

Fabella, Raul V.

Working Paper

Signaling and contract cost under weak governance: Water service privatization in Metro-Manila, Philippines

UPSE Discussion Paper, No. 2012-13

Provided in Cooperation with:

University of the Philippines School of Economics (UPSE)

Suggested Citation: Fabella, Raul V. (2012) : Signaling and contract cost under weak governance: Water service privatization in Metro-Manila, Philippines, UPSE Discussion Paper, No. 2012-13, University of the Philippines, School of Economics (UPSE), Quezon City

This Version is available at:

<https://hdl.handle.net/10419/93573>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



UP School of Economics
Discussion Papers

Discussion Paper No. 2012-13

October 2012

**Signaling and Contract Cost Under Weak Governance:
Water Service Privatization in Metro-Manila, Philippines**

by

Raul V. Fabella, Ph.D.

Professor of Economics
University of the Philippines School of Economics
Diliman, Quezon City

UPSE Discussion Papers are preliminary versions circulated privately to elicit critical comments. They are protected by Republic Act No. 8293 and are not for quotation or reprinting without prior approval.

Signaling and Contract Cost Under Weak Governance: Water Service Privatization in Metro-Manila, Philippines

by

Raul V. Fabella
School of Economics
University of the Philippines

Abstract

Many supply contracts between the state and private agents in a developing country are cost-re-imbusement variety and are rolled out under weak and unreliable governance. The latter has to be provided for through higher supply cost. The state in turn can lower the contract cost by providing verifiable credible commitments of its intentions. We show using a modified the Laffont-Tirole cost-reimbursement contract model that the more reliable is the state in respect to the delivery of its contractual obligations, the lower the cost of contracts to the state and society. We argue that the various actions taken by the Philippine government before the privatization of the water service in Metro Manila in 1997, viz., the substantial increase in the tariff, the reduction in the labor complement by 30% and the outsourcing of the dispute resolution mechanism to an international appeals panel, induced entry and aggressive bidding by the contenders that dramatically reduced the cost to the public of the water services concession contract in Metro Manila, Philippines. (Key words: signaling, credible commitment, procurement contracts, weak governance) JEL Class. L33, I30, H57

Abstract (100 words).

Cost-reimbursement contracts entered into by the state are often written under unreliable governance. Using a modified the Laffont-Tirole cost-reimbursement model, we show that the more reliable the principal, the lower the cost of contract. Credible commitments of good future behavior provided by the state can lower the cost. We argue that various difficult actions taken by the government before the privatization of the water service in Metro Manila in 1997, viz., substantial increase in the tariff and reduction in the labor complement, induced entry and aggressive bidding dramatically reducing the cost to the public of the water services. (Key words: signaling, credible commitment, procurement contracts, weak governance) JEL Class. L33,I30, H57

Correspondence: Dr Raul V Fabella
School of Economics
University of the Philippines
1411 Diliman, Quezon City
Philippines
e-mail: raulfabella@yahoo.com.ph
tel: 632-9513586

I. INTRODUCTION

Underdevelopment is characterized not only by widespread poverty and bad policies but, more fundamentally, by weak institutions, especially those of enforcement of contracts and property rights. These manifest themselves as higher cost of contracting and market exchange. At one extreme, these result in *missing markets*. More likely they engender thin markets with high prices. Thus, the development of Western Europe dovetailed the growth of institutions that lowered the cost of contracting and exchange (North, 1990; North and Weingast, 1989). Empirical evidence of the negative impact of weak institutions on economic performance (e.g., Easterly and Levine, 2002; Rodrik, Subramanian and Trebbi, 2002) are abundant. Where weak governance prevails, existing market exchanges tend to be supported by *private ordering* (Williamson, 1983; 1985; 2002), or *second party enforcement* (North, 1990) which, however, raises the cost of contracts to the parties.

The mainstream of contract theory assumes a strong governance in the form of an unbiased outside enforcement agency or a court of law that renders *reneging* by signatories to a contract unprofitable. As long as obligations are observable, strong third party enforcement will deter reneging. It also renders the difference in delivery dates of (non-spot) contract obligations moot. Where, however, enforcement is weak, differential delivery dates matter and players factor in the possibility of reneging and enforcement cost into the contract (see e.g., Fabella, 2009). If the reneging problem is severe, the market or transaction will go missing.

