

# Prologue

Auctions have proven to be an excellent trading mechanism to allocate goods, services, resources, etc., to individuals and firms; they have known considerable and continuous growth during the last decades due to their interesting properties in price formation when the value of goods traded is either not known or it varies. "Auction", as a word, is derived from the Latin *augeō*, which means "I increase" or "I augment". A widely-accepted definition of an auction has been proposed by Wolfstetter (1996). It is "*a bidding mechanism, described by a set of auction rules that specify how the winner is determined and how much he has to pay. In addition, auction rules may restrict participation and feasible bids and impose certain rules of behaviour*". This definition may extend to the purchasing case too, also known as reverse auction, where a buyer uses an auction for procurement. In reverse auctions –in contrary to forward auctions- the price of the item decreases and the winner is the one who submits the lowest bid (offer).

The aim of all trading mechanisms (e.g., auctions, negotiations, bargaining, posted pricing, etc.) is to reach a final price which is acceptable to the involved parties (that is, sellers and buyers) and which serves as the dominant evaluation criterion for a bid.

The present work deals with the investigation of the behavioural aspects of bidders in electronic auctions. The subject is of interest as it has been noticed that behavioural patterns exist in auctions of sibling items. This has triggered many research attempts, which employ different approaches in modeling these behaviours.

Modeling human behaviour is of interest as the decision making process of a bidder of whether and when to place a bid, may not be subject to rationality; bounded rationality asserts that decision-makers are intendedly rational; that is, they are goal-oriented and adaptive, but because of human cognitive and emotional architecture,

oftentimes, rationality fails and as a consequence, there is a mismatch between the decision-making environment and the choices of the decision-maker [4].

This research approaches the problem at hand using splines (cubic polynomials) to fit curves between knot points that have been collected from numerous auctions. As a testbed the electronic platform of eBay is used, while as family of auctioned items, without loss of generality, the family of antique maps and engravings has been selected; then, these are classified per auction duration, that is in 5, 7 and 10 days. The results extracted show that: (i) auctions with the same duration exhibit uniform characteristics, and (ii) no significant differences are noticed when duration changes. Also our approach is evaluated in other types of items and the results are encouraging and justify our decision to model behaviour using splines.

In order to better present the above, this thesis is structured as follows. In Chapter 2, we overview auctions and we present their basic properties, characteristics and mechanisms. Yet it is presented why e-auctions show such popularity. In Chapter 3, an introduction in the research takes place, while the advantages of this approach are listed. Also, a review of the relevant literature studied is presented, whilst the parameters that affect behaviour and their interrelations are gathered. Chapter 4 deals with the methodology that was used for the research, having at first introduced the challenges that come along with data that have to surpass. Finally, in Chapter 5, we present the findings of our research and in Chapter 6, we highlight the conclusions of our work and we suggest guidelines for future research.

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# Directory of Indices

**Summary**

**Acknowledgements**

**Directory of Indices**

**Matrix of Figures**

**Matrix of Tables**

## CHAPTER ONE

<i>1.1 Scope of the research</i>	2
<i>1.2 Aim of the research</i>	2
<i>1.3 Outline</i>	3

## CHAPTER TWO

<i>2.1 Introduction</i>	5
<i>2.2 Origins of auctions</i>	7
<i>2.3 e-Auctions</i>	8
<i>2.4 Attractiveness and popularity of e-auctions</i>	15

## CHAPTER THREE

3.1	<i>Introduction to research</i>	18
3.2	<i>Benefits</i>	20
3.3	<i>Literature review</i>	22
3.4	<i>Parameters affecting behaviour</i>	23

## CHAPTER FOUR

4.1	<i>Data Challenges</i>	27
4.2	<i>Methodology of research</i>	28
4.3	<i>Description of research</i>	28
4.3.1.	<i>Set target</i>	28
4.3.2.	<i>Data mining</i>	29
4.3.3.	<i>Data filtering and sample determination</i>	30
4.3.4.	<i>Data analysis</i>	33
4.3.4.1	<i>Mathematical modelling</i>	35
4.3.4.1.1	<i>Regression analysis</i>	35
4.3.4.1.2	<i>Curve fitting</i>	37
4.3.4.1.3	<i>Frequency distribution</i>	37
4.3.4.2	<i>Excel modelling</i>	38

## CHAPTER 5

5.1	<i>Results</i>	41
5.1.1	<i>Figure -b/a</i>	41
5.1.2	<i>Figure c/a</i>	42
5.1.3	<i>Figure d/a</i>	43
5.2	<i>Remarks</i>	44
5.3	<i>Bidding experience to winning bid height association</i>	44

## CHAPTER SIX

6.1	<i>Conclusions</i>	47
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BIBLIOGRAPHY	50
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APPENDIX	52
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# Matrix of Figures

Figure 2-1: simplified auction process (adapted from Bichler et al. 2002)	5
Figure 2-2: the auction workflow	10
Figure 2-3: bid history in eBay	11
Figure 3-1: span of confidence arises from the different magnitudes of auctions concerning products that belong to the same family	19
Figure 3-2: this approach circumvents the analytical econometric models that exhibit limited flexibility by neglecting the particular drivers of such models and focuses on the behavior of the bidders	20
Figure 3-3: schematic of the dynamic forecasting model of an ongoing auction	21
Figure 3-4: the interrelations amongst the main factors of an auction in terms of the parameters affecting behaviour	25
Figure 4-1: presentation of the relative ranking of the winner against the other participants in an auction	32
Figure 4-2: the final form of bid history table data that is retained; it involves a serial number of bid, $t$ as sum of day & time of bid expression, bid amount, user ID and user rating	33
Figure 5-1: (-b/a) distribution for 5-day-duration auctions, 7-day-duration auctions and 10-day duration auctions	41
Figure 5-2: (c/a) distribution for 5-day-duration auctions, 7-day-duration auctions and 10-day duration auctions	42
Figure 5-3: (d/a) distribution for 5-day-duration auctions, 7-day-duration auctions and 10-day duration auctions	43
Figure 6-1: further disaggregation, w.r.t. to region, virtuoso, period of antiquity, or else wise could uncloud the landscape of the bidding behavior in antique maps and engravings	49

# Matrix of Tables

Table 2-1: advantages and risks of e-auctions	9
Table 2-2: infomediaries	12
Table 2-3: quality of service requirements and the respective performance indicators	13
Table 2-4: elements of technical, operational and quality requirements	14
Table 3-1: main parameters that affect behaviour and their influence	24
Table 5-1: main characteristics of figure (-b/a)	41
Table 5-2: main characteristics of figure (c/a)	42
Table 5-3: main characteristics of figure (d/a)	43
Table 5-4: association of the bidding experience and the average ratio of winning bid to opening bid that was noted	45