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**PUBLIC SECTOR MOTIVATION
AND DEVELOPMENT FAILURES**

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ABSTRACT

Public Sector Motivation and Development Failures*

This paper provides a theoretical analysis of the relationship between public sector motivation and development. In the model the public sector produces a public good and workers are heterogeneous in terms of public sector motivation (PSM). Wages in the private sector are increasing in the quality of the public good. In this context, public sector wage premia (PSWP) have two opposite effects: low PSWP help screen workers with PSM into the public sector, while high PSWP help motivate workers to be honest. Raising PSWP may not improve the quality of governance and multiple equilibria might arise. The model highlights that the relative importance of workers selection and provision of "on the job" incentives in the public sector varies in systematic ways with wages in the private sector. I provide anecdotal and original empirical evidence consistent with the theoretical predictions and discuss some policy implications for public sector reforms in developing countries.

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1 Introduction

It is widely perceived that government bureaucracies in developing countries are slow, inefficient and corrupt. While public sector bureaucracies do not get very good press anywhere in the world, it seems that the problem is particularly acute in developing countries. All countries with high living standards have teachers who teach, police officers who police, judges who judge, public works that work, armies that respond to external threats. No country has developed without state reliance on an effective public bureaucracy to discharge the key functions of the state (see e.g. Amsden (1989), Wade (1990) and Evans (1998)). So why do some bureaucracies perform badly and others well? Is it because all other sectors in developing countries are backward that the public sector is backward too?

It has been noted that failures of management are common in public production of services. Frontline workers rarely receive explicit incentives for successful service delivery, there are no stipulations for service quality and quantity, no measurement of effectiveness or productivity, few rewards or penalties. The provider organization monitors only inputs and compliance with processes and procedures, but since the objectives are often not well known and if it is difficult to monitor behavior, "accountability" is created by strict rules intended to prevent abuse and activity is regulated by scripts that must be followed strictly. These considerations suggest that an important part of the answer to the previous question could be that the technology of public sector delivery in developing countries has higher monitoring or measurement costs.

In this paper instead I take monitoring and incentives constraints as given and propose a novel argument that links the performance of the public sector to the performance of the other productive sectors in the economy via the selection of heterogeneous public sector workers. The analysis combines two main ingredients. First, I assume that some individuals are moved by "public sector motivation", in the sense that they tend to behave relatively more in the interest of the public if employed in the public sector. Second, I assume that a more efficient public sector improves the returns in the private sector as well.

As an example consider schooling: good teaching is a complex endeavor. Direct monetary incentives are hard to provide since the quality of a teacher cannot be assessed strictly on the basis of student scores on a standardized examination and monitoring by another trained educator - a head teacher or school principal - can create the temptation to play favorites or extract payments

from teachers for good assessments, merely introducing an additional problem of monitoring the monitors. In this sort of environments, one promising way to improve the delivery of schooling services could be the recruitment of intrinsically motivated teachers, for which the provision of incentives is relatively easier.

This paper argues that one key difference between rich and poor countries is that in rich countries individuals that have not strong intrinsic motivation to be good teachers do not apply for a teaching position since they can easily find a well paid job in the private sector. In poorer countries instead even individuals that are not animated by strong intrinsic motivation may be attracted into the public sector by wages that are relatively higher than in the private sector. This makes the selection of motivated agents harder in poorer environments. The example of teachers is also illustrative of the second part of the assumption. Better teachers improve education outcomes which in turns lead to higher wages in the private sector. This feedback mechanism suggests the possibility of development failures, one of the key results of the analysis.

Public service motivation (PSM) frequently appears in sociological and administrative studies of public bureaucracies[1]. Differences in (incentives based) payment between public and private sector managers are thought to be compensated by a non-pecuniary benefit for the public employees. Wilson (1989) for instance argues that public sector agencies are built around the idea of "mission" and the process of identification with the mission often motivates agents to perform their tasks more effectively than monetary incentives. Evans (1998) provides a comparative study on IT-sector policies in three developing countries suggesting that PSM agents can positively impact the functioning of state bureaucracy. Writing about the Department of Electronics in India, Evans reports that this agency "had always been dominated by technically oriented managers with a strong substantive interest in the sector for which they were responsible... DOE technocrats were immersed in a project of transformation that was of greater interest than minor individual perquisites". He reports similar experiences for the Commission for the Coordination of Electronic Processing Activities (CAPRE) in Brazil, and for the equivalent agency in Korea. Wade (1989) reports similar evidence for top economic bureaucracies in Taiwan.[2]

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[1] Rainey and Steinbauer (1999) quoted in Francois (2000), define PSM as a "general, altruistic motivation to serve the interests of a community of people, a state, a nation, or humankind...".

[2] Francois (2000) rationalizes the idea that the public sector can indeed be more effective in exploiting the public service motivation of employees. Besley and Ghatak (2003) present a model emphasizing the role of matching be-

At an abstract level, the basic intuition goes as follows: suppose a public sector employing only motivated agents and such that wages in the public sector are high enough to deter opportunistic behavior, but lower than those prevailing in the private sector. This generates efficient state intervention and high returns in the private sector. Under these conditions it is easier to attract only motivated agents in the bureaucracy, justifying the initial assumption that the public sector employs only motivated agents. It is easy to construct the opposite vicious circle leading to low wages in the private sector and poor public sector performance. This intuition suggests that multiple equilibria may exist for a given level of public sector wage premia (PSWP).[3]

The model predicts a non-monotonic relationship between public sector wage premia and public sector efficiency. This result follows from the interplay of moral hazard and selection constraints, the latter working through the endogenously determined outside option for the public sector, i.e. the equilibrium wage in the private sector. Higher wages in the public sector may attract non motivated agents without deterring their opportunistic behavior if the wages in the private sector are sufficiently low. From a policy perspective, this suggests that increasing public sector wage premia may reduce the quality of the public sector especially in middle income countries, where the conflict between adverse selection and moral hazard constraints is more pronounced.[4]

Countries with a more developed private sector have an advantage in recruiting agents that are animated by public sector motivation, and still pay wages that are high enough to deter opportunism. The literature recognizes that a good public service can be obtained only with sufficient pecuniary incentives or personnel motivation. While empirical evidence exists casting some doubts on the first view, this paper shows that the latter one may not be sufficient. The paper clarifies when these views may be inaccurate, suggesting that the perverse effects of higher public sector

tween principals and agents with similar preferred missions as an important source of efficiency in mission oriented organizations. In contrast with the current work, these two papers take a partial equilibrium perspective.

[3]In contrast with most of existing works in the theoretical literature on corruption, the source of multiple equilibria in this model is the selection of heterogeneous agents into the public sector. In other words, occupational choices are strategic complements, and not opportunistic behavior per se.

[4]The main mechanism works through a self selection constraint. This implies that the multiple equilibria of the model are Pareto Ranked. It is likely however that the rents that agents enjoy in the public sector depend on the composition of public sector employees. We provide a simple extension of the model in which we endogeneize these rents. Since rents are higher in a public sector employing non motivated agents, the Pareto ranking result is lost. A group of public sector employees opposes reforms aimed at improving the working of the public sector.

wages should be stronger in middle-income countries. Second the paper suggests that exogenous increase in private sector incomes (e.g. because of exogenous changes in terms of trade) may trigger improvement in public sector efficiency.