Where the deal pushes through despite weak governance, alert agents will factor in the cost of privately enforcing the terms of the contract (private ordering) leading to higher cost for the same contracted deliverable. For example, under possible *ex-post opportunism* by A, the principal may demand a “bond” or “hostage” from A as a condition for hiring, which makes the contract costly for A (see, e.g., Williamson, 1983). In the case of “effort-in-advance contracts” where renegeing opportunity is enjoyed by the principal, the agent demands a premium on top of reservation before accepting the contract (Fabella, 2009). Laffont and Mortimart (2002) proposed a modification of the incentives compatibility constraint, the *enforcement-proofness constraint*, that preserves the integrity of the contract under adverse selection regardless of the quality of outside governance.

When the principal holds the prerogative for ex-post opportunism, the agent, given weak third party enforcement and given the spotty past performance of the principal, will demand credible commitment devices and/or signals of future good behavior before agreeing to the contract. The principal knowing the perception by agents of his type will try to reduce the cost of procurement by rolling out such devices as will alter the perception of its type.

This scenario is especially relevant where the LDC state is the principal in procurement contracts where the private sector agent advances the cost of delivery and is re-imbursed later by the state (cost re-imburement contracts). When the state has a poor reputation for fidelity to its contractual obligations, and given that the state is itself the third party enforcer of contracts, the probability that no agent will accept the contract is high. The case of water service privatization in Metro-Manila in 1997 precisely faced

such a hurdle. Will the private actors come to the privatization table? Will they be aggressive enough to ensure observable consumer surplus? What could the state do to counter its dismal reputation?

In this paper, we modify the Laffont-Tirole cost reimbursement contract (1993) to allow for the possibility of the principal P being unable or unwilling to fully reimburse the agent A's cost. Agent A factors this into his calculation. The agent only knows the probability distribution across type of principal. This can be viewed as reflecting the principal's capacity to deliver being suspect. This is clearly true where the delivery of reimbursement of cost is through a substantive *tariff adjustment* that is approved by a state regulatory office. When the price is a sensitive political issue, this adjustment process is usually politicized and approval becomes a random event. Resorting to the established court of law may be very costly and/or involve clandestine payoffs.

Section II gives a slightly modified symmetric information Laffont-Tirole cost-reimbursement model under strong governance as the reference point. Section III modifies the model further to allow for the weak governance, that is, the capacity of the principal to fully reimburse cost and transfer is known only up to a probability distribution. The effects on contracted effort and fiscal transfer of weak governance are analyzed. In particular, payoff to the agent rises, effort falls and the social value of the project falls as the perceived delivery capacity weakens. Section IV discusses how the state can lower the cost via a credible commitment and signaling devices. Section V discusses the case of the water privatization via a concession in Metro Manila in 1997,

where these devices explain in part the aggressive bids and large tariff discounts for the consumers .

II. THE BASE MODEL: STRONG GOVERNANCE

In this section, we construct a modified Laffont-Tirole cost-reimbursement model (Laffont and Tirole, 1993) to serve as the comparator. To put weak governance in clearer focus, we use instead the observable effort version. The principal P here is the state, and there is only one agent – the firm. Let V be the social value defined as the aggregate consumers surplus of the project in question. A single firm can realize the project and its cost function is

$$C(x) = \beta(x) - e \quad (1)$$

where x , the deliverable output, is a random variable, with density function $f(x)$, affecting the efficiency variable β and observable e is the effort. Thus, cost $C(x)$ falls with a rise in effort for every given x . Effort is costly to the firm. The firm's quasi-linear utility function is

$$U = t(x) - v(e) \quad (2)$$

where $v(e)$ is the disutility of effort function with $v' > 0$, $v'' > 0$, $v(0) = 0$, $v(\infty) = \infty$, and t is the fiscal transfer made by the principal (say, the state) to the firm. The firm incurs a cost C to deliver x but the state is committed to reimbursing C in full, say, via a tariff

adjustment. Thus, in (2), we implicitly have $+C$ and $-C$ which cancel. The agent has an outside reservation utility U^0 . Thus, the individual rationality constraint is

