

The Reputational Budget and its Uses

Lucio Picci¹

University of Bologna

Personal page: <http://www.spbo.unibo.it/picci>

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Abstract

The “reputational budget” is a new metric of reputation that allows for useful applications. I describe it within the context of a Reputation-based Governance framework, by underlying the differences with conventional “reputation scores”. The concept is illustrated by considering a problem of management of public works, where firms help public administrations in building public infrastructure.

The reputational budget provides objective criteria to use reputational information in public procurement, and it may sustain the working of a market for reputation, with potentially important implications for governance. Moreover, it may alleviate the moral hazard problem that arises in the life-cycle of bureaucrats

Keywords

Reputation, Reputational budget, Reputation-based Governance, Public procurement

J.E.L. codes: D7, H1 H4, H5

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“Сегодня мы работаем на репутацию.
Завтра репутация будет работать на нас”
Russian saying².

1. Introduction

Reputational considerations are obviously important in governance. Electors are influenced by the reputation of candidates, and the choice of political appointees to some extent depends on their past record. Deals and alliances are made, or not made, according to convenience and also to the perceived trustfulness of one’s partner. The importance of reputation encompasses both the public and the private sphere. “Word of mouth” plays a key role in determining societal outcomes, ranging from serious matters, to very mundane problems, such as the choice of the restaurant where to dine³.

The recent diffusion of appropriate Internet-based information systems has allowed for a more formal management of reputational considerations within decision-making processes. An example is provided by the eBay auction site, where buyers and sellers can cast a vote, or “feedback”, on their business partner. Such assessments remain visible and constitute the basis for the computation of what amounts to an index of reputation. In this context, the Internet allows for a “digitalization of word-of-mouth” (Dellarocas, 2003).

No attention has yet been dedicated to the definition of a metric for reputation, and the problem of measuring reputation has been considered only in an implicit fashion. For example, within the literature on Internet-based Reputation Systems, the

² Translation: “Today we work for our reputation. Tomorrow our reputation will work for us.”

³ The concept of reputation (and of trust) can be considered using two alternative sets of game theoretic tools. Reputation can be seen in a moral hazard setting using the Folk Theorem: in an infinitely repeated game, players may prefer the long-run benefit of not cheating, to the short-run advantage of cheating. Also, reputation can be considered in an adverse selection setting, for example within a bayesian game context, where the quality of a player is not immediately evident to others. See Cabral, 2005, for details and for a formal definition of concepts.

implicit metric of reputation is a sum of the assessments received by an actor, possibly truncated sometime in the past (as it happens for eBay; see Dellarocas, 2003). Tadelis (2002), on the other hand, focuses on a measure of reputation that is represented by the value of a firm's brand, without elaborating further on the determinants of that value.

In this paper I argue that different metrics of reputation may have different implications for governance, and I introduce one such metric, the "reputational budget". It is a number expressing "how much reputation" an actor of governance has accumulated. It is different from conventional reputation scores, because, unlike them, it is also a function of the size of the projects that have been executed. I argue that the characteristics of the reputational budget have implications that are interesting enough to justify its introduction.

As the old adage among econometricians goes, there can't be "measurement without theory" (with reference to Koopmans, 1947), and I cast the concept of the reputational budget within a coherent framework, Reputation-based Governance, as described in Picci (2007). Reputation-based Governance requires an appropriate information system that all the interested parties can access in order to post their assessments of the outcomes of policies. These ratings reverberate to the actors of governance and allow for the computation of measures of reputation. Such information, in turn, provide both ex-post and ex-ante desirable incentives, shaping an environment that is characterized by a remarkably high degree of accountability of the actors of governance.

As the backdrop for the introduction of the reputational budget I consider a concrete case: the procurement of public works. Assume a situation where all approved projects are described within what, for clarity, may be thought of as a public Web site where all interested actors can log in to carry out a determined set of actions. Upon completion of each project, the public administration in charge assesses the quality of the work carried out by the contracting firms. These, in turn, rate how the public administration has managed the project. Most importantly, the citizens who are affected by the project may rate it by accessing the information system. Assessments are quantitative, while there may be a possibility of also leaving comments expressed in natural language. All the quantitative assessments received by one project, appropriately weighted and aggregated, form an overall index of its perceived quality.

These information then propagate to the firms and to the administrations that contributed to the execution of the projects, and allow for the computation of their reputations. The reputation of an actor of governance, in the end, is a function of the perceived outcomes of the projects that it carried out over time.