Finally, by recognizing that the relative importance of selection and incentives constraints in the public sector varies in systematic ways with average incomes in the private sector, the model suggests that different countries may need different public sector policies, depending on which constraint is relatively more binding. This has important implications for public sector wage policies, wage compression and degrees of decentralization in the public sector.

The rest of the paper is organized as follows. Section 2 presents the basic model and discusses the main assumptions and results in light of other theoretical models of corruption displaying multiple equilibria. Section 3 presents an extension that endogeneizes the rents enjoyed in the public sector. Section 4 discusses anecdotal and presents some novel empirical evidence consistent with the main results. It also discusses some policy implications derived from the theoretical framework. Section 5 offers some concluding remarks.

2   The model

Consider a two sectors economy: a private sector and a public sector. The public sector produces a public good G. Returns in the private sector are assumed to be an increasing function of the quality of the public good G.

The economy is populated by a continuum of measure one of risk neutral individuals that live only one period. A mass of measure b of individuals works in the public sector. The size of the public sector b is exogenously given.

Individuals differ with respect to their public service motivation. Motivated agents experience non monetary benefits θ from working in the public sector until the end of their lives. The proportion of motivated agents in the economy is α.

Assumption 1 $\alpha > b$

If $\alpha < b$ it is not possible for the public sector to be entirely composed by motivated agents. We rule out this case, as we are interested in determining under which conditions the public sector employes only motivated agents.

In order to produce the public good G, each public sector employee is given control over an exogenous amount of resources g. A public sector employee can divert this resources increasing her utility by g. In this case she does not contribute to the production of the public good G. We assume that a public sector employee cannot be compensated on the basis of her individual contribution to the production of the public good.

The opportunistic behavior of a public sector employee is detected with exogenous probability $q \in (0, 1)$. Upon detection, a public sector employee is fired and looses her wage. This is assumed to be the maximum punishment available to deter public sector employees against opportunistic behavior. For simplicity we assume that it is not possible to replace a public sector employee that has been fired: following the opportunistic behavior of a public sector employee, the contribution to the public good is equal to zero regardless of detection.

Let us denote w^b the wage paid in the public sector. The value of a public sector career for a non motivated agent is given by

$$V_{nm}(w^b) = \max\{w^b, \left(w^b + g\right) \cdot (1 - q)\}$$

If

$$w^b < \left(w^b + g\right) \cdot (1 - q) \iff w^b < \frac{1 - q}{q}g$$

a non motivated agent behaves opportunistically in the public sector.

Since a motivated agent only get private benefits θ if she works in the public sector until the end of her life, the value of a public sector career for a motivated agent is given by

$$V_m(w^b) = \max\{w^b + \theta, \left(w^b + g + \theta\right) \cdot (1 - q)\}$$

If

$$w^b + \theta < \left(w^b + \theta + g\right) \cdot (1 - q) \iff w^b < \frac{1 - q}{q}g - \theta$$

a motivated agent behaves opportunistically in the public sector. While it is easier to deter the opportunistic behavior of motivated agents, public sector motivation is not sufficient to prevent

opportunistic behavior. If the wage in the public sector is sufficiently low even motivated agents engage in opportunistic behavior.

It is clear that the value of a public sector career for a motivated agent is always higher than the value of a public sector career for a non motivated agent, i.e.

$$V_m(w^b) > V_{nm}(w^b)$$

Let x denote the proportion of public sector employee that do not engage in opportunistic behavior. We assume

Assumption 2 : $G = \Gamma(x)$ *and* $\Gamma'(x) > 0$.

Since we take the size of the public sector b as exogenous, the only possible way to increase the quality of the public good is to improve the selection of agents and the provision of incentives in the public sector.

Motivated and non motivated agents are identical in the private sector. Their utility of working in the private sector is given by $w(G)$. We assume that

Assumption 3 : $w'(G(x)) > 0$, $(\theta + g)(1 - q) \geq w(G(0)) \geq 0$ *and* $w(G(1)) \leq \frac{1-q}{q}g$

We assume that a more efficient public sector raises the utility of working in the private sector. When the quality of the public good $G(\cdot)$ is very low, we assume that the private sector is so depressed that at least motivated agents still prefer to work in the public sector. Finally when the quality of the public good $G(\cdot)$ is very high, motivated agents still prefer working and not behaving opportunistically in the public sector. The second and third part of our assumption rule out cases under which the public sector cannot attract workers.

Agents decide the sector they want to work. If a measure $y > b$ of agents apply for a position in the public sector, we assume that the probability of getting a job in the public sector is $\frac{b}{y}$ independently of the type of the agent.

We first determine the quality of the public good $G(x)$ as a function of the public sector wage w^b, taking as given the utility of working in the private sector $w(G)$. We then endogeneize $w(G)$ in order to find the equilibrium correspondence with respect to w^b.

We consider three cases separately

Case 1: $w^b \leq \frac{1-q}{q}g - \theta$

In the case under consideration the wage in the public sector is so low that both motivated and non motivated agents engage in opportunistic behavior. For any $w(G)$, the quality of the public good is equal to $G = \Gamma(0)$.

Case 2: $\frac{1-q}{q}g - \theta \leq w^b \leq \frac{1-q}{q}g$

In this second case, the wage in the public sector is high enough to deter the opportunistic behavior of motivated agents, but is not high enough to deter the opportunistic behavior of non motivated agents: the quality of the public sector $G(x)$ depends on the selection of workers in the two sectors, and therefore on the utility of working in the private sector $w(\cdot)$.

If

$$\left(w^b + g\right) \cdot (1 - q) < w(\cdot)$$

non motivated agents have no incentives to work, and behave opportunistically, in the public sector since utility of working in the private sector is higher than the wage and rents they would earn in the public sector. In this case only motivated agents work in the public sector, and $G = \Gamma(1)$.

If instead

$$\left(w^b + g\right) \cdot (1 - q) > w(\cdot)$$

non motivated agents have incentives to work, and behave opportunistically, in the public sector. All the agents in the economy apply for a job in the public sector. The assumed rationing scheme implies that a proportion $1 - \alpha$ of public sector employees are non motivated agents and therefore behave opportunistically. In this case $G = \Gamma(\alpha)$.

In the case under consideration therefore the quality of the public good $G(x)$ is increasing in the utility of working in the private sector, $w(\cdot)$.

Case 3: $\frac{1-q}{q}g - \theta \leq w^b$

In this last case the wage in the public sector is so high that both motivated and non motivated agents do not engage in opportunistic behavior. For any $w(G)$, the quality of the public good is equal to $G = \Gamma(1)$.

In cases 1 and 3 considered above, the quality of the public good $G(\cdot)$ does not depend on the utility of working in the private sector $w(\cdot)$. Since we assume that $w'(G(x)) > 0$, if an equilibrium exists in case 1 and in case 3, it must be unique.

Consider first case 1. In this case $G = \Gamma(0)$, regardless of the selection process in the public sector. An equilibrium always exists if

$$w(\Gamma(0)) \leq (w^b + \theta + g)(1 - q)$$

The second part of assumption 3 ensures that this inequality is always satisfied. In this case, the utility of working in the private sector $w(\Gamma(0))$ is sufficiently low that (at least) motivated agents prefer to work in the public sector. Since in case 1 we have $w^b \leq \frac{1-q}{q}g - \theta$ all public sector employee behave opportunistically.

