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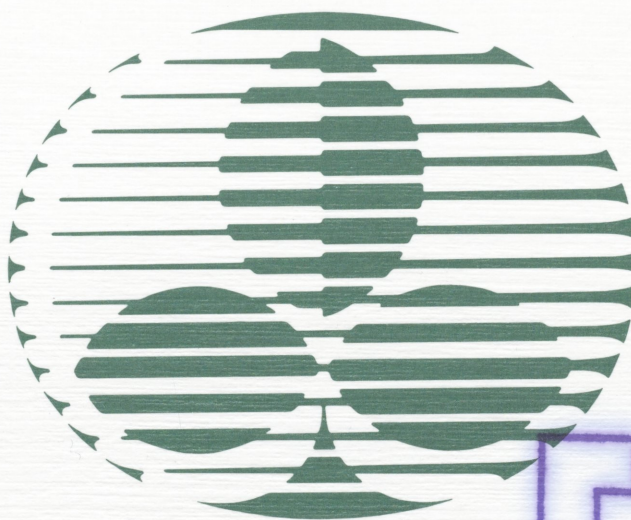
**On the Social Benefits of Auctions**

by

**Thomas Friedheim**

Januar 1992

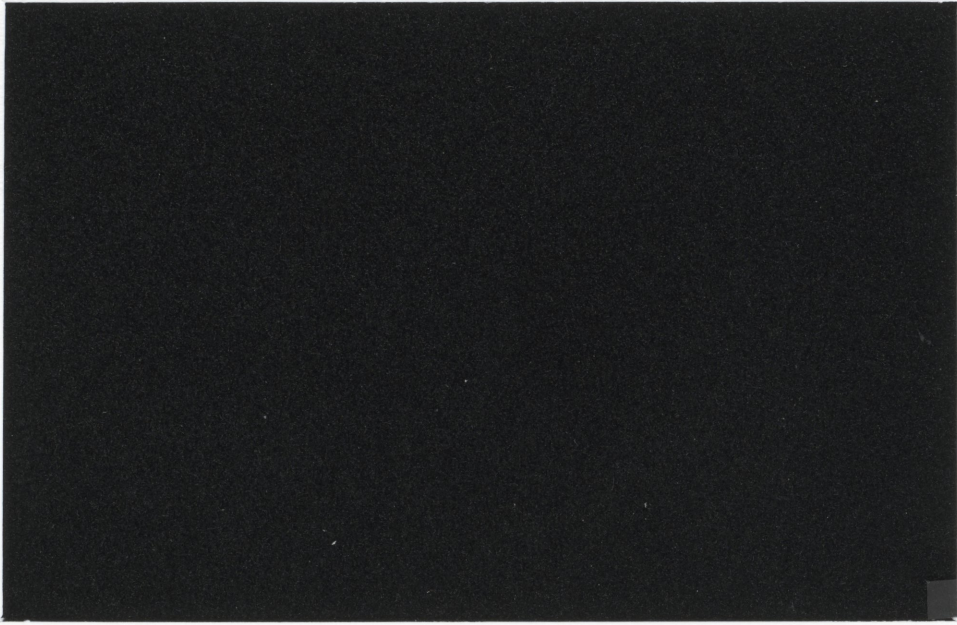
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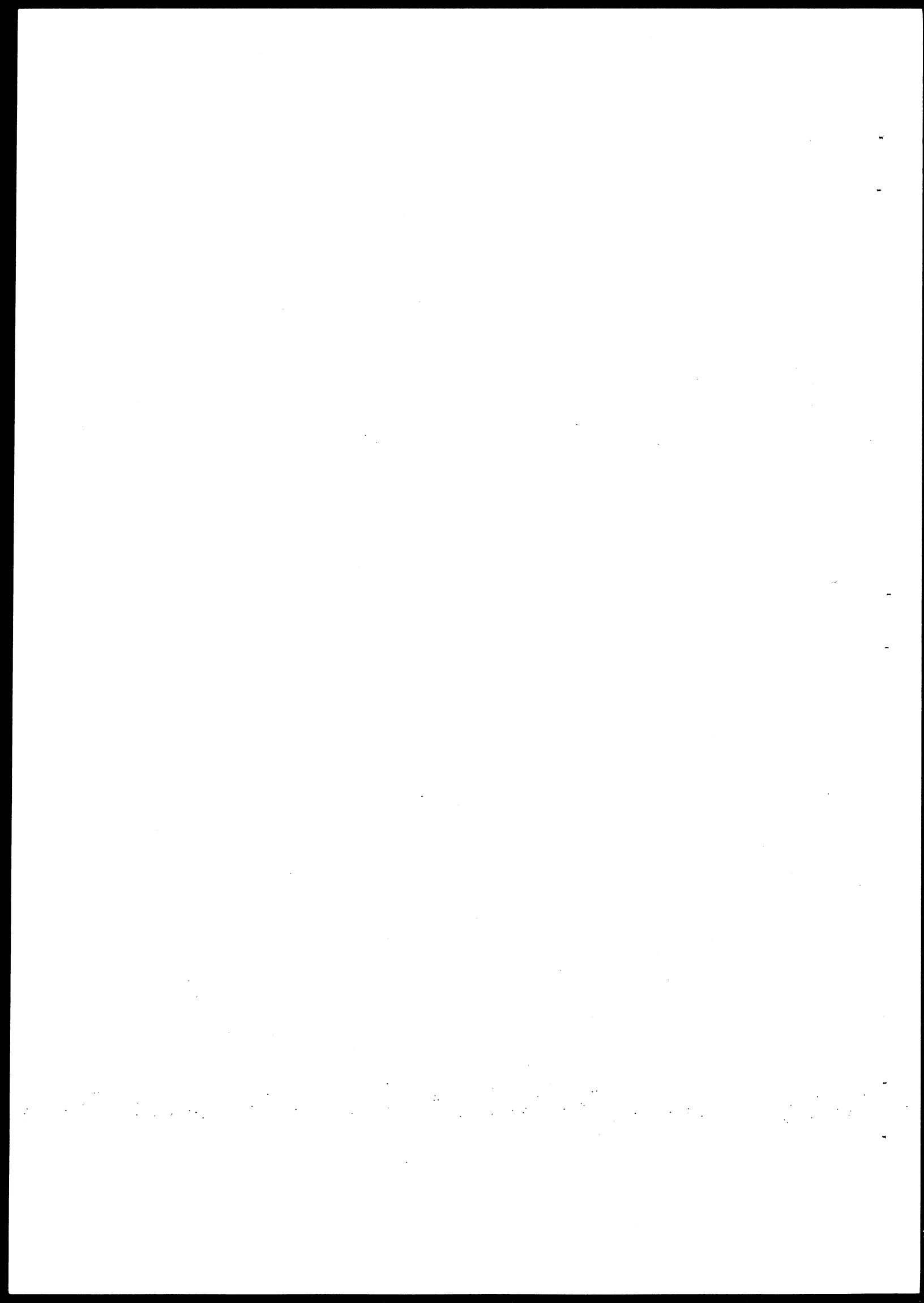
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## 1. Introduction

