-seeking behavior that the unskilled may welcome. It may still be the case that the unskilled would oppose other forms of rent-seeking actions, like extortion or bribery.

[24] We should stress here that the result $w^{**} - T^{**} > w^* - T^*$ will not hold for values of α sufficiently close to 1. The intuition for this lies in the link between α and the wage elasticity of Eq. (2): the larger the elasticity of labor demand by private entrepreneurs, the weaker the upwards pressure on wages caused by a bloating public sector (because a smaller increase in the wage is needed to restore the equilibrium in the labor market).

[25] For example, Geddes (1994) suggests that oversized and inefficiently run public sectors have been common-place in the past populist governments in Latin America and have relied on widespread support coming from the working class population as a whole.

should be the result of some sort of frictions or stickiness in the labor market preventing an immediate adjustment of the wage to restore the market-clearing equilibrium. Note, however, that the effect of a public sector absorbing the (temporary) excess supply of labor may still bring about some similar implications as those in our benchmark model, by preventing the eventual downward adjustment of wages.

Our model also shows that a bloated public sector, although hurting aggregate output, may actually enjoy the support of unskilled workers who indirectly benefit from it in the form of higher wages. In that regard, the model may shed new light on one of the underlying reasons that have made several populist governments so successful in the past, despite being widely perceived as running inefficiently large and ineffective public sectors (see Geddes, 1994).

The above political economy argument is closely linked to the choice of taxes and transfers in the economy. In our model individuals are taxed on a lump-sum basis. This is an issue that deserves some further discussion: under such circumstances a Pareto-dominating institutional arrangement may exist relative to the bloated public sector equilibrium. In particular, one could set bureaucratic salaries low enough to induce only PSM agents become bureaucrats and, at the same time, make transfers to the unskilled workers to keep their total income equal to that prevailing in the bloated equilibrium. In principle, this would be feasible to a central planner, however, institutional constraints or lack of sufficient trust in political bodies may well turn such a scheme impossible to implement in reality.

Note, too, that the way we model taxation simplifies the exposition, but also (and more importantly) allows us to isolate the wage-distortion effect from other types of distortions working through taxation. Introducing more realistic taxes into the model (e.g., income taxes) would in general mean that a bloating public sector would place an additional distortion, on top of that of inflated wages, on entrepreneurial incentives. In that respect, our previous results would be somehow reinforced in the presence of taxes that are increasing in earnings. Nonetheless, our results may be still interpreted as somewhat more general than that. The public sector may well be financing itself, at least temporarily, by sources other than current taxation: for example, they may use borrowing. In that case, entrepreneurs should not see their (current) profits being affected by a bloating a public sector through excessive taxation; however, they would still have to face higher market wages as the public sector absorbs labor supply.[26]

One important policy lesson is that the economy has got a lot to gain from improving the sorting mechanisms into different occupations, in particular when it relates to state bureaucracy. Contrary to a standard view in the public debate, improving sorting may sometimes require paying bureaucrats less (and not more), so as to resort to the sense of mission of certain agents while keeping self-interested agents away. In any case, by promoting policies attracting the right people or reducing the scope for opportunistic behavior, the economy may avoid falling into a rent-seeking trap.

Appendix A

Proof of Lemma 1. Suppose a bureaucrat intends to announce $\widetilde{\theta}_i = 1$ when $\theta_i = 2$, so as to be able to set $e_i = 0$ with probability $3\varepsilon_i$. Then, the optimal level of ε_i is pinned down by solving:

$$\varepsilon_i^* \equiv \underset{0\le\varepsilon_i\le 1/3}{\arg\max} : E(U_i) = B - \frac{1}{2}\times\frac{3}{2}\frac{1}{1+\lambda_i} - \frac{1}{2}\times\frac{3}{2}\left[(1-3\varepsilon_i)\frac{1}{1+\lambda_i} + \varepsilon_i\right]. \tag{19}$$

Since (19) is linear in ε_i, the optimal level of ε_i can be found simply by checking the sign of $\partial E(U_i)/\partial\varepsilon_i$: if $\partial E(U_i)/\partial\varepsilon_i > 0$ then $\varepsilon_i^* = 1/3$, while if $\partial E(U_i)/\partial\varepsilon_i < 0$ then $\varepsilon_i^* = 0$. Noting that

$$sign\{\partial E(U_i)/\partial\varepsilon_i\} = sign\left\{3(1+\lambda_i)^{-1} - 1\right\},$$

then $\partial E(U_{PD})/\partial\varepsilon_i > 0$ obtains, while Assumption 2 ensures $\partial E(U_{PD})/\partial\varepsilon_i < 0$. ■

Proof of Proposition 1.