In case 3 we have $G = \Gamma(1)$, regardless of the selection process in the public sector. Assumption 3 ensures that an equilibrium always exists in this case. Since in case 3 we have $\frac{1-q}{q}g - \theta \leq w^b$, assumption 3 implies

$$w(\Gamma(1)) \leq \frac{1-q}{q}g \implies w(\Gamma(1)) \leq w^b + \theta$$

Even when the quality of the public good $G(\cdot)$ is very high, motivated agents prefer to work in the public sector and choose not to behave opportunistically.

Case 2 is illustrated in figure 1.

First note that assumption 3 ensures that an equilibrium always exist. If

$$w(\Gamma(1)) \geq (w^b + g)(1 - q) \tag{1}$$

an equilibrium with $G = \Gamma(1)$ always exist. This inequality ensures that, when the quality of the public good G is very high, non motivated agents prefer to work in the private sector. Assumption 3 ensures that motivated agents always prefer to work in the public sector, and not behaving opportunistically. The quality of the public good G is therefore high, as the public sector is entirely composed by motivated individual.

If

$$w(\Gamma(\alpha)) \leq (w^b + g)(1 - q) \tag{2}$$

an equilibrium exists in which both motivated and non motivated agents prefer to work in the public sector. In the case under consideration we have $\frac{1-q}{q}g - \theta \leq w^b \leq \frac{1-q}{q}g$. This inequality implies that non motivated agents behave opportunistically in the public sector. The rationing rule determining public sector access implies that the proportion of public sector employees that do not

behave opportunistically is equal to α: the proportion of motivated agents in the economy and in the public sector.

Note that conditions (1) and (2) do not mutually exclude each other. Multiple equilibria can exist. When $\frac{1-q}{q}g - \theta \leq w^b \leq \frac{1-q}{q}g$ the same wage in the public sector, is sufficient to deter opportunistic behavior from motivated agents, but is not high enough to deter opportunistic behavior of non motivated agents. When this is the case, the equilibrium level of G is an increasing function of the utility that agents receive in the private sector. A higher utility of working in the private sector ensures that non motivated agents do not try to work in the public sector. On the other hand, the utility of working in the private sector is an increasing function of G. The combination of these two increasing equilibrium relationships naturally explains the multiplicity of equilibria.

Proposition 1 *If $w^b \leq \frac{1-q}{q}g - \theta$ there exists a unique equilibrium in which every agent in the economy prefers to work in the public sector and every public sector employee behaves opportunistically.*

If $\frac{1-q}{q}g - \theta \leq w^b \leq \frac{1-q}{q}g$ two classes of equilibria may exist. Under condition (1) there exists one equilibrium in which only motivated agents work in the public sector, and every public sector employee do not behave opportunistically. Under condition (2) there exists one equilibrium in which every agent prefers to work in the public sector. A proportion equal to $1 - \alpha$ of public sector employees behave opportunistically. Since condition (1) and (2) are not mutually exclusive, multiple stable equilibria can exist[5].

If $\frac{1-q}{q}g - \theta \leq w^b$ there exists a unique equilibrium in which public sector employees do not behave opportunistically, regardless of their types.

The equilibrium correspondence is depicted in figure 2.

There are two kinds of equilibria. A separating equilibrium is an equilibrium in which only motivated agents work in the public sector, and all the non - motivated agents work in the private sector. A pooling equilibrium is an equilibrium in which both motivated and non - motivated agents apply for a job in the public sector.

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[5]When condition 2 and 1 are simultaneously verified there is a third unstable equilibrium in mixed strategies in which non motivated agents are indifferent between working in the public and in the private sector.

The exogenously given parameter w^b is the variable of interest to us, and is reported on the $x-$axis. On the $y-$axis we report the utility levels for workers in the public sector $V_m(w^b)$ and $V_{nm}(w^b)$ and the utility of working in the private sector $w(G)$. The thick lines show the equilibrium correspondence. When $w^b < \frac{1-q}{q}g - \theta$, every public sector employee behaves opportunistically. The quality of the public good G is low regardless of being in a separating or in a pooling equilibrium. The utility of working in the private sector is therefore given by $w(\Gamma(0))$. When $\frac{1-q}{q}g - \theta \leq w^b \leq \frac{1-q}{q}g$, motivated agents do not behave opportunistically while non motivated agents do. It becomes important to distinguish pooling equilibria (in which every agent prefers to work in the public sector) from separating equilibria (in which only motivated agents prefer to work in the public sector). In pooling equilibria the realized quality of the public good G is $G = \Gamma(\alpha)$. In separating equilibria is $G = \Gamma(1)$. Lastly, if $w^b \geq \frac{1-q}{q}g$, every public sector employee does not behave opportunistically and the quality of the public good is $G = \Gamma(1)$. The utility of working in the private sector is $w(\Gamma(1))$.

When multiple equilibria exist they are Pareto ranked.[6] It is thus possible to reinterpret the multiplicity of equilibria as a form of coordination failure. Suppose that a non motivated agent thinks that other non motivated agents work in the public sector. Given these beliefs, she finds optimal to work in the public sector, correctly anticipating that the wage in the private sector will be low.

The public sector combines two incentive problems: on the one hand paying a lower w^b helps in attracting only motivated agents (selection); on the other hand some rents have to be paid in order to deter opportunistic behavior (moral hazard). As it clearly appears from figure 2, the equilibrium interaction of the incentive compatibility and selection constraints, gives us the following

Corollary *Under the parametric configuration ensuring the existence of multiple equilibria, the*

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[6]To see why the two equilibria are necessarily Pareto Ranked, note that in an equilibrium in which $G = \Gamma(1)$ workers in the private sector earn utility $w(\Gamma(1)) > w(\Gamma(\alpha))$ and are therefore better off than in an equilibrium with $G = \Gamma(1)$. Motivated agents in the public sector are indifferent among the two equilibria since in any case w^b is such that they do not behave opportunistically. The equilibria are Pareto ranked if we can show that non motivated agents in the public sector in the equilibrium with $G = \Gamma(\alpha)$ earn a lower utility than non motivated agents in the private sector in the equilibrium with $G = \Gamma(1)$. Note however that by construction, $w(\Gamma(1)) > V_{nm}(w^b)$, and $V_{nm}(w^b) > w(\Gamma(\alpha))$. As it is further discussed below, equilibria are Pareto ranked because the rents of behaving opportunistically in the public sector are identical in the two equilibria.

quality of the public good is non-monotonic in the wage paid in the public sector w^b, if $w(\Gamma(1)) \leq \frac{1-q}{q}g$.

Suppose the economy starts with a low (but still higher than $\frac{1-q}{q}g - \theta$) wage in the public sector w^b. This wage is sufficiently high to deter opportunistic behavior of motivated agents, and is so low that it does not attract non motivated ones. The quality of the public good G is high, despite the low wage in the public sector. Assume that the wage w^b rises for exogenous reasons. An higher w^b attracts non motivated agents in the public sector, but may not be high enough to deter them from behaving opportunistically. The quality of the public good decreases to $G = \Gamma(\alpha)$. Further increases in w^b do not change the selection of agents in the public sector, but eventually restore $G = \Gamma(1)$ by deterring opportunistic behavior from non motivated agents.