$$t(x) - v(e) \geq U^0. \quad (3)$$

The price of the contract is the total reimbursement promised by the state $(t + C) = (t + \beta - e)$. Let $\lambda > 0$ be the shadow cost of public funds if the taxation is distortionary. The social value of the project reflecting consumer sovereignty is:

$$V(x) = S(x) - (1 + \lambda)(t(x) + \beta(x) - e). \quad (4)$$

S is the consumer's surplus deemed fixed since x is fixed. The state maximizes (4) subject to the participation constraint of the agent. Here we deviate from Laffont-Tirole model in that the social objective function V includes only the net consumer's surplus but not the agent profit since the agent-firm in our case may be foreign. The state's problem is to find a contract (t, e) that maximizes the expected net consumer's surplus, i.e.,

$$\begin{aligned} \max_{\{e,t\}} \{ & \int [S(x) - (1 + \lambda)(t(x) + \beta(x) - e)]f(x)dx \} \\ \text{s.t. } & \int t(x)f(x)dx - v(e) \geq U^0 \end{aligned} \quad (5)$$

The 1⁰ conditions for an interior maximum are

$$\begin{aligned} \text{(i)} \quad & (1 + \lambda) - \delta v' = 0 \\ \text{(ii)} \quad & -(1 + \lambda) + \delta = 0 \end{aligned} \tag{6}$$

where δ is the Lagrange multiplier. From (6.i) and (6.ii), we have:

- (a) $\delta = (1 + \lambda) / v' > 0$, thus the participation constraint (3) binds as equality;
- (b) $v'(e) = 1$ is the efficiency condition which gives the first best effort level e^* ;
- (c) Given e^* we find the optimal transfer $t^* = U^0 - v(e^*)$ from the participation constraint. The optimal contract between the state and the agent is (t^*, e^*) .
- (d) If the reimbursement is less than $(t^* + C)$, the state can be held to full accountability by some impartial court of justice. This is the manifestation of strong governance.

These are essentially the Laffont-Tirole results for the observable cost version. The cost-reimbursement contract is Pareto efficient and individually rational, i.e., both P and A participate. Delivery by A of e^* is assured by PC. Delivery by P of t^* and C is assured by strong outside enforcement. Strong enforcement renders the distinction between contract delivers dates immaterial.

III. WEAK GOVERNANCE

The economic environment is characterized by weak governance if despite the commitment to fully reimburse C and deliver t^* , the state (the principal) is perceived able to deliver on average only $q(t + C)$, $0 < q < 1$. q is known to both P and A. In particular, P

knows that A know q . The state here may initially be well-intentioned but falls short for many reasons: an unforeseen fiscal difficulty or an emergent political reality may intervene, when cost reimbursement requires raising taxes or tariffs. We may also be operating in an environment of multi-layered principal where the *intermediate* principal, the regulatory agency, promises C but delivery of C is due to the ultimate principal, an unpredictable political decision maker or an overreaching judiciary. There is a court of law that is tasked to enforce the contract but only at some cost to A.

The agent, in turn, knows and factors this into his utility calculation. The utility of the agent is then

$$\begin{aligned} U &= q(t + C) - v(e) - C \\ &= qt - v(e) + C(q-1). \end{aligned} \tag{7}$$

A participates only if $U \geq U^0$ or

$$qt(x) - v(e) \geq U^0 - (\beta(x) - e) (1 - q). \tag{8}$$

We call this the *augmented participation constraint* (APC) where $(\beta - e) (1 - q) > 0$ is added unto the agent's reservation utility U^0 to get an *enforcement proof* participation condition (see e.g., Laffont and Meleu, 2002, for the case where opportunism is the prerogative of the agent). It is clear that (8) will be violated for small enough q . As long as (8) holds, agent A is expectationally insured from possible renegeing by P on the reimbursement. In effect, A demands a premium over and above his *outside reservation utility* U^0 to cover the expected cost to himself of enforcement. We call $U^0 + (\beta - e) (1 -$

$q) = U^0$ his *insider reservation utility*. The presence of possible ex-post contract opportunism by P creates a wedge between insider and outsider reservation utility. This is an instance of Williamson's (1985; 2003) "fundamental transformation".