(i) Suppose first that $\hat{B} > \widetilde{A} + 1$. An equilibrium in which only PSM agents apply for bureaucracy exists only if $L^D(w)$ crosses $L^S(w)$ at a wage strictly below $\hat{w}$ and (weakly) above $\underline{w}$. This requires $(1-b)(\alpha A/\hat{w})^{\frac{1}{1-\alpha}} + b/2 < 1 \le (1-b)(\alpha A/\underline{w})^{\frac{1}{1-\alpha}} + b/2$, which using Eqs. (9) and (10) leads to Eq. (13). Finally, we still need to prove that PSM agents prefer bureaucracy to supplying unskilled labor and entrepreneurial profits are larger than wages. Denoting by w^* the wage that solves $(1-b)(\alpha A/w^*)^{\frac{1}{1-\alpha}} + b/2 = 1$, we can observe that $\hat{B} - \gamma > w^* = \alpha A[(1-b)/(1-b/2)]^{1-\alpha}$, hence $U_{PSM} > w^*$ for any $\hat{B} \le B < \overline{B}$; moreover, since $w^* < \widetilde{A}$, it follows that $w^* < \prod(w^*)$. Suppose now that $\hat{B} \le \widetilde{A} + 1$. Noting that $\overline{B}$ is always strictly larger than $\widetilde{A} + 1$ (since, given our parametric restrictions, $\alpha < 1 - \alpha$), it follows that the condition (13) also holds when $\hat{B} \le \widetilde{A} + 1$.

(ii) First, notice from Eqs. (11) and (12) that $L^D\left(\widetilde{A}\right) < L^S\left(\widetilde{A}\right)$, hence in equilibrium $w < \widetilde{A}$. As a result, an equilibrium in which both PSM and PD agents apply for bureaucracy exists if $L^D(\hat{w}) \ge 1$, which using the second line in Eqs. (11) and (9) leads to Eq. (14). Finally, denoting by w^{**} the wage that solves $(1-b)(\alpha A/w^{**})^{\frac{1}{1-\alpha}} + b(1-\mu/2) = 1$, we can observe $\underline{B}(\mu) - 1 > w^{**} = \alpha A[(1-b)/(b-b\mu/2)]^{1-\alpha}$, hence $U_{PD} > w^{**}$ for any $B \ge \underline{B}(\mu)$; moreover, since $w^{**} < \widetilde{A}$, then $w^{**} < \prod(w^{**})$. ■

Proof of Lemma 2. Notice first that $\partial\Gamma/\partial\mu < 0$. $\Gamma(\cdot)$ reaches a maximum when $\mu = b$. Replacing $\mu = b$ into (15):

$$\Gamma(\alpha, b, \mu = b) = \frac{\left(1-\frac{b}{2}\right)^{\alpha} - \left(1-b+\frac{b^2}{2}\right)^{\alpha}}{(1-b)^{\alpha}}. \tag{20}$$

Notice now that, since $0 < b < 1$, the RHS of Eq. (20) is strictly increasing in α. Moreover, it is straightforward to observe that the RHS of Eq. (20) approaches zero as $\alpha \to 0$. Given that Eq. (20) is strictly increasing in α, it then suffices to focus $\alpha = \frac{1}{2}$. Plugging this value into Eq. (20), it follows that we need to prove that

$$\left(1-\frac{b}{2}\right)^{\frac{1}{2}} < (1-b)^{\frac{1}{2}} + \left(1-b+\frac{b^2}{2}\right)^{\frac{1}{2}}, \quad \forall b \in (0,1). \tag{21}$$

A sufficient condition for Eq. (21) to hold is that: $1-\frac{b}{2} < 2-2b+\frac{b^2}{2}$; which is necessarily true for any $b \in (0,1)$, since the function $\psi(b) = \frac{3}{2}b - \frac{b^2}{2}$ is strictly increasing within the interval $[0, 1]$, with $\psi(1) = 1$. ■