While the result is stated with respect to public sector wage, the same non monotonic relationship exists between public sector wage premia (PSWP) $P = \frac{w^b}{w(\Gamma)}$ and the quality of governance $G = \Gamma$, regardless of whether a partial or a general equilibrium perspective is taken. This is important since in the empirical section we will explore the relationship between public sector wage premia and quality of governance. Formally, however, the wage in the private sector is an endogenously determined variable, while w^b is the exogenously given parameter on which comparative statics exercises should be performed.

Before I provide a simple extension of the model that endogeneizes the rents that public sector employees acquire from opportunistic behavior, I discuss some of the key assumptions of the model. Central to the analysis is the idea that agents are heterogeneous in terms of public sector motivation. However, another important characteristic of public sector jobs is that the quality of outputs is often harder to measure than in the private sector (because outputs are not marketed). In this case, lower wages in the public sector may be screening in not those who have a public service motivation but those who are incompetent or lazy. The present model could be extended to the case in which workers are also heterogenous in terms of talent, or cost of effort. Suppose that talent and public sector motivation are independently distributed in the population. If the public sector is not much worse than the private sector in screening talented individuals the logic of the current model would still be valid, provided wages in the public and private sector are replaced by appropriate wage schedules. More generally, the robustness of the results would depend on the relative ability of public and private sectors in screening individuals and on the relative returns to talent in the two

sectors. Those two dimensions are hard to quantify. In particular, despite the different nature of public sector jobs in terms of non-marketed outputs, information is public and information generated on the talent of individuals in the private sector may be used to screen individuals in the public sector as well (through hiring procedures based on experience in the private sectors, concourses, or wage offers that match private sector earnings). These considerations suggest that considering talent, while enriching the analysis, would not modify the intuition for the main results, in particular the strategic complementarity leading to multiple equilibria through the selection of individuals with heterogeneous motivation.

Along similar lines, the reader might question the real world relevance of the regime in which public sector wages are so high that no agent behave opportunistically. While would society pay such a high wage in the public sector, even when all the constraints have been solved? One possible answer is that the public sector is also trying to recruit more talented individuals, and that high public sector wages reflect this policy. Alternatively, while this model is deliberately silent about who decide the level of w^b and how w^b and G are financed, if public sector workers are "too" represented in the political process than w^b could end up being "too" high. It is thus clear that public sectors employees would favor an increase in the public sector wages and would always prefer to select the low corruption equilibrium when multiple equilibria exist.

Countries with a more developed private sector have an advantage in recruiting agents that are animated by public sector motivation, and still pay wages that are high enough to deter opportunism. This mechanism is conceptually different from existing arguments in the literature such as the fact that richer countries can afford higher wages for public sector employees to provide incentives to deter moral hazard, or that the average income in the economy may favor corruption by increasing the rents that can be extracted. In order to focus on the novelty of the selection argument and for the sake of expositional clarity, the model abstracts from these further mechanisms by taking as exogenous the level of public sector wages and the rents that can be earned through opportunistic behavior.

The multiple equilibria result of this paper is common to other theoretical contribution in the literature on corruption (for a review see Bardhan (1997)). In contrast to the models reviewed in Bardhan, the current model predicts a non-monotonic relationship between public sector wage (premia) and corruption. The key to understand this different result is the difference in the kind of

strategic complementarity leading to multiple equilibria. In the literature the opportunistic behaviors of agent are strategic complements (as in Tirole (1996), Sah (1988), Cadot (1987) and Andvig and Moene (1991)), while in this framework the strategic complementarity is the occupational choice, i.e. the self-selection of heterogenous agents into the public sector.[7] In other words, the sources of multiplicity rationalized by other contributions correspond to the case in which in the current model public sector motivation is increasing in the number of honest agents in the public sector, either because of limited monitoring, or because of peer effects. I have instead assumed that the private non pecuniary benefits that motivated agents derive from working in the public sector θ are exogenously given in order to isolate the distinct source of multiplicity of the current model.[8]

The next section introduces the possibility that supervisory jobs in the public sector do appeal to those with public service motivation. In doing so, it endogeneizes the rents that can be extracted from opportunistic behavior and, in contrast to the previous result on the Pareto rankness of the multiple equilibria, provides a rationale for why a subset of public sector employees may oppose reforms that changes the equilibrium.

3 Endogenous rents in the public sector

The rents that can be extracted through opportunistic behavior were exogenously given in the previous section. In this section we show that endogeneizing these rents implies that, when multiple equilibria exist, they are no longer Pareto ranked. We present a simple extension of the basic model in which the probability of being caught q is endogenously determined. We aim at capturing the intuition that, in a simple hierarchical setting if motivated supervisors have higher incentives to monitor than non motivated supervisors, the presence of (enough) non motivated supervisors attracts non motivated agents into the public sector. In other words, the rents that can be extracted through opportunistic behavior are higher in a *"worse"* public sector.

Public sector employees specialize into two tasks: agents and supervisors. The public sector is

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[7]For a similar mechanism in a different context see Ghatak et al. (2006).

[8]Bardhan notes that "it is widely recognized that in LDC (...) allegiance or clan based loyalties often takes precedence over public duties". To the extent that lower wage in the private sector increases the importance of kinship based relationship, and makes it more difficult to resist pressures from friends to divert public resources into private interest, the logic of the model is parallel to these sociological explanations.

assumed to be composed by a continuum of symmetric agencies. In each agency a large number of projects are undertaken. Each project is managed by an agent, and the behavior of each agent is assumed, for simplicity, to be monitored by a supervisor. The agent controls the amount of resources g necessary to produce the public good. The supervisor exerts non observable effort to monitor the behavior of the agent.

Supervisors choose effort q at cost $\frac{q^2}{2\zeta}$. Conditional on the opportunistic behavior of the agent, a supervisor creates verifiable information that proves the opportunistic behavior with probability q.

While the opportunistic behavior of an agent is verifiable by a court, we assume for simplicity that the supervisor has to be paid a fixed wage w^{m}[9].

The agent is paid a wage w^b if his opportunistic behavior is not detected, and is fired when is opportunistic behavior is detected. A fired agent has utility equal to 0.

Motivated supervisors and motivated agents enjoy the non monetary pay-off $\theta > g$ if and only if the public project they have been assigned to succeeds. The project succeeds if the agent does not behave opportunistically or if she is caught. The assumption $\theta > g$ ensures that a motivated agent never engages in opportunistic behavior.

Agents and supervisors are recruited from the same pool of applicants: workers in the private sector. We make the following assumption on the recruitment and task assignment process in the public sector

Assumption 4 :

The timing of events is as follows

Employees are randomly assigned to a task (either agent or supervisor) and to one of the symmetric agencies,

Employees observe the type of their colleagues within their agency,

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[9]We assume that supervisors cannot be given incentives on the basis of the outcome of the project. Supervisors could also be given some incentives by conditioning their payment on the detected behavior of the agent they monitor. For simplicity we avoid this complication. All that is needed for our results is that a motivated supervisors have more incentives to monitor, and that a non motivated supervisors allow some rents to the agent. This occurs when the Nash equilibrium of the monitoring game is at a corner, i.e. if ζ is low enough. Moreover, the provision of incentives may become very costly if collusion is allowed between the supervisor and the agent.

