

# Curriculum Vitae

## FRANCESCO DECAROLIS

### Personal Data:

Date of birth: May 17, 1980  
Place of birth: Rome, Italy  
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### Education:

2003- **The University of Chicago**, Chicago, Illinois, USA  
PhD Program in Economics  
Specialized Fields: **Mathematical Economics, Industrial Organization, Public Sector Economics**  
Thesis advisor: Professor Ali Hortacsu

2003-2004 **The University of Chicago**, Chicago, IL, USA  
MA in Economics

1998-2002 **Università Bocconi**, Milan, Italy  
Degree Course in Economics (CLEP) with major in International Economics  
Graduated on October 19, 2002, with a grade of 110/110 summa cum laude.  
Thesis advisor: Professor Guido Tabellini

### Education (other):

Summer 2007 **Institute for Computational Economics, The University of Chicago**, Chicago, IL, USA  
Summer School

Summer 2001 **Università Bocconi Study Tour Program**, Chile and Bolivia

Fall 2000 **University of British Columbia**, Vancouver, British Columbia, Canada  
Study Exchange Program

Summer 1997 **Phillips Academy**, Andover, MA, USA  
Summer Program

### Honours and Awards:

**Economic Research Fellowship, The Bank of Italy**, fellow for the academic year 2008-2009.  
**Henry Morgenthau, Jr. Memorial Fund, The University of Chicago**. Economics Dept. dissertation fellowship, 2007.  
**University Unendowed Fellowship/Scholarship, The University of Chicago**, academic years 2003-2007.  
**Bocconi Post Graduate Scholarship, Bocconi University**, academic years 2003-2005.  
**Felice Gianani Scholarship**, 2005. Attributed by the Associazione Bancaria Italiana.  
**Young Economist Award**, 2004. Attributed by the European Economic Association.  
**Angelo Costa Award, Rivista di Politica Economica**, 2003. First classified, best Italian BA thesis in Economics.  
**Glaeser Funds** and various other research grants from the Dept. of Economics of The University of Chicago.

### Current Research – 2008 Forthcoming Job Market Paper:

#### “When the Highest Bidder Loses the Auction: Theory and Evidence from Public Procurement”

This paper presents a theoretical and empirical analysis of a very common class of auctions in public procurement, where the winner of the auction is not the highest bidder, but the bidder closest to the average bid. The paper demonstrates that when bidders' valuations are private and independent, this type of auction is inefficient and, also, revenue minimizing for the auctioneer when bidders are numerous. On the other hand, when agents have a common valuation of the object and asymmetric budgets, this auction is preferred over the standard first-price type by an auctioneer who bears a high enough cost due to the winner's bankruptcy. Finally, another point of discussion is how, compared to the first-price auction, this format leaves more room for collusion and how this affects the longevity of this mechanism. The empirical analysis is based on data from Italian public procurement auctions which, after a change in the regulation in June 2006, are now run alternately using a form of the average-bid-wins rule or the first-price rule. In line with the theory, a switch toward a first-price rule is strongly associated with quantitatively large increases in the winning bid and decreases in the number of bidders. On the other hand there is some, moderate, evidence that this also leads to greater renegotiations after the contract is awarded.

## Publications:

### A. Scientific Journals

2003, "Economic Effects of Democracy. An Empirical Analysis". *Rivista di Politica Economica*, Nov-Dic, pp. 69 - 116. Winning paper of the Angelo Costa Award and of the European Economic Association's Young Economist Award.

### B. Non Scientific Journals

2003, "Effetti Economici della Democrazia". *Equilibri* 7(2), 2003, pp. 157 - 163. Il Mulino, Bologna.

## Working Papers:

2005, "Democracy, Trade and Trade Policy".

2005, "Homotopy Continuation Methods: An Algorithm for the Fixed Point and Newton Homotopy Methods with Some Examples". (Joint with Ricardo Mayer and Martin Santamaria)

(download papers and codes at: <http://home.uchicago.edu/~fdc/w-papers.htm>)

## Working Experience:

### - Academic: Teaching Assistantships at The University of Chicago

Spring 2006 ECON 20700. Game Theory and Economic Applications (Prof. Roger Myerson).

Fall 2007 Business 42001-MBA Program and Business 42800-Executive Master Program. Competitive Strategy (Prof. Marianne Bertrand).

### - Non Academic

Summer 2007 **NERA Economic Consulting**, Rome, Italy.

Internship; working on the spectrum auction for Broadband Wireless Technology.

Summer 2006 **Consip s.p.a., Italian Ministry of Economy and Finance**, Rome, Italy.

Visiting scholar at the Italian Public Procurement Agency.

Spring 2003 **Organisation for Economic Co-operation and Development (OECD)**, Paris, France.

Trainee in the Statistics Directorate, Trade and Structural Statistics Section; working on the "Trade Indicators Project" (TIP).

## Languages:

**Italian:** Mother tongue. **English:** Excellent. **French:** Good knowledge. **Spanish:** Basic knowledge

## Information Technology Knowledge:

Windows; Microsoft Office; Internet; HTML; EViews; STATA; MATLAB; LaTeX; Ruby.

## Referee for:

*International Journal of Industrial Organization, Rivista di Politica Economica.*

## Conferences' Presentations:

2004, Presenter at the European Economic Association Annual Congress held in Madrid, Spain.

## Thesis Committee:

Prof. Ali Hortacsu (Chair)

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## Additional References

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## Extended Abstract

### **When the Highest Bidder Loses the Auction: Theory and Evidence from Public Procurement**

The research issue that I address concerns the theoretical and empirical analysis of auctions where under the awarding rule the highest bidder will not win the auction. The research is motivated by the observation that, despite the intuitively unappealing properties of such auctions, they are widely used. In places as diverse as Florida and Peru, Italy and Taiwan, the public procurement of works occurs through sealed bid auctions in which the highest bidder loses because the awarding rule eliminates bids that deviate excessively from the average of the bids.