Reputations are then linked with institutional incentives. For example, an underperforming contracting firm would acquire a bad reputation and would find it hard to secure new contracts, as it already happens today within Federal public procurement in the United States (Kelman, 2002). A bureaucrat in the same predicament would not obtain a job promotion, and competing administrations could also be punished or rewarded according to their measure of reputation⁴.

The paper proceeds as follows. In the next section, I illustrate a simple example of computation of the reputational budget. Then, I suggest how the reputational budget could be used. The conclusions follow.

2. The Reputational budget

Consider a public administration executing a number of public works, each one with the help of a single contracting firm. Table 1 shows the example that will lead us through the illustration of the reputational budget. For simplicity, assume that the works have been executed only in two years, 2007 (“this year”) and 2006 (“last year”). Assume further that there are a total of 9 firms, identified in Column 1 of Table 1, and that each one of them has contracted one project in each year.

To simplify matters further, we assume that upon completion of a project only the citizens are allowed to rate them. Also, we assume that only a single dimension of

⁴ This brief account of Reputation-based Governance of public works is enough to consider the issues raised by this paper, but is necessarily incomplete. The interested reader may find a more detailed description in Picci (2007). In particular, note that considerations other than the reputation of the relevant actors should obviously remain relevant for governance. In the procurement case, the cost of bids and, possibly, the cost effectiveness of the previous projects carried out by a given firm should obviously be considered during the source selection process.

the project (say, “overall quality”) can be assessed by the public, on a range from 0 (very bad) to 5 (excellent)⁵.

Column 2 of Table 1 reports the overall assessment received by each project, typically computed as the average, or the median, of all the assessments cast by each citizen. Here only the hypothetical aggregate of the individual ratings are shown. Column 3 indicates the size of the projects, expressed, say, in thousands of Euros. We assume that projects’ outcomes lose relevance as time goes by, with a time discount factor equal to 0.8. Column 4 shows the time discounted values of projects. The sizes of last year’s projects are multiplied by the time discount factor, while this year’s projects are not discounted.

The reputation score of each firm is a weighted average of the assessments received by the projects that it carried out. Doing well on bigger projects, or in more recent ones, influences overall reputation more than doing well in small or past projects⁶. Column 9 shows the reputation scores of the nine firms, computed as:

$$(1) \quad R_i = as_{i,2006} \cdot \frac{pv_{i,2006}}{pv_{i,2006} + pv_{i,2007}} + as_{i,2007} \cdot \frac{pv_{i,2007}}{pv_{i,2006} + pv_{i,2007}}$$

where R_i is the reputation score of firm i and $as_{i,year}$ is the assessment received by the project carried out by firm i in a given year. $pv_{i,year}$ indicates the present value of the same project. For firm 1, the reputation score is obtained as:

⁵ As noted above, in the unabridged formulation of reputation-based governance of public works, public administration and firms rate each other, and the overall rating of a firm is a weighted average of the valuations that its projects received by both the public and by public administrations. Also, assessments of a completed project may be on more than one dimension, see Picci 2007. A demonstrator of the Internet-based information system supporting a reputation-based governance of public works (available at <http://fire.ei.unibo.it:8080/rebagware/>) is illustrated in Confalonieri et. al., 2007.

⁶ This definition of the reputation score has an important difference with the one that is implemented, for example, on eBay. There, the reputation score is equal to an unweighted sum of the “feedbacks”. Here, each assessment received is weighted by the size of the transaction.

$$(1') \quad R_1 = 4 \cdot \frac{120}{120 + 300} + 3 \cdot \frac{300}{120 + 300} = 3.286$$

Reputation scores do not contain information on the relative importance of firms: If two firms carried out the same number of projects each year, with one firm doing projects twice as big than the other, and both firms received exactly the same assessments, they would have the same reputation score. An example is provided by the outcomes of firm n. 1 and of firm n. 7 in Table 1. The two firms received the same assessments each year, and they have the same reputation (equal to 3.286), even if the projects of firm n. 7 were twice the size of those of firm n. 1.

The idea of the reputational budget is to develop a metric of the assessments where the overall size of the projects carried out by a firm matters. Obviously, there are many ways to make this idea operational. To narrow down the field of possible alternatives, we establish that the reputational budget should have the following characteristics.

- a) Every year, all firms are allocated a certain number of “reputational points”, some positive, some negative, so that the sum of the reputational points allocated equals zero.
- b) The reputational points that are allocated depend linearly on the size of the projects, so that, *coeteris paribus*, if a project is twice as big as another project, it commands twice as many reputational points.
- c) The reputational budget of a firm is equal to the sum of the time discounted reputational points that it has received over time. The sum of the reputational budgets of all firms is zero.