Employees form supervisor-agent pairs within their agency. These pairs maximize the surplus of workers within the agency

Supervisors and agents simultaneously and non cooperatively take actions.

Under this last assumption we can state,

Lemma 2 *Assume $\zeta\theta > \frac{g}{g+w^b}$. Motivated supervisors monitor motivated agents while non motivated supervisors monitor non motivated agents*

Proof. In the Appendix ■

A motivated agent never engages in opportunistic behavior. In order to maximize the quality of the public good $G(\cdot)$ it would be optimal to assign a motivated supervisors to the monitoring of non motivated agents. From the point of view of supervisor - agent pairs this allocation has two costs. First, non motivated agents loose rents g. Second, motivated supervisors loose with strictly positive probability the non monetary pay-off and exert some costly monitoring effort.

Proposition 3 *When rents in the public sector are endogenous, multiple equilibria are not necessarily Pareto Ranked.*

Proof. In the Appendix. ■

Consider a separating equilibrium in which only motivated agents and supervisors work in the public sector. A non motivated agent has no incentives to work in a public sector in which there are only motivated agents and supervisors since he would be matched with a motivated supervisor and will enjoy no rents.

In a pooling equilibrium some supervisors are non motivated. In this kind of public sector the pressure to punish opportunistic behavior is lower, and a non motivated agent would earn positive rents. It may be the case that the endogenously higher rents from opportunistic behavior that a non motivated agent earns in a pooling equilibrium more than compensate the increase in the wage in the private sector.[10]

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[10] Allowing for the possibility that, once a supervisor discovers the opportunistic behavior of the agent, she can ask bribes, would give some incentives to non motivated supervisors to monitor. In equilibrium the probability that the agent itself engages in misbehavior is reduced. However this comes at a cost. The rents from opportunistic behavior

The fact that the multiple equilibria may not be Pareto ranked implies that reforms of the public sector are opposed by a part of public sector employees and has thus profound implications for the understanding of the political economy of public sector reforms[11].

4   Discussion

4.1   Empirical Evidence

What is the empirical relevance of the theoretical arguments developed in the previous section? What are the implications for our understanding of the causes of bad governance in general and of corruption in particular? Alesina et al. (1999) provides an interesting analysis of the regional distribution of public employment in Italy. They compare the Northern regions with Southern regions. The comparison is particularly interesting from out perspective for two reasons. First, there are huge differences in income levels between the rich north and the poor south. Second, because of centralized wage setting, nominal wages in the public sector in the north and in the south are almost identical in nominal terms, and can be regarded as relatively more exogenous than if we were comparing different countries or regions within countries but with decentralized public sector wage setting. Although the focus of Alesina et al. (1999) is on the redistributive role of public sector jobs, their evidence is incredibly consistent with the spirit and main implication of the theoretical analysis. They first document huge public sector wage premia differences between the north and the south. Because of the different income per capita but equal nominal public sector wages, wage premium in the south are typically much higher. Accordingly, although it is inherently difficult to measure productivity of public sector employees, fragments of evidence suggest that productivity of public sector employees is much lower in the South than in the North. Their conclusions are similar in spirit to those in Putnam (1993) on differential responsiveness

spread on multiple levels of the hierarchy making screening even more difficult. The fundamental trade off between the provision of incentives on the job and the selection of motivated employee is again obtained.

[11]Multiple equilibria exist when the ratio of the values of a career in the private and public sector is close to one: it is likely that wages in the public sector fall in this range even after controlling for political economy considerations. As emphasized in Borland and Gregory (1999) it is not clear which political economy mechanism determines public sector wages. To focus on the precise economic mechanism described in the paper, the model is silent about these aspects.

and effectiveness of local bureaucracy between the North and the South. Alesina et al. (1999) also document important cultural differences between public versus private jobs attitude in the North and in the South. Specifically, they identify a "culture of dependence", namely the fact that educational and attitudinal choices are tilted towards the public sector in the South.

While the evidence from regional differences across Italy is suggestive and consistent with the qualitative features of the multiple equilibria result, some further insights can be gained by cross-country evidence on the determinants of (perceived) corruption and in particular on the relationship between public sector wage premia and corruption. Recent evidence do not find a strong relationship between public sector wage premia and corruption. Treisman (2000) is cautious in reporting the negative impact that public sector wages have on corruption, because of endogeneity problems. Panizza (2001), Evans and Rauch (2001) and Van Rijckeghem and Weder (1997) do not find that higher wages are associated with lower corruption. While an endogeneity problem exists (corrupt politicians tend to set higher public sector wages), this evidence is consistent with our results on the non monotonic relationship between corruption and public sector wages. The theoretical section however points out towards the fact that the relationship between public sector wage premia and corruption is intrinsically non-linear. First of all, there is a non-monotonic relationship between public sector wage premia and the quality of the public governance. Secondly, the model points out that the effects of higher public sector wage premia may depend on the average level of income in the country. In particular, the model tell us that the relative importance of the moral hazard and adverse selection constraints depends on the average income of the country. Middle income countries are likely to be able to solve the moral hazard problem for motivated agents, but not for non motivated agents. In those countries it is thus relatively more likely that higher public sector wage premia will lower governance by making the selection process less effective. In Table 1 I use data from Treisman (2000) to document cross-country partial correlations between the quality of public sector governance and public sector wage premia. I measure quality of public sector governance in country i as

$$Gov_i = 10 - C_i$$

where C_i is a measure of perceived corruption in country i ranging from 0 to 10. While the small number of observation and the cross-country nature of the exercise does not allow to interpret the results in a causal way, the broad picture is consistent with the theoretical exercise.

In the sample the index of governance ranges from 1.7 to 9.75, with mean 5.20 and standard deviation equal to 2.54. The public sector wage premium (defined as average Central government wage relative to per capita GDP) ranges from a minimum of 0.8 to a maximum 8.4, with average of 2.82 and standard deviation equal to 1.70. I run simple OLS regressions as

$$GOV_i = \alpha + \beta WP_i + \gamma INC_i + \delta Z_i + \varepsilon_i$$

where WP_i is the public sector wage premium in country i, INC_i is (log of) GDP per Capita in country i and Z_i are further controls, including British colony dummies, legal origin dummy and a measure of ethnic fragmentation.

Column I shows that, once we control for GDP per capita, British colony dummies, legal system dummies and an index of ethnic fragmentation, the wage premium is totally uncorrelated to the quality of governance. Column II instead finds a U-shaped relationship between public sector wage premia and quality of governance. The negative coefficient on the public sector wage premium and the positive coefficient on its square are statistically significant at the 10% and 5% respectively. They imply that a positive relationship between public sector wage premia and governance is found for countries with wage premia above 3.8, i.e. only for the top quartile of public sector wage premia. In the spirit of figure 2, Column III adds the cube of public sector wage premium. While none of the coefficients of the polynomial is individually statistically significant, the basic pattern of Column II is confirmed, as the coefficient on the third degree term is very small.[12]

Finally, Column IV tries to check whether the relationship between public sector governance and public sector wage premium varies with the level of development of a country. Beyond of being of intrinsic interest, this analysis might also be relevant in thinking about appropriate recommendations in terms of public sector reforms. I divide countries in the sample according to their GDP per capita, and classify the top quartile as rich, and the bottom quartile as poor. While on average the relationship between public sector wage premia and public sector governance is not very strong, I do find evidence that this relationship tend to be negative in middle income countries, i.e. in those countries that are more likely to worsen the selection process by raising public sector wages.