Proof of Proposition 2. Using the results in Corollary 1, it follows that $w^{**} - T^{**} > w^* - T^*$ if and only if:

$$w^{**} - \frac{1}{2}b\left[B + (1-\mu/2)w^{**}\right] > w^* - \frac{1}{2}b\left(B + \frac{1}{2}w^*\right). \tag{22}$$

Plugging Eqs. (16) and (17) into Eq. (22) leads to, $w^{**} - T^{**} > w^* - T^*$, if and only if:

$$\frac{2-b(1-\mu/2)}{2-b/2} > \left[\frac{1-b(1-\mu/2)}{1-b/2}\right]^{1-\alpha} \equiv \Phi(\alpha). \tag{23}$$

[26] Notice that even if entrepreneurs were not myopic, and take into account the future rise in taxation to pay for current public debt (Ricardian Equivalence), this would not be enough by itself to affect their current occupational choices—we need, in addition to that, a switching cost for occupations over the life cycle (or an important sunk cost for entrepreneurial activities), so that their current occupational choice is affected by future taxation as well.

Notice that $\Phi'(\alpha) > 0$, since the expression within squared brackets is strictly smaller than 1. This, in turn, implies that we only need to prove that Eq. (23) holds for $\alpha = 0.5$. Setting $\alpha = 0.5$ into Eq. (23), leads to the following condition $[2 - b(1 - \mu/2)]^2(1 - b/2) > (2 - b/2)^2[1 - b(1 - \mu/2)]$, which after some simple, but tedious, algebra yields:

$$\left(1-\frac{\mu}{2}\right)^2\left(1-\frac{b}{2}\right) > \frac{1}{4}\left[1-b\left(1-\frac{\mu}{2}\right)\right]. \tag{24}$$

Notice that Eq. (24) is always necessarily true, since $(1 - \mu/2)^2 > 1/4$ for any $0 < \mu < 1$, and $b/2 < b(1 - \mu/2)$ because $0 < \mu < 1$. ■

Proof of Proposition 3. First of all, note that any $\hat{B} \leq B < \underline{B}(\mu)$ leads to a unique equilibrium with wage w^*. As consequence, since a larger B involves higher taxes, to prove the proposition it suffices to show that the utility of unskilled workers in the bloated equilibrium with $B = \overline{B}$ may be greater than their utility in the lean equilibrium with $B = \hat{B}$. This occurs when the following condition holds:

$$w^{**}[2-b(1-\mu/2)] - w^*(2-b/2) > b\left(\overline{B}-\hat{B}\right). \tag{25}$$

Using Eq. (25) we can observe that, when a unique lean equilibrium exists, the unskilled prefer the bloated equilibrium with $\overline{B}$ rather than the lean equilibrium with $\hat{B}$ when

$$\alpha(1-b)^{1-\alpha}\left[\frac{2-b(1-\mu/2)}{[1-b(1-\mu/2)]^{1-\alpha}} - \frac{2-b/2}{(1-b/2)^{1-\alpha}}\right] > \frac{b(1-\gamma)}{A}. \tag{26}$$

In addition, a unique lean equilibrium exists – i.e. $\hat{B} < B(\mu)$ – if and only if $(1 - \gamma) > \Gamma(1 - \alpha)A$. Hence, using the expression for Γ in Eq. (15), it follows that configurations that lead a situation where the unskilled to prefer $\overline{B}$ over $\hat{B}$ must necessarily satisfy the following condition:

$$\frac{\alpha}{1-\alpha}\frac{1-b}{b}\left[\frac{2-b(1-\mu/2)}{1-b(1-\mu/2)^{1-\alpha}} - \frac{2-b/2}{(1-b/2)^{1-\alpha}}\right] > (1-b/2)^{\alpha} - [1-b(1-\mu/2)]^{\alpha},$$

which after some algebra leads to the condition:

$$\begin{aligned} S(\alpha) \equiv{}& (1-b/2)^{1-\alpha}\left[\frac{\alpha}{1-\alpha}\frac{1-b}{b}(2-b+b\mu/2) + (1-b+b\mu/2)\right] \\ &- (1-b+b\mu/2)^{1-\alpha}\left[\frac{\alpha}{1-\alpha}\frac{1-b}{b}(2-b/2) + (1-b/2)\right] > 0. \end{aligned} \tag{27}$$