Columns 5, 6 and 7 of Table 1 show the computation of reputational points satisfying the properties listed above⁷. Column 5 computes a set of weights, $w_{i,year}$, expressing

⁷ A note on terminology. Reputation scores is the “intuitive” metric of reputation – the one provided here being slightly different from the one used on eBay – see note 5. Reputational points, on the other hand, are the units that form a reputational budget.

the assessments while considering the size of the related projected. For each firm they are equal to the overall assessment, $as_{i,year}$, times the share of the firm's project within the sum of the projects carried out by all firms in a given year:

$$(2) \quad w_{i,year} = as_{i,year} \cdot \frac{pv_{i,year}}{\sum_{i=1}^k pv_{i,year}}$$

In the summation symbol at the denominator of the fraction, k is the number of firms (and of projects executed in a given year), 9 in our example. To clarify further, consider that for firm 1, in year 2006, such weighted assessment equals:

$$(2') \quad w_{1,2006} = 4 \cdot \frac{120}{3120} = 0.154$$

Column 6 shows the demeaned assessments. They are equal to the assessments minus the average weighted assessments, which equals the sum of the weights of Column 5:

$$(3) \quad asdem_{i,year} = as_{i,year} - \sum_{i=1}^k w_i$$

For firm 1 in 2006, the value is:

$$(3') \quad asdem_{1,2006} = 4 - 2.292 = 1.708$$

Column 7, finally, computes the reputational points, equal to the demeaned assessments of Column 6 times the present value of the project carried out in a given year:

$$(4) \quad RP_{i,year} = asdem_{i,year} * pv_{i,year}$$

For firm 1 in 2006, the value is obtained as:

$$(4') \quad RP_{1,2006} = 1.708 * 120 = 204.923$$

Column 10 shows the reputational budget for each firm, simply obtained as the sum over the two years of the time discounted reputational points:

$$(5) \quad RB_i = RP_{i,2006} + RP_{i,2007}$$

For firm 1, the reputational budget is equal to:

$$(5') \quad RB_1 = 204.923 - 91.304 = 113.62$$

Note that RB_i , as required by condition c) above, time discounts the reputation points of past years, since they are computed using the present value of projects – see equation (4). Also, the sum across firms of the reputational budgets is equal to zero, and the reputational points in a given year sum to zero (see the bottom of column 10 and, for each year, the bottom of column 7). Moreover, note that such computations satisfy property b) above, as again it is made clear by a comparison of firm 1 and 7: The two firms receive the same assessments in each year, and the latter carried out projects that are exactly twice as big as the former. As already indicated, their reputation scores are identical, but the reputational budget of firm n. 7 is twice that of firm n. 1 (227.237 reputational points vs. 113.619).

Reallocating reputational points among firms, for example, trading them, immediately allows for a recomputation of the reputational budget (Column 10) and of the reputation scores (Column 7). In particular, it can be easily shown that if at the end of each year all firms sell their reputational points (or buy them if they own a negative quantity of them), the following happens. First, demand for reputational points equals supply, since the reputational points allocated every year sum to zero by construction. Second, at the end of this exchange, every firm will have a reputation that equals the weighted average of individual reputations⁸.

⁸ See the bottom of column 5 in Table 1. Strictly speaking, this property holds exactly only when there is a firm whose reputation is equal to such a weighted average - a firm with exactly zero reputational points. This will approximately be true when there are many firms.

3. Uses of the reputational budget

Within a Reputation-based Governance of public works the reputational budget could be used in two broad ways. First, the public administration may consider the reputational budget within the source selection process. Second, firms may trade reputational points. I consider these two possibilities in turn.

Using reputation considerations within Federal public procurement is not a novelty. In the United States, in the 1990s a reform in public procurement effectively forced public officials to consider the reputation of the bidder in source selection, together with price and perceived quality of the proposal (Kelman, 2002). There, the reputation of the firms is assessed by the source selection official after consulting a database where public administrators routinely record their assessments of the performances of the firms they interact with, and eventually other sources.

The present context is different in many respects. First, within Reputation-based Governance, assessing the outcome of projects is not the precinct of bureaucrats, but it includes the citizenry. A further important departure with respect to the U.S. experience could follow from the adoption of the reputational budget. The public administration could accept tender proposals by firms whose reputation score, or reputational budget, is above a certain threshold. There is an important difference between these two alternatives. As noted above, the reputational score does not depend on the relative importance of the firm, while the reputational budget does. In fact, the reputational budget conveys information on how good, or bad, a given firm was perceived to be, *and* on the size of the projects that it carried out.