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[12] The model displays multiple equilibria, implying that the same public sector wage premia may be consistent with very different levels of public sector governance. This suggests that it may be difficult to uncover a strong relationship in the data, even when squared terms are included. Bender (1998) surveys the evidence on public sector wage premia around the world, documenting huge cross-country variation.

On a more qualitative ground, the existence of multiple equilibria suggests that culture, through its effects on the expectations of individuals, may be an important determinant of corruption. Treisman (2000) finds that history matters for corruption more than the current economic and political situation. He reports that "long lived aspects of countries' cultural or institutional traditions affect the level of perceived corruption more significantly than current state policies". Among the variables determining this "tenacity of the past" (exposure to) democracy and colonial origins seems to be the most important.

The agency problem in the public sector is exacerbated when the wage in the private sector is particularly low. A recent literature emphasized how, in the presence of credit market imperfections, countries with a more unequal distribution of assets are characterized by lower wages in the private sector[13]. In the model this can be represented in a compact form in the following way. Let the wage in the private sector $w(G, I)$ be an increasing function of the quality of the public good G and a decreasing function of the level of inequality I. The model suggests that more unequal countries have worse public sectors in equilibrium, as it is illustrated in figure 3. The results in Panizza (2001) on Latin America, are consistent with the view that inequality may indeed exacerbate corruption: in this notoriously unequal region, a public sector wage premium is often observed associated with high levels of corruption. Treisman (2000), controlling for economic development, finds that Latin America seems indeed to have a higher degree of perceived corruption than what is predicted by other variables. Schiavo-Campo et al.(1996) report evidence on the same lines. The recent successful experiences of some East Asian countries in reducing corruption, may have been facilitated by a relative equality in the distribution of earnings, wealth, and opportunities.

Overall, while it is inherently difficult to empirically identify the precise channels leading to the non-monotonic relationship between public sector wage premia and corruption, the theoretical arguments appear to be consistent with anecdotal evidence as well as broad cross-country patterns.

4.2   Policy Implications

Does the theoretical analysis in the previous section yields policy implications? While the model is simple and the agency problems in the public sector highly stylized, the analysis presents some original elements on how to think about public sector reforms in developing countries.

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[13]See e.g. Banerjee and Newman (1993) and Ghatak and Joung (2002)

First of all, the model suggests that it is not necessarily a good thing to have cheap labor to hire in the public sector. Cheap labor makes more difficult to screen motivated agents. While low wages in the private sector may also reduce the wage bill paid to public sector employees, they also hurt the selection of individuals in the public sector. This second effect may be particularly detrimental when, because of agency problems within the public sector, some rents have to be paid to limit opportunistic behavior.

The existence of enough motivated agents in the economy can be interpreted as a form of social capital. This form of social capital may not be sufficient to ensure the existence of an efficient public sector. The literature recognizes that a good public service can be obtained only with sufficient pecuniary incentives or personnel motivation. While empirical evidence exists casting some doubts on the first view, this paper shows that the latter one may not be sufficient, because of the possibility of coordination failure in the occupational choices of individuals.

On a more positive ground, the theoretical analysis as well as the empirical section, suggest that public sector reforms should be tailored to the level of income per-capita in the country. Middle income countries in particular may find inappropriate policies aiming at increasing public sector wage premia, as those policies are more likely to worsen the recruitment process and attract non motivated agents for which monetary incentives are not enough to deter opportunism.

From the analysis in section 3, we learn that the recruitment processes at different levels of the public sector hierarchy become inherently linked. Reforms at specific levels of the hierarchy can have important effects on the whole bureaucracy. For instance, targeting the recruitment of motivated supervisors and forming an "ésprit de corps" at the top of the public sector hierarchy could be an effective way of improving the performance of the entire public sector. The model assumes that supervisors and agents are selected from the same pool. The model is thus not rich enough to compare wage compression in the public and in the private sector. However, it is possible to imagine simple extensions of this framework that would justify wage compression in the public sector. Since the presence of non motivated supervisors attracts non motivated agents, the model suggests a rationale for higher wages compression in the public sector. Such wage compression may be particularly appropriate in poorer countries, in which wages in the private sector are so low that it is essentially impossible to only recruit motivated agents.

An interesting extension would analyze the trade off between fostering motivation by delegating

authority and controlling opportunistic behavior by retaining formal authority at higher level of the public sector hierarchy. The analysis of the optimal degree of delegation can then be thought as a way of endogeneizing θ. Poor countries in which the selection process can not be easily solved should not have highly decentralized public bureaucracies, since authority is relatively more likely to be used for private gains. Decentralization, and flatter hierarchies may instead be appropriate in richer countries where fostering initiative at lower levels of the hierarchies may increase public sector motivation without worsening the selection process.

In general, the main message of the model is that the designer of public sector reforms in developing countries should be aware of the fact that the relative importance of selection process and provision of on the job incentives is likely to vary in systematic ways with the level of development of a given country, and that, as a consequence, the appropriate public sector reforms, both in terms of compensation policies, recruitment processes and internal organization of public sector agencies, should be different in poor versus middle income countries. With respect to the multiple equilibria result, the model suggests that in the good equilibrium, increasing rents might improve public sector efficiency, while in the bad equilibrium it will not.

5 Conclusions

We presented a model of the relationship between public sector motivation and development. The main results are i) multiple equilibria can exist for a given level of public sector wage premia, ii) the relationship between public sector wage premia and corruption may be non monotonic. The results are consistent anecdotal and original cross-country evidence. By recognizing that the relative importance of workers selection and provision of "on the job" incentives varies in systematic ways with wages in the private sector, the model delivers novel policy implications for public sector reforms in developing countries.

The model is simple and could be extended in a number of directions. A more complete theory should account for heterogeneity in talent among workers. A detailed analysis of the appropriate public sector organizational arrangements and of the equilibrium interplay of incentives between the private and public sectors is left for future research.

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6   Appendix

Proof. of Lemma 1

Let us denote $q_{i,j}$ the monitoring effort of a supervisor $i \in \{m, nm\}$ when she is matched with an agent of type $j \in \{m, nm\}$.

Claim 5 *The surplus generated by positive assortative matching is $W^+ = 2(w^s + w^b + \theta) + g$.*

Proof. Since $\theta > g$, a motivated agent never behaves opportunistically, and thus the project succeeds with probability one. Since the agent never behaves opportunistically, a motivated manager has no incentives to exert monitoring effort: $q_{m,m} = 0$. The surplus generated by a pair of motivated agents - supervisor is $w^s + w^b + 2\theta$.