Letting $\alpha = 0$ in Eq. (27), we can observe $S(0) = 0$. Next, differentiate $S(\alpha)$, to obtain:

$$\begin{aligned} S'(\alpha) \equiv{}& \left(1-\frac{b}{2}\right)^{1-\alpha}\frac{1-b}{b(1-\alpha)^2}\left(2-b+\frac{b\mu}{2}\right) \\ &- \ln\left(1-\frac{b}{2}\right)\left(1-\frac{b}{2}\right)^{1-\alpha}\left[\frac{\alpha}{1-\alpha}\frac{1-b}{b}\left(2-b+\frac{b\mu}{2}\right) + \left(1-b+\frac{b\mu}{2}\right)\right] \\ &- \left(1-b+\frac{b\mu}{2}\right)^{1-\alpha}\frac{1-b}{b(1-\alpha)^2}\left(2-\frac{b}{2}\right) \\ &+ \ln\left(1-b+\frac{b\mu}{2}\right)\left(1-b+\frac{b\mu}{2}\right)^{1-\alpha}\left[\frac{\alpha}{1-\alpha}\frac{1-b}{b}\left(2-\frac{b}{2}\right) + \left(1-\frac{b}{2}\right)\right]. \end{aligned}$$

Let again $\alpha = 0$, which simplifies the above expression to:

$$S'(0) = \frac{(1-b)(1-\mu)}{2} - (1-b+b\mu/2)(1-b/2)\ln\left[\frac{1-b/2}{(1-b+b\mu/2)}\right].$$

Now, denote $1 + H \equiv (1 - b/2) / (1 - b + b\mu/2)$, which means that $H \equiv [(1 - \mu)b/2] / (1 - b + b\mu/2)$. In addition, by property of the natural logarithm, we have that $\ln(1 + H) \leq H$; hence

$$\begin{aligned} S'(0) &\geq 0.5(1-b)(1-\mu) - (1-b+b\mu/2)(1-b/2)H \\ &= 0.5(1-\mu)\left(1-2b+b^2/2\right). \end{aligned} \tag{28}$$

Notice now that $(1 - 2b + b^2/2) \geq 0$ for any $b \leq 2-\sqrt{2} \approx 0.586$. As a result, there exists $b \geq 2-\sqrt{2}$, such that when $0 < b < b$, $S'(0) > 0$ and thus, when $0 < \alpha < \overline{\alpha}$ with $\overline{\alpha} > 0$, we may find feasible parametric configurations such that the expression on the LHS of Eq. (26) is strictly larger than $b\Gamma(1 - \alpha)$. Lastly, bearing in mind that the difference between $(1 - \gamma)$ and $\Gamma(1 - \alpha)$ can be made arbitrarily small by appropriately adjusting the values of γ and A, it follows that we may also find parametric configurations such that (26) holds, which completes the proof the proposition. ■