No newspaper without news on the TREUHANDANSTALT, last but not least on the agency's scandals.<sup>1</sup> The well-known inheritor of East Germany's state-owned enterprises has been vested with the mandate to privatize its firms. The sale is in essence a negotiated deal between the agency and potential investors. The result is, as THE ECONOMIST remarks, "a privatisation process which is opaque to most outsiders (and even some insiders), and which often brings howls of 'unfair' from would-be buyers."<sup>2</sup> What can be done? Time and again, German as well as foreign observers have requested that the enterprises be auctioned. Auctions, it is claimed, are more competitive and more transparent than privately negotiated contracts. Once the 'hammer falls', it is clear *who* bought<sup>3</sup> *what* at *which* price. There are examples. Pakistan, for instance, is currently pursuing an ambitious privatization programme including a catalogue of 115 state enterprises. Here the companies are deemed to be put on auction.<sup>4</sup>

The subject-matter of this paper deals with the merits of the institution called auction. The paper begins by giving insights into the bidding theory (auction theory) and the results of the economic discipline referred to as experimental economics. Auction theorists have built models to answer the question: Given that there are several auction types at hand (English, Dutch, sealed bid), which one should a seller choose in order to maximize his returns? The results are surprising. Next, the tea auctions in the various producing countries are analysed. How do they perform? Is the practice of lot division the tea traders' gentleman-like art of collusion with the effect of depressing auction prices? Would the tea producing countries stand to gain if they switched from the English tea auction to the Dutch auction bidding rules?

Finally, tea auctions are an important institution of distribution in the major exporting countries but there are also alternatives to these auctions, notably privately negotiated cash or forward contracts. Should auctions, as an institution, be treated like a good such as mountain bikes, which have to stand the test of competition by other bicycles? If the use of auctions is declining vis-à-vis other pricing institutions, auctions will just suffer the fate of the velocipede. No reason to worry. This view shall be challenged. It will be shown what the implications on allocative efficiency and the distribution of wealth are, if the tea auctions are fading away. This issue will be examined on the basis of two case studies presenting the Sri Lankan and Indonesia tea export economies. These countries represent polar cases in the international tea scenery with respect to the use of auctions. Therefore, a separate chapter has been included,

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<sup>1</sup> Once again, I am very grateful to the RESEARCH CENTRE for INTERNATIONAL AGRARIAN DEVELOPMENT, which sponsored the field research in Sri Lanka and Indonesia in July and August 1991. The field research was enlightening indeed and pleasant to boot, thanks to Wilfried WARNECKE, P.T. INCOMEX UTAMA, Jakarta, and Kumar PAUL and his sons Shehan, Kumar and Romesh of K. PAUL ASSOCIATES, Colombo, and Maxwell FERNANDO of FORBES & WALKER, Colombo. Finally, my thanks go to the Heidelberg crew, consisting of Ilka SCHLÜCHTERMANN, Claudette ROUSE and Ulrike FRESE.