A non motivated supervisor has no incentives to monitor: $q_{nm,nm} = 0$. A non motivated agent behave opportunistically with probability one. A non motivated pair generates a surplus $w^s + w^b + \rho g$. Summing the surplus of the two pairs gives us $W^+ = 2(w^s + w^b + \theta) + g$ ■

Claim 6 *The surplus generated by negative sorting is $W^- = 2(w^s + w^b + \theta) - \frac{g}{w^b + g} \frac{1}{\zeta} \left[\frac{2w^b - g}{2(w^b + g)} \right]$*

Proof. Since $\theta > g$, a motivated agent never behaves opportunistically, and thus the project succeeds with probability one. A non motivated supervisor has no incentives to monitor: $q_{nm,m} = 0$. The pair motivated agent - non motivated supervisor generates a surplus of $w^s + w^b + \theta$.

A motivated supervisor has incentives to monitor. Let p denote the probability that the non motivated agent behaves opportunistically. A motivated supervisor optimally sets q to solve

$$\max_q p \left[q(w^s + \theta) + (1 - q)w^s \right] + (1 - p)(w^s + \theta) - \frac{q^2}{2\zeta}$$
$$= w^s + \theta - p\theta(1 - q) - \frac{q^2}{2\zeta}$$

which gives

$$q_{m,nm} = \zeta p \theta$$

If $q_{m,nm} > \frac{g}{g+w^b}$ a non motivated agent does not engage in opportunistic behavior, and therefore $p = 0$. If instead $q_{m,nm} < \frac{g}{g+w^b}$ a non motivated agent engages in opportunistic behavior, and therefore $p = 1$. Since $\zeta\theta > \frac{g}{g+w^b}$ there exists a unique equilibrium in mixed strategy given by by $q_{m,nm} = \frac{g}{w^b+g}$ and $p = \frac{g}{w^b+g}\frac{1}{\zeta\theta}$.

Since the non motivated agent is playing in mixed strategy, her payoff is equal to w^b. The utility of the motivated supervisor is

$$w^s + \theta - p\theta(1-q) - \frac{q^2}{2\zeta}$$

$$= w^w + \theta - \frac{g}{w^b+g}\frac{1}{\zeta\theta}\theta(1 - \frac{g}{w^b+g}) - \frac{\left(\frac{g}{w^b+g}\right)^2}{2\zeta}$$

$$= w^w + \theta - \frac{g}{w^b+g}\frac{1}{\zeta}\left[\frac{2w^b-g}{2(w^b+g)}\right]$$

The pair non motivated agent - motivated supervisor generates a surplus of $w^s+w^b+\theta-\frac{g}{w^b+g}\frac{1}{\zeta}\left[\frac{2w^b-g}{2(w^b+g)}\right]$. We thus have $W^- = 2(w^s + w^b + \theta) - \frac{g}{w^b+g}\frac{1}{\zeta}\left[\frac{2w^b-g}{2(w^b+g)}\right]$ ∎

Finally, note that $W^+ - W^- = g + \frac{g}{w^b+g}\frac{1}{\zeta}\left[\frac{2w^b-g}{2(w^b+g)}\right] > 0$ ∎

Proof. of Proposition 3

While applying to the public sector a worker does not know if she will be supervisor or agent. Conditional of being accepted in the public sector, the two events are realized with the same probability.

Claim 7 *In the pooling equilibrium non motivated agents earn* $V_{nm}(w^b) = \frac{1}{2}\left(w^b + g\right) + \frac{1}{2}w^s$.

Proof. Because of the assortative matching result supervisors never monitor: motivated supervisors are matched with motivated agents, therefore they do not need to monitor. Non-motivated supervisors have no incentives to monitor. In the pooling equilibria thus, non motivated agents are never caught and earn $w^b + g$. Being $\frac{1}{2}$ the probability of being assigned a supervisory task, $V_{nm}(w^b) = \frac{1}{2}\left(w^b + g\right) + \frac{1}{2}w^s$ ∎

Claim 8 *In a separating equilibrium non motivated agents would earn in the public sector* $V_{nm}(w^b) = \frac{1}{2}w^b + \frac{1}{2}w^s.$

Proof. Consider a deviation by a small mass of measure ε of non motivated agents. The probability that they will be agents and matched with a non motivated supervisor is arbitrarily close to zero. $V_{nm}(w^b) = \frac{1}{2}w^b + \frac{1}{2}w^s$ ∎

The result then follows by noting that in the pooling equilibrium we have

$$\frac{1}{2}\left(w^b + g\right) + \frac{1}{2}w^s > w(\Gamma(\alpha))$$

while the separating equilibrium

$$\frac{1}{2}w^b + \frac{1}{2}w^s < w(\Gamma(1))$$

These two conditions do not exclude the case $\frac{1}{2}\left(w^b + g\right) + \frac{1}{2}w^s > w(\Gamma(1))$. ∎

Table 1

Quality of Governance and Public Sector Wage Premia: a non-linear relationship

Dependent Variable: Quality of Governance	I	II	III	IV
Public Sector Wage Premium	0.11	-0.61	-1.75	0.2
	[0.12]	[0.37]*	[1.10]	[0.13]
Public Sector Wage Premium Squared		0.08	0.4	
		[0.03]**	[0.27]	
Public Sector Wage Premium Cube			-0.02	
			[0.02]	
Public Sector Wage Premium * middle income dummy				-0.3
				[0.16]**
Public Sector Wage Premium * rich income dummy				-0.09
				[0.45]
GDP per Capita	5.07	4.76	4.66	5.69
	[0.53]***	[0.53]***	[0.54]***	[0.78]***
Controls	yes	yes	yes	yes
Observations	52	52	52	52
R-squared	0.78	0.8	0.8	0.8

Robust standard errors are reported in parenthesis. ***, **, * mean significant at 1%, 5% and 10% respectively. All data are from Treisman (2000). Quality of Governance is equal to (10 – Average Transparency International's annual index of "perceived corruption", for 1996, 1997 and 1998). Public sector wage premium is defined as the average Central government wage relative to per capita GDP. Controls are dummy for common law system, dummy for former British colony and ethnic fragmentation. GDP per capita is log of income per capita in 1990. Middle income countries are countries in the second and third quartile of the sample in terms of GDP per capita in 1990.