Defining a cut-off point in order to be admitted in the bidding process that equals, say, the first percentile of the reputational budgets of all firms⁹, would in fact select firms that typically are of size above average – or that are of medium size, but that performed very well in the past.

⁹ Note that the average of the reputational budgets is zero by construction. The median, as opposed to the mean (or sum), of the reputational budgets may be positive or negative, depending on the distribution of the assessments.

Such a rule would make sense when the size or complexity of projects suggests not to give the job to a small firm. In those cases, the administration may desire to deal with a big firm that has done at least reasonably well in the past, but at the same time may be willing to give smaller firms a chance, provided that they have shown been exceptional performers. Using the reputational budget to define a cut-off point, in other words, would incorporate in the considerations of the public administration the presence of a trade-off between the reputation and the size of the firm. On the other hand, if the size of the project is small, the public administration may desire to define a cut-off rule for presenting a bid that is a function of the reputation score, instead than of the reputational budget, expressing in this way its indifference with respect to the size of the bidding firms.

Of more interest is the case where there is a market for the exchange of reputational points, allowing firms to balance their reputational budgets. In order to discuss such a possibility, it is useful first to consider some relevant past contributions. Holmström (1982) studies the lifetime evolution of career concerns, to conclude that these may be too strong at the early stages of a career, and too weak as retirement age approaches. The intuition behind his result may be seen in a simple moral hazard repeated game. As the end date of the game (i.e. retirement age) approaches, the future expected stream of payoffs tends to vanish, and “cheating” today (putting little effort on work) becomes a more advantageous prospect compared to the early stages of the game (see Kreps et al., 1980).

In this context, trading reputation may be of help in setting the incentives straight. Fama (1980) already noted that managers may be disciplined by the fact that their reputation today positively influences the expected pay that they may secure by moving to another firm – a situation where the “trading of reputation” is in fact taken care of by the presence of a market for managerial labor.

A possibility for trading reputation is by trading brand names. To analyze how it affects life-cycle incentives (of firms’ owners) to exert effort – again, in the spirit of Holmström – Tadelis (2002) considers a model both of moral hazard and of adverse selection, to conclude that trading brand names provides the sought-for incentives to build a good reputation – i.e., past good behaviours are rewarded – and that it alleviates the moral hazard problem even with short-lived agents.

Tadelis' results, as he himself clearly states, are conditional on the assumption that clients do not observe such trading in reputation (brand names). Otherwise, since the model is also one of adverse selection, clients would take the buying of someone else's reputation as a sign of bad quality. We witness here one of those cases where the availability of more information leads to worse overall outcomes, as in Hirshleifer (1971), and as discussed more generally in Bassan et al. (2003). Tadelis concludes that, for example, secrecy "is not reasonable in all industries (e.g., medical practices)" – which, for the particular case cited, comes as sobering news for the reader. According to Tadelis, the "model of the paper [...] seems to fit small owner-operated firms with transient clients, such as restaurants and small service businesses, but is harder to link to larger firms." Note also that the market for reputation illustrated by Tadelis is in fact "only" a market for brand names. Sales of brand names are perforce rare, and the ensuing lack of thickness of the market would not bode well for its efficient functioning.

In this respect, the computation of a reputational budget would innovate in several ways. First, reputational points could be traded at any time, or at least frequently, allowing for the presence of a well functioning market. Secondly, a market for reputational points could more easily guarantee the secrecy that is necessary in Tadelis' treatment, given that the very visible brand names would not change hands.

Different institutional solutions may be devised in order for reputational points to be exchanged and for reputational budgets to be balanced. For example, firms could be required to balance their reputational budget by the end of each year, so as to carry over to the next year zero reputational points. For this purpose, a market for reputational points could function for a period of time at the end of each year. Just as market forces impose balancing a budget, an appropriate institutional arrangement could impose firms to start a new year with non-negative reputational points, which amounts to asking all firms to equalize their reputation scores by trading reputational points. In public procurement, such a result could be obtained by adopting a rule establishing that public administrations can only admit tender proposals from firms whose reputation is not below average. In this way, firms interested in public contracts and having a negative reputational budget would have a compelling incentive to buy

reputational points, and firms with a positive reputational budget would increase their profits by selling theirs.

Such a market for reputation would also present firms with interesting opportunities for arbitrage. Assume for example that firms differ in technology in the following way. Some firms have a comparative advantage in producing at low cost, but are relatively inefficient when it comes to providing high quality products or services. Other firms are the opposite. Trading reputational points would then allow firms to exploit their comparative advantages. Firms of the first type would find it convenient to focus on what they can do well – produce cheaply – expecting that they will obtain below average assessments, but knowing that they will be able to buy the needed reputational points on the market. Firms with a comparative advantage in quality would also focus on what they can do well, i.e., acquiring reputational points that they would later sell to the low-cost firms¹⁰.

