1Introduction

Expenses with public procurement auctions represent a striking percentage of the national GDPs of most countries. In Brazil, this number currently amounts to approximately 13% of the nation's GDP, while EU countries spend as much as 20% of their GDP on procurement auctions. Procurement auctions usually feature rigid and specific rules: Designed in part as an attempt to avoid corruption, a large portion of public sector procurement auctions are carried out in two phases. Instead of having projects be analyzed according to an underlying score function, public procurements frequently consider the relevant quality and price dimensions of projects submitted separately. In practice, this means that the technical specifications of the products are only utilized as qualifying criteria. This paper studies the theoretical implications of utilizing two-stage procurement rules on firms' strategic pricing decisions when the agency displays favoritism towards one of the firms on the qualifying phase.

While the problems of favoritism and corruption in procurement auctions are notoriously prevalent in discussions of the subject, little has been done in the literature to study formally the strategic effects of favoritism, particularly in the two-stage case[1]. Laffont & Tirole (1991) discusses the optimal design of multidimensional auctions as an attempt to avoid corruption, assuming that an agency is able to manipulate the relative weight of the various attributes, and concludes that the auction designer may wish to focus the decision process on observable dimensions of bids such as prices. McAfee & McMillan (1989) discusses favoritism in an international trade setting, where favoring national sellers with higher costs may be an expenditure-minimizing strategy due to comparative advantage effects.

The competition between firms to be favored by the agency in a subsequent procurement game has been studied before. Che (2004) considers a two-dimensional score-based procurement where firms compete in a first price setting for the agency's favoritism, who in turn distorts the winner's score by a fixed amount. Compte et al. (2005) considers the possibility of firms being allowed to resubmit a losing bid after all other firms have submitted

[1] Our objective is to investigate the strategic effects of corruption on current mechanisms of government procurement. While a solution for the asymmetric effects derived from corruption is shown, our focus is not on designing corruption-proof mechanisms.

theirs. In their setting, prices rise beyond the bribe's price, due to lower competition between firms.

The incorporation of additional dimensions beyond price in modeling procurement auctions has also been previously explored in the literature, both as choice variables (Che, 1994; Burguet & Che, 2003) and as exogenous random variables (Zheng, 2000). We follow the second line by assuming that, along with costs, quality is exogenous and randomly distributed.

We develop a model with a two-stage decision rule, introducing favoritism through the distortion of the minimum quality threshold. Since under these rules there is no scoring function to distort[2], one of the firms will be benefitted by the agency being able to set the minimum quality required by projects of a particular procurement, which is then revealed to all firms. Given this information, firms choose prices according to their beliefs on the number of competitors that will pass the qualifying phase.

The paper presents two sets of main results. First, we derive the equilibrium of the procurement game induced and show that, even with completely ex-ante symmetric distributions of quality and costs among all firms, corruption on the qualifying stage may have significant distortive effects on pricing strategies, where the favorite firm will choose higher prices than all others, fixing any realization of the cost random variable. This type of favoritism in the qualifying phase adds a subtle but important difference from the McAfee & McMillan (1987) setup that is central to the result; when the qualifying rule is endogenously determined by one of the firms, the Bayesian-consistent distribution of rivals is different for the favorite firm and all others.

For the second part, we ask how a principal that may be aware of the favoritism displayed by the agency will choose to design the price competition rules. Adopting a mechanism design approach, we find that a second-price mechanism conditional on qualifying is optimal from a price competition perspective. The intuition to this result is that by adopting a second-price rule, the principal is able to eliminate the asymmetry in bidding behavior, increase efficiency, and therefore collect additional rents. This solution to price asymmetry has one major side effect, however: Ex-ante profits for the favorite firm also increase, while all other firms' decrease.

[2] See Laffont & Tirole (1991) .