Figure 1

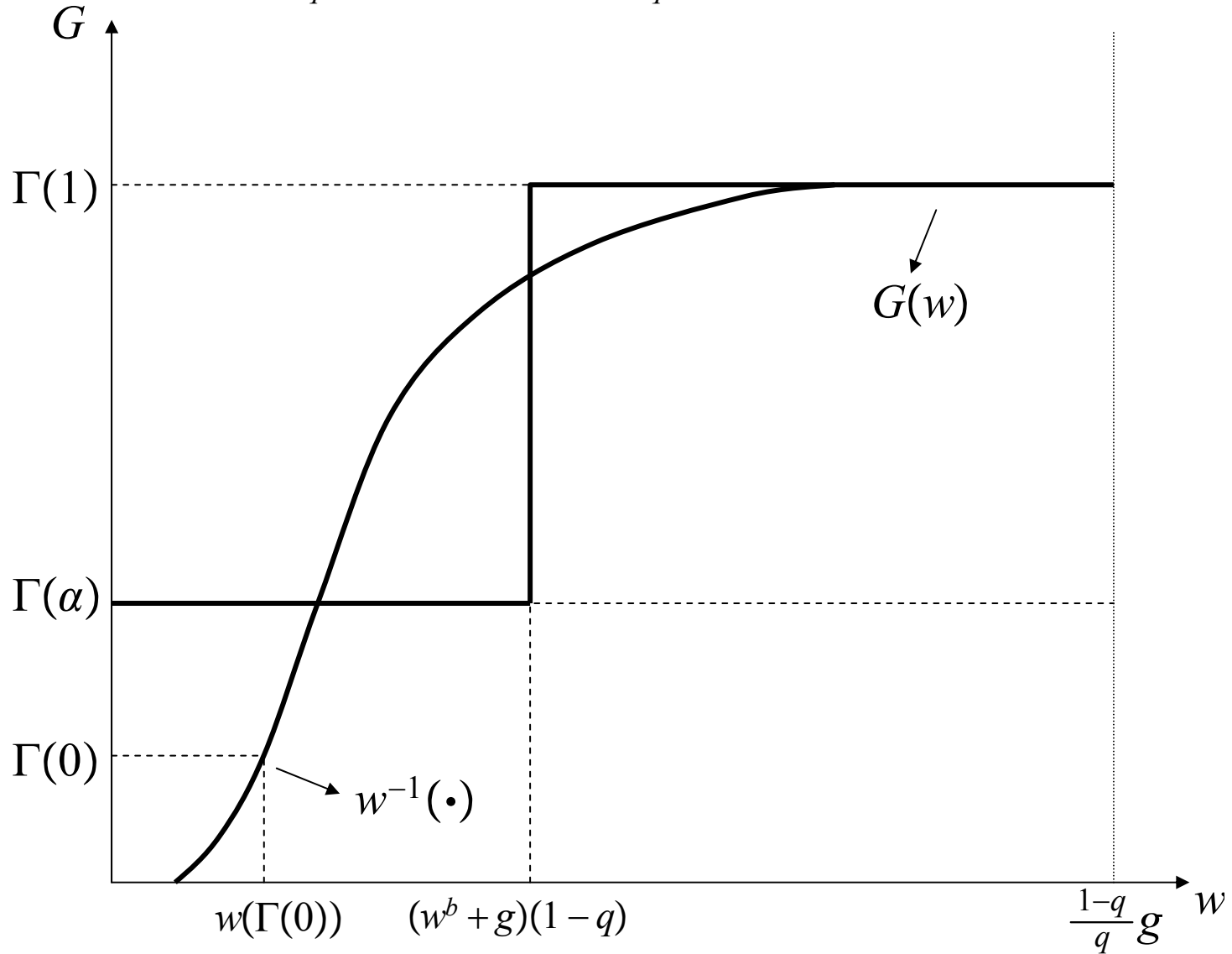**Case 2** : $\frac{1-q}{q}g - \theta \le w^b \le \frac{1-q}{q}g.$ **Multiple Equilibria**

Figure 2

$w(G)$

The Equilibrium Correspondence

$V_m(w^b)$

$V_{nm}(w^b)$

Complete corruption

No corruption

Separation

$w(\Gamma(1))$

$w(\Gamma(\alpha))$

Pooling

$w(\Gamma(0))$

Complete corruption

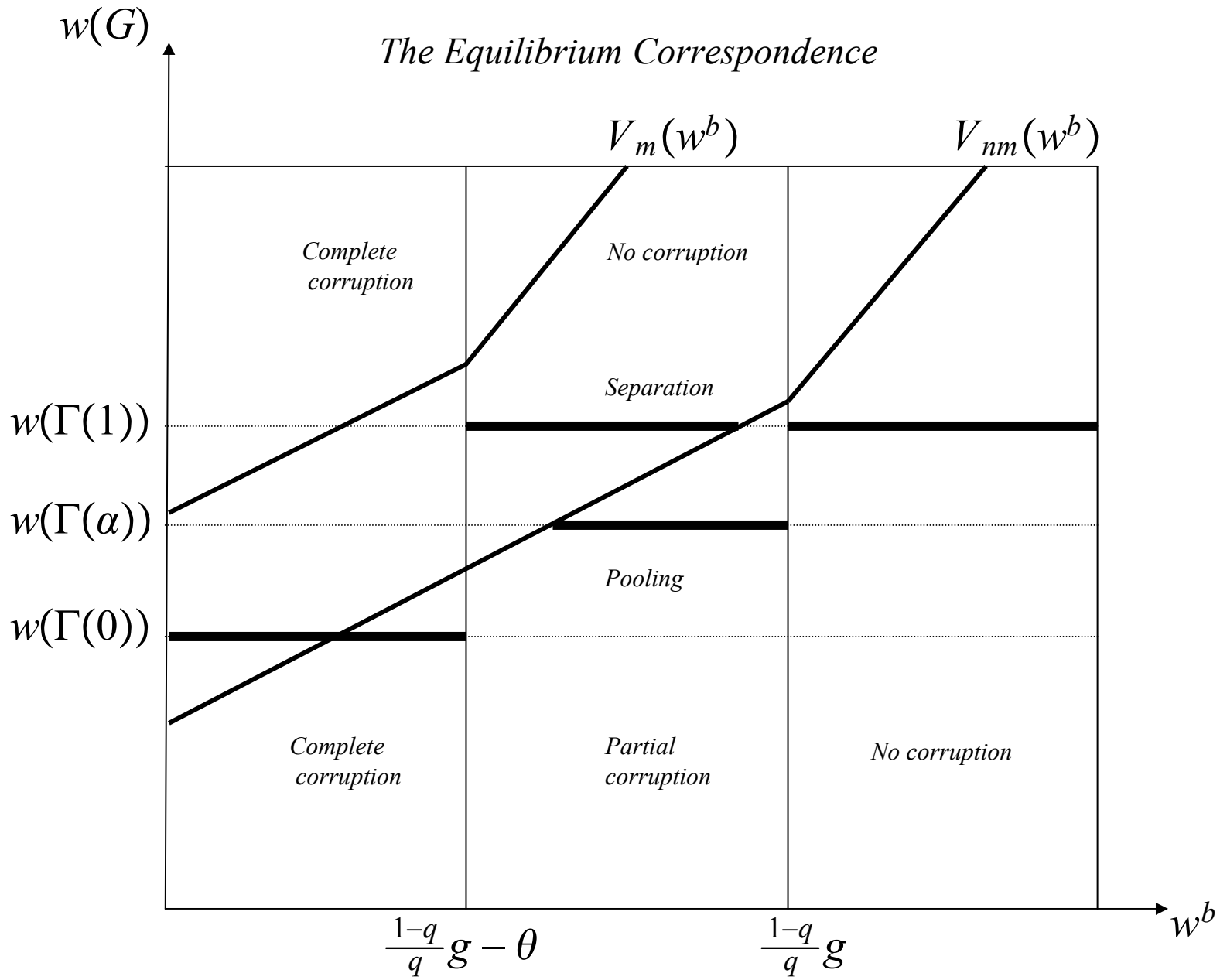*Partial corruption*

No corruption

$\frac{1-q}{q}g - \theta$

$\frac{1-q}{q}g$

w^b

Figure 3

Increase in inequality in case 2