The state's ex ante optimization problem using (1) is now:

$$\max_{\{e, t\}} \left\{ \int [S(x) - (1 + \lambda)(t(x) + \beta(x) - e)]f(x)dx \right\} \quad (9)$$

$$\text{s.t. } \int [qt(x) - v(e) + (\beta(x) - e)(q - 1)]f(x)dx \geq U^0.$$

Letting δ be the Lagrange multiplier, the 1⁰ conditions for an interior maximum are

$$\begin{aligned} \text{(i)} \quad & -(1 + \lambda) + \delta((q - 1) + v') = 0 \\ \text{(ii)} \quad & -(1 + \lambda) + \delta q = 0. \end{aligned} \quad (10)$$

(10.ii) shows that $\delta > 0$ and the augmented participation constraint binds strictly. i.e., $qt(x) - v(e) = U^0 + (\beta(x) - e)(1 - q)$ for every x . Combining (8.i) and (8.ii) gives $v'(e) = 1$. Thus,

Lemma 1: For every x , the optimal contract (t^0, e^0) solves

$$\begin{aligned} \text{(i)} \quad & v'(e^0) = 1 \\ \text{(ii)} \quad & qt^0 - v(e^0) = U^0 + (\beta - e^0)(1 - q) \end{aligned}$$

Claim 1: Suppose weak governance is characterized by enforcement cost $(t + (\beta - e)(1 - q))$ paid for by A. Then, optimal contract (t^0, e^0) has the properties:

- i) $e^0 = e^*$, i.e., optimal effort under weak governance is undistorted relative to strong governance;
- (ii) $t^0 > t^*$, i.e., the transfer is distorted upwards;
- (iii) t^0 falls as q rises;

Proof: (i) Obvious from Lemma (1.i). (ii) Since the PCs bind strictly in (5) and (9), we have $t^0 = (t^* / q) + (\beta - e^*)(1 - q)/q > t^*$ for any q . (c) Obvious, since $(1 - q)/q$ decreases as q rises. Q.E.D.

The agent anticipating the possible failure of P to deliver $(t + C)$ will demand a higher transfer than would otherwise be adequate under strong governance. This higher transfer maintains optimal effort at the same level as at strong governance. Claim 1.c is of interest. The state can lower the cost to itself by raising q . One way to do this is by offering a credible commitment or rolling out signals of better behavior in the future.

IV. SIGNALING AND CREDIBLE COMMITMENT

Where the principal's perceived capacity to deliver is suspect (q low), the agent may refuse to contract or if he contracts, he will demand high payoff. The principal knowing this may use either a credible commitment device which guarantees the high price of renegeing for itself or use a signaling device (as in Spence, 1973). The former

may take the form of enlarging the set of victims in case of renegeing by the state so that the social or economic cost to the state is higher. The latter aims to signal a new type for the principal by presenting a credential incongruent with the old type. These could be “acts” highly unlikely and very costly in the old order. These alter the perceived probability distribution q . If these devices are seen as credible by the potential contractors, they will flock and lower t .

V. THE CASE of the WATER CONCESSION in MANILA

Water supply and sewerage service previously supplied by the state owned and operated enterprise, the Metropolitan Water and Sewerage System (MWSS), was privatized via a cost-reimbursement concession contract in 1997. Water was a very politically sensitive commodity and tariff adjustment was considered politically risky for the authorities and therefore seldom resorted to. The MWSS was also severely overmanned since worker tenure was protected by the civil service law. This made the water system a chronic fiscal burden. The courts of law in the Philippines was and still is seen as weak and susceptible to shadowy side-payments and political interference.