Last, the presence of a market for reputation in fact allows the public administration not to *directly* consider reputation in source selection, thus requiring less of an institutional change. At the closing of the market, all firms would have the same reputation scores and zero reputational points. Good performances are prized because they command reputational points that can later be sold. The role of reputation in source selection would in fact be present, but it would be mediated by the presence of a market for reputation.

4. Discussion and conclusions

I have illustrated the concept of the reputational budget considering a typical public procurement problem. The reputational budget, just as the framework of reputation-

¹⁰ If, as in Tadelis (2002), trading in reputation remains secret, public administrations would not separate the type of the firm that they face – low cost, or high quality. Such a lack of separation has in itself a cost, because there are projects for which one type of firm could be preferred to the other. For example, in a case where quality correlates positively with the ability to carry out complex projects, it would be beneficial for the administration facing one such project to choose a high quality firm.

based governance into which it is embedded, has a more general applicability. For example, reputational points could be traded by bureaucrats who are forced to balance their personal reputational budgets at the end of each year using part of their salary. True, in such a context an unconstrained market for reputational points could be seen as running the risk of reverting the public administration to a pre-Weberian and patrimonial model of bureaucracy: In order to recoup the moneys spent for the reputational points needed to remain viable as a public official, some bureaucrats would have strong incentives to pursue rent seeking activities and possibly to become corrupt. A more modest solution could however be obtained simply by making a fixed part of the bureaucrat's salary conditional on the reputational points acquired every year.

Reputational budgeting could also be used within the private sector. However, the framework of Reputation-based Governance puts a strong emphasis on the democratic accountability of public policies. The quantification of the reputational budget derives from the assessments of policies as carried out by the citizens and by other actors of governance. Within Reputation-based Governance, the possibility of such a systematic assessment, and its relevance in the ensuing allocation of resources and of power, plays the important role of providing a channel for the legitimization of policies that runs parallel to their traditional legitimization through democratic elections. Such a dimension of the problem is inevitably lost when the concept of the reputational budget is applied to the private sphere. True, recent emphasis on the social accountability of private actors may suggest a wider applicability of the concept of Reputation-based Governance, and of the instrument of the reputational budget.

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Table 1. Reputation scores and the reputational budget

Columns:											
1	2	3	4	5	6	7	8	9	10		
Year		2006									
Firm <i>i</i>	$as_{i,year}$	Value.proj	$pv_{i,year}$	$w_{i,year}$	$asdem_{i,year}$	$RP_{i,year}$					
1	4	150	120	0.154	1.708	204.923					
2	3	800	640	0.615	0.708	452.923					
3	2	350	280	0.179	-0.292	-81.846					
4	0	50	40	0.000	-2.292	-91.692					
5	2	1100	880	0.564	-0.292	-257.231					
6	1	945	756	0.242	-1.292	-976.985					
7	4	300	240	0.308	1.708	409.846					
8	4	130	104	0.133	1.708	177.600					
9	5	75	60	0.096	2.708	162.462					
	Avg=2.78	$\Sigma=3900$	$\Sigma=3120$	$\Sigma=2.292$			$\Sigma=0$				
Year		2007									
Firm <i>i</i>	$as_{i,year}$	Value.proj	$pv_{i,year}$	$w_{i,year}$	$asdem_{i,year}$	$RP_{i,year}$	value works	R_i	RB_i		
1	3	300	300	0.196	-0.304	-91.304	420	3.286	113.619		
2	1	700	700	0.152	-2.304	-1613.043	1340	1.955	-1160.120		
3	4	550	550	0.478	0.696	382.609	830	3.325	300.763		
4	2	40	40	0.017	-1.304	-52.174	80	1.000	-143.866		
5	4	950	950	0.826	0.696	660.870	1830	3.038	403.639		
6	4	1300	1300	1.130	0.696	904.348	2056	2.897	-72.637		
7	3	600	600	0.391	-0.304	-182.609	840	3.286	227.237		
8	4	100	100	0.087	0.696	69.565	204	4.000	247.165		
9	2	60	60	0.026	-1.304	-78.261	120	3.500	84.201		
	Avg=3	$\Sigma=4600$	$\Sigma=4600$	$\Sigma=3.304$		$\Sigma=0$	$\Sigma=7720$		$\Sigma=0$		

Note:

The time discount factor equals 0.8