The contribution of my research is twofold. On the theoretical side I provide a formal analysis of an important class of auction mechanisms, proposed by the civil engineering literature, that differs remarkably from the auction formats generally studied in economics. On the empirical side, instead, I take advantage of a change of the regulation introduced by new Italian Law of Public Contracts of June 2006 in order to estimate how the automatic elimination of the highest bidder affects efficiency, revenues and bidders participation in public procurement auctions for road construction works.

Standard auction theory focuses only on auctions where the bidder who submits the highest bid wins the auction. This is the case in both first-price auctions (where the winner pays his own bid) and in second-price auctions (where the winner pays the second highest bid). This focus of the theory is justified, on the one hand, by the fact that in most of the auctions in the real world the highest bidder wins and, on the other hand, by the fact that these auctions have attractive theoretical properties as shown by Myerson (1981). However, the public procurement regulations of many countries adopt a very different approach, according to which the winner is the firm bidding the discount (on the announced contract value) that is closest to the average of the discounts submitted (AB rule). Indeed, the merits of this auction format have been invoked in the engineering literature, for example by Ioannou and Leu (1993) and, in the version of the "closest-from-above" to the average, by Liu and Lai (2000). This research seeks to illustrate the properties of the "average-bid-wins" rule when the tools of game theory are used to analyze the strategic behavior of bidders. In particular, this paper demonstrates that, within the standard independent private value paradigm, the AB auction is inefficient and, when there are many bidders, it is revenue minimizing for the auctioneer. As a consequence, the need to explain why this auction is used at all, leads me to consider the possibility that the winning contractor could be insolvent. In particular, I show that the auctioneer's preference for the AB auction over a standard first-price (FP) can be established in a model where there is both uncertainty on the part of the agents' common valuation and asymmetries in the size of the bidders' budgets. In this case, if a limited liability regulation makes bankruptcy cheap for firms with a low budget, AB is preferred over FP by an auctioneer that bears a high enough cost due to the winner's bankruptcy. Finally, the theoretical analysis that I present also looks at the incentives that the AB format gives to bidders to behave non competitively. I show that firms are more likely to use shill bidders (bid under multiple identities) and to collude in AB than in FB auctions. In fact, cooperative behavior on the part of members of non all-inclusive cartels might explain why some negative features of the competitive equilibrium outcome of the AB format do not show up in

observed bidders' behavior. This, in turn, might provide a reason for the longevity of this mechanism despite the fact that, in equilibrium, it generates an allocation outside the core (the idea of non-core allocating auctions was recently introduced by Day and Milgrom, 2007).

In addition to the theoretical discussion, the research includes an empirical analysis based on a sample of Italian public procurement auctions. This is a new dataset assembled for this study that contains all the public procurement auctions for road construction works held in Italy between January 2005 and March 2007. This period is especially significant because a new law was passed in June 2006 allowing individual public administrations to choose whether to run auctions under the Italian version of the AB rule, in place since 1994, or under a standard first-price format. The new circumstances offer the possibility of comparing bidders' behavior under the two rules. Therefore, this policy change offers a unique opportunity for testing auction theory and for quantitatively assessing the performance of the two mechanisms used. Moreover, what makes the analysis even more interesting is that in Italy, in the last few years, the total yearly value of contracts awarded with the automatic elimination of the highest bidder is around 10 Billion Euros (about 0.7% of the Italian GDP). The results of the empirical analysis support most of the conclusions of the theoretical study. Bidders strongly respond to changes in the auction mechanism. The increase in the winning discount (i.e. the rebate bidders' offer to complete the contract auctioned) is remarkable: in the most conservative estimate it goes from 17% under the AB rule to 29% under the FP rule. However, there are also some indications, albeit moderate, that winners of FP auctions successfully renegotiate (in the post-auction phase) greater increases in payments they claim from the auctioneer than do the winners of AB auctions. Overall, the extra renegotiation induced by FP is in the order of 2% of the contract value and, hence, do not appear to justify why a revenue maximizing auctioneer could choose an AB instead of a FP rule. Furthermore, the data provide some clear indications of the conditions conducive to collusion. A result in this direction is, for instance, that a switch from AB to FP is found to be associated with a fivefold decrease in number of bidders: the average number of firms drops from 50 to 7. The empirical analysis presented shows that the exceptionally high number of firms participating in Italian auctions, the average number of firm in equivalent US auctions is between 3 and 5, can be mainly explained by the awarding rule used. Finally, by looking not only at the winning bids but also at the bids made by the firms that lost, I show that the distance between the firm and the place of the work (a proxy often used in the literature to measure the private component of the bidders' valuation) is not at all negligible. This is a relevant finding since, with private values, AB auctions give rise to inefficiencies in allocating contracts. Therefore, the conclusion that we can draw based on the analysis of Italian data on auctions for road construction works is that the unsatisfactory performance of AB auctions compared to FP forms is quantitatively relevant not only for the maximization of the auctioneer's revenues but also for allocation efficiency.

Finally, I would like to stress that my analysis of two different auction mechanisms is in the same spirit of that of Athey, Levin and Seira (2004), where open and sealed bid formats are compared. Ideally, the next stage of my research is to follow that study by applying structural estimation techniques to the auctions presented in this paper. Under the assumption of competitive behavior in the sample of FP auctions that I collected, I could use a methodology after Guerre, Perrigne and Vuong (2000) to estimate firms' costs. This in turn will allow to simulate policy changes, like changes in the auction format, and, therefore, to better understand the effects of different awarding rules.