To entice participation by the private sector, the state under then President Fidel Ramos implemented a number of “improbable” changes in the run-up to privatization: (i) it engineered the passage of the “National Water Crisis Act” which gave the President targeted and time-bound emergency powers to negotiate and close contracts in the address of the water crisis; (ii) it raised water tariff substantially from ₱5 per cubic meter to ₱ 8.70. (iii) it reduced the state water system workforce by 30% (about 4000 employee) by offering a generous retirement package for state employees. These were

improbable developments in the old regime. (iv) it contracted early in the process the services of the International Finance Corporation (IFC) as advisors which among others provided the templates and helped in the drawing up together with potential bidders the “Concession Agreement” (CA) which spelled out the whole regulatory environment for the private operators; (v) the CA identified the legitimate risks faced by the concessionaires and specified their address such as the tariff adjustment windows for prudent and justifiable costs incurred and finally (vi) the Concession contract specified a dispute resolution mechanism called the “Appeals Panel” to mediate disagreements between the parties. The composition of the panel was international to guarantee that international standards are applied. (Section 18, the Concession Agreement). Finally, it specified that each bidder should be a consortium of a local and a foreign partner (s), the former to operate the system, the latter to provide the specific expertise in water management.

How did these events contribute to success? The first hurdle was getting enough players to participate to avert an auction failure. The second is to get them to bid aggressively. This called for the rolling out credible signals and commitment devices on the part of the principal, the state.

The first one, the Water Crisis Act, signaled that the executive branch had the confidence of the legislative branch in this enterprise and any decision made by the former was not likely to be challenged by the latter. This addressed the uncertainty related to the multiplicity of veto power so dreaded in LDC contracting. The raising of the water tariff by a substantial amount signaled a “new” political authority strong enough to stand up to possible political firestorm. The reduction of the labor complement

meant that it was willing to spend substantial amount to see the project through and would not allow “business as usual” to stand in the way. It also made future efficiency-related retrenchments by the winner less costly. The involvement of the IFC was a signal that the parameters of the game will comply with best practice in the world where concession templates have proven successful. The “Concession Agreement” which was jointly crafted by the possible bidders and the state explicitly identified the risks and potential flashpoints and the possible remedies thereof according to global best practice. It also rolled out the whole regulatory environment including the setting up of the regulatory office. The CA also specified that disputes be adjudicated by an Appeals Panel to include an international dispute resolution practitioner.

These devises suggested a radical change in the political landscape with respect to water procurement. The success of the assurance exercise was made manifest by the number of parties that expressed interest of which four were prequalified: “Ayala Corporation with United Utilities,” “Metro Pacific Corporation with Anglian Water,” “Benpres Holdings Corporation with Lyonnaise de Eux,” and “Aboitiz Holdings with Campagnie Generale de Eux.” The local sponsors were all conglomerates engaged in many activities except water services. The international partners were all global players in water and sanitation services. These were either French or British. Each bidder submitted a tariff bid (i.e., per cubic meter of water). Who submits the lowest tariff (or the highest discount) wins. The aggressiveness of the bids surprised the architects.

The bid results were as follows:

Table 1. Bids Tendered by Participating Consortia by Service Area

East	Percent Discount	Peso Bids
Ayala-United	73.61	₱ 2.31
Aboitiz-CGE	37.12	₱ 5.20
Metro Pacific-Anglian	35.49	₱ 5.66
Benpres-Lyonnaise	30.21	₱ 6.12
West	Percent Discount	Peso Bids
Ayala-United	71.36	₱ 2.51
Benpres-Lyonnaise	43.41	₱ 4.96
Aboitiz-CGE	43.12	₱ 4.99
Metro Pacific-Anglian	33.10	₱ 5.87
Tariff Prior to Bid	100.00	₱ 8.780

Adapted from Dumol, 2000

The Ayala-United consortium won both the East and the West Zones at ₱2.32 per cubic meter of water and ₱2.51 per cubic meter, respectively. Ayala-United was awarded the East Zone, by virtue of a predetermined lower average formula. Thus, Benpres-Lyonnaise, with the second highest bid of ₱4.96 per cubic meter for the West Zone, got the West Zone. Ayala-United's bid for the East was only 26.38% of current water tariff of ₱8.70 per cubic meter. That of Benpres-Lyonnaise was only 56.57% of existing tariff. The feeling of total vindication by advocates was well placed and euphoria seemed in order. A column in one broadsheet entitled "The Sweetness of Privatization," summarized the reaction of the day. Such outcome would not have come about if the players did not get sufficient reassurance that prudently incurred cost would be reimbursed.

While there are other possible reasons for the aggressive bids (e.g., cognate interests of bidders and the reimbursement via rate rebasing, each of which however

requires that the state delivers on its part of the contract and thus be credible), it can be argued that the credible commitment devices rolled out by the state partly resulted in the sizeable discounts. Procurement cost, in effect, fell.