References

Acemoglu, D., Verdier, T., 1998. Property rights, corruption and the allocation of talent: a general equilibrium approach. Econ. J. 90, 194–211.
Acemoglu, D., Verdier, T., 2000. The choice between market failures and corruption. Am. Econ. Rev. 108, 1381–1403.
Acemoglu, D., Ticchi, D., Vindigni, A., 2011. Emergence and persistence of inefficient states. J. Eur. Econ. Assoc. 9, 177–208.
Aghion, P., Bolton, P., 1997. A theory of trickle-down growth and development. Rev. Econ. Stud. 64, 151–172.
Alesina, A., Danninger, S., Rostagno, M., 2001. Redistribution through public employment: the case of Italy. IMF Staff Papers. Palgrave Macmillan J., vol. 48.
Aney, M., Ghatak, M., Morelli, M., 2011. Can market failure cause political failure. LSE STICERD Research Paper No. EOPP029.
Banerjee, A., Newman, A.F., 1993. Occupational choice and the process of development. J. Polit. Econ. 101, 274–298.
Barro, R., Sala-i-Martin, X., 1995. Economic Growth. McGraw-Hill.
Benabou, R., Tirole, J., 2006. Incentives and prosocial behavior. Am. Econ. Rev. 96, 1652–1678.
Besley, T., 2004. Paying politicians: theory and evidence. J. Eur. Econ. Assoc. 2, 193–215.
Besley, T., Ghatak, M., 2005. Competition and incentives with motivated agents. Am. Econ. Rev. 95, 616–636.
Bond, P., 2008. Persistent court corruption. Econ. J. 118, 1333–1353.
Bond, P. and Glode, V. (2011), "Bankers and Regulators", mimeo, University of Minnesota.
Caselli, F., Morelli, M., 2004. Bad politicians. J. Public Econ. 88, 759–782.
Delfgaauw, J., Dur, R., 2008. Incentives and workers' motivation in the public sector. Econ. J. 118, 171–191.
Delfgaauw, J., Dur, R., 2010. Managerial talent, motivation, and self-selection into public management. J. Public Econ. 94, 654–660.
Durden, G., 1990. The effect of rent-seeking on family income levels: some suggestive empirical evidence. Public Choice 67, 285–291.
Francois, P., 2000. Public service motivation as an argument for government provision. J. Public Econ. 78, 275–299.
Geddes, B., 1994. Politician's Dilemma: Building State Capacity in Latin America. UC Press, Berkeley.
Gelb, A., Knight, J.B., Sabot, R., 1991. Public sector employment, rent seeking and economic growth. Econ. J. 101, 1186–1199.
Ghatak, M., Mueller, H., 2011. Thanks for nothing? Not-for-profits and motivated agents. J. Public Econ. 95, 94–105.
Ghatak, M., Morelli, M., Sjostrom, T., 2001. Occupational choice and dynamic incentives. Rev. Econ. Stud. 68, 781–810.
Ghatak, M., Morelli, M., Sjostrom, T., 2007. Entrepreneurial talent, occupational choice, and trickle up policies. J. Econ. Theory 137, 27–48.
Hassler, J., Rodriguez Mora, J.V., Storesletten, K., Zilibotti, F., 2003. The survival of the welfare state. Am. Econ. Rev. 93, 87–112.
Heller, P.S., Tait, A., 1983. Goverment Employment and Pay: Some International Comparisons. IMF, Washington D.C.
International Monetary Fund, 1998. Good Governance: The IMF's Role. IMF.
Jaimovich, E., 2011. Sectoral differentiation, allocation of talent, and financial development. J. Dev. Econ. 96, 47–60.
Keefer, P., Knack, S., 1997. Why don't poor countries catch up? A cross-national test of an institutional explanation. Econ. Inq. 35, 590–602.
Kikeri, S., 1998. Privatization and labor: what happens to workers when governments divest. World Bank Technical Paper 396. World Bank, Washington, D.C.
Knack, S., Keefer, P., 1995. Institutions and economic performance: cross-country tests using alternative institutional measures. Econ. Polit. 7, 207–227.

Lloyd-Ellis, H., Bernhardt, D., 2000. Enterprise, inequality and economic development. Rev. Econ. Stud. 67, 147–168.
Macchiavello, R., 2008. Public sector motivation and development failures. J. Dev. Econ. 86, 201–213.
Matozzi, A., Merlo, A., 2008. Political careers or career politicians? J. Public Econ. 92, 597–608.
Mauro, P., 1995. Corruption and growth. Q. J. Econ. 110, 681–712.
Messner, M., Polborn, M., 2004. Paying politicians. J. Public Econ. 88, 2423–2445.
Murdock, K., 2002. Intrinsic motivation and optimal incentive contracts. RAND J. Econ. 33, 650–671.
Murphy, K., Shleifer, A., Vishny, R., 1991. The allocation of talent: implications for growth. Q. J. Econ. 106, 503–530.
Niskanen, W.A., 1971. Bureaucracy and Representative Government. Aldine Publishing Co., Chicago.
Prendergast, C., 2007. The motivation and bias of bureaucrats. Am. Econ. Rev. 97, 180–196.
Putnam, R., 1993. Making Democracy Work. Princeton University Press.
Rauch, J., Evans, P., 2000. Bureaucratic structure and bureaucratic performance in less developed countries. J. Public Econ. 75, 49–71.
Robinson, J., Verdier, T., 2002. The political economy of clientelism. CEPR Disc. Paper 3205.
Van Rijckeghem, C., Weder, B., 2001. Bureaucratic corruption and the rate of temptation: do wages in the civil service affect corruption, and by how much? J. Dev. Econ. 65, 307–331.