The lesson here is that the general reputation for weak enforcement in an LDC state which threatens either a missing market or very high cost of contracting can be hurdled in a particular sector by rolling out credible commitments and signals of regime change for that sector.

VI. SUMMARY and CONCLUSION

Weak governance is more the rule than the exception among LDCs. Indeed, one of the main reasons for underdevelopment and poverty is weak institutions and enforcement (Shirley, 2007). One channel by which weak governance leads to poor economic performance is the cost of procuring goods and services. When the state, the principal here, is perceived to be unable to deliver fully on its commitments, alert agents, who are contracted to supply goods and services, tend to factor into contracts the private cost of enforcing the contract. The courts of law may exist but is very costly to use. Contractors may have to bribe bureaucrats to release their legitimate claims.

Weak governance is characterized by unpredictability due to the multiplicity of veto powers or to the shifting and/or non-uniqueness of its objective function. The contracts closed by the regulatory agencies may be vetoed by the political authority responding to shifting populist or electoral imperatives. The state's inability to deliver its side of the bargain such as clearing of the area of squatters for a road project causes costly delays.

For ease of treatment, the paper uses a modified Laffont-Tirole cost-reimbursement model under strong governance as reference point. Weak governance is introduced in the form of the perceived incapability of P to deliver fully on the contracted reimbursement. This comes as the cost to A of enforcing the contract and results in an *augmented participation constraint*. The social value of the project is the net consumer's value of the surplus. We show that under weak governance, contracted effort is undistorted but the optimal transfer is higher. As an alternative, the state may roll out costly signals of future good behavior or a credible commitment devices to signal its resolve. This lessens the cost of the project but incurs the cost of the devices. The cost of the devices to the principal renders them credible to the agent. These devices contribute to the lowering of the contract cost. The case of the privatization of water and sewerage service via an auctioned concession contract in Metro-Manila in 1997 where the bidding was very aggressive illustrates this.

References

- Concession Agreement (Service Area East) 21 September 1997, Angara, Abello, Concepcion, Regala and Ruiz Law Offices, monograph.
- Dumol M (2000) *The Manila Water Concession: A Key Government Official's Diary of the World's Largest Water Privatization* (Washington, D.C., The World Bank).
- Easterly W, R Levine (2002) *Tropics, Germs and Crops: How Endowments Influence Economic Development*, mimeo, Center for Global Development and Institute for International Economics.
- Laffont J-J, D Mortimart (2002) *The Theory of Incentives: The Principal Agent Model* (Princeton: The Princeton University Press).
- Laffont J-J, J Tirole (1993) *A Theory of Incentives in Procurement and Regulation* (Cambridge: MIT Press).
- Laffont J.-J, M Meleu (2000) *Enforcement of Contracts with Adverse Selection in LDCs*, Mimeo, IDEI, Toulouse.
- North D, B Weingast (1989) *Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in the 19th Century England*, *Journal of Economic History*, 51-69.
- North D (1981) *Structure and Change in Economic History* (New York: Norton Press).
- North D (1990) *Institutions, Institutional Change and Economic Performance* (New York: Cambridge University Press).
- Rivera V (2003) *Restructuring Regulation, Price Setting and Serving the Urban Poor: The Case of Manila Water Company Under MWSS Privatization*, *South Asia Forum for Infrastructure Regulation*.
- Rodrik D, A Subramanian, F Trebbi (2002) *Institutions Rule: The Primacy of Institutions Over Geographic and Integration in Economic Development*, NBER Working Paper 9305, NBER, Cambridge, Mass.
- Spence, Michael (1973), "Job Market Signaling", *Quarterly Journal of Economics* 87, 355-374.
- Spence, Michael (1974) *Market Signaling* (Cambridge, Mass: Harvard University Press).

Williamson O (1983) Credible Commitments: Using Hostages to Support Exchange, *American Economic Review* 73, 519-540.

Williamson O (2002) "The Theory of the Firm as a Governance Structure: From Choice to Contract", unpublished monograph.

Williamson O (1985) *The Economic Institutions of Capitalism* (New York, NY: The Free Press)