<sup>2</sup> THE ECONOMIST, p.22.

<sup>3</sup> Assuming that the principal must be revealed.

<sup>4</sup> FAR EASTERN ECONOMIC REVIEW, p.42.



which describes the tea economy in both countries. The main questions pursued here, can be stylized as follows: Is Sri Lanka well-advised to auction almost a hundred percent of its tea production, whereas Indonesia auctions only about one quarter? Furthermore, is there a rationale for government intervention so as to safeguard that a certain portion of the tea production is auctioned?

## 2. The Theory of Auctions

This chapter begins with a presentation of the foremost auction types. An introduction to auction theory with respect to the distributional and allocational consequences of alternative bidding mechanisms and strategies follows. Finally, the insights into auctions gained by the "new frontier" discipline in economics, called experimental economics, will be discussed.

### 2.1 Types of Bidding Mechanisms

The most prominent auction type is certainly the English auction. However, there are other auction types widely used such as the Dutch auction, the first-price sealed-bid auction and the double auction. A more theoretical auction candidate is the second-price sealed-bid auction. These pricing institutions will be sketched in turn.

**English auction.** The basic feature of the so-called English auction is the presence of an auctioneer who calls out prices in ascending order, while he invites the bidders to signal their bids until, eventually, the good is "knocked down" to the most eager buyer. There are numerous variants of the English or ascending bid auction, which are subject to the rules of the respective traders' organization. The auctioneer may start the process, for instance by announcing his minimum price (reservation price). If a bidder signals his interest, the auctioneer proceeds in unit steps (e.g. measured in dollars) until no higher bid is forthcoming. He then knocks down the good at a price equal to the last standing bid. English auctions usually proceed so rapidly that the layman is at a loss wondering who is bidding, who bought, and at which price. This is probably the most commonly used method of auctioning for agricultural commodities such as tea, coffee (e.g. the Nairobi coffee auction), tobacco (the biggest being the Harare auction), or livestock.

**Dutch auction.** This auction method is used for wholesale flowers in Holland, hence the name Dutch auction. Also in Canada, tobacco is sold through Dutch auctions.<sup>5</sup> In the Dutch auction the potential buyers are facing a 'clock', the hands of which are indicating prices instead of hours. In fact, the clock substitutes the auctioneer. Contrary to the English auction, it starts at a price above the expected final price, and then gradually declines in clockwise steps. The most eager buyer is the first to push a button in front of him, thus stopping the

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<sup>5</sup> SMITH (1987), p.138.

clock. The price indicated on the clock is the sales price.<sup>6</sup> Occasionally the Dutch auction – as opposed to the English ascending bid auction – is called the descending bid auction, which is misleading, however, as nobody is bidding until the most eager buyer stops the clock. There is only one bid for each lot on offer. Obviously, the English auction is informationally much richer, since the bidding competition is conveyed.

**First-bid sealed auction.** Whereas the English auction and the Dutch auction require the presence of the bidders when the auction takes place, in sealed auctions the bidders submit written bids within a stipulated time, after which the bids are compared. Typically, in a competitive sealed tender the award of a contract goes to the bidder with the lowest bid. US Treasury bonds, for instance, are auctioned on the basis of first-price sealed-bid tenders.<sup>7</sup>

**Second-bid sealed auction.** Auctions, in which the item on sale is awarded to the bidder with the highest bid at a price equivalent to the second highest bid, are seldom used in practice. The auction design has, however, some interesting theoretical properties, as shall be shown below.<sup>8</sup> The second-bid sealed auction has been referred to as the VICKREY auction, as he introduced it to auction theory and whose seminal work on auctions stimulated the subsequent research on bidding institutions.<sup>9</sup>

**Double auction.** The name disguises, perhaps, the institution's tremendous importance in practice, since trading on organized exchanges, such as commodity futures markets, is conducted along the principles of double auctions. Whereas in the open and sealed-bid auctions there is only a single seller or a single buyer who is soliciting bids at a time, in the double auction numerous sellers and buyers are trading simultaneously. Moreover, a seller may switch and become a buyer or vice versa, depending on the orders from his principals. The auction process starts with a bid from a seller or buyer. According to the auction rules, then, any subsequent bid from the seller must be lower than the previous bid and any subsequent bid from the buyer must be higher so that bids from the buyer and seller converge to meet at a contract price.<sup>10</sup>

## 2.2 The Revenue Equivalence Theorem

The question arises as to which of the bidding mechanisms is best from the seller's viewpoint when seeking to maximize his proceeds. (It is assumed throughout this chapter that the auctioneer is a seller and the bidders are buyers.) This challenging question has mainly been approached from the theoretical side but there is also some experimental evidence. We first turn to the theory of auctions.

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<sup>6</sup> BOULDING, pp.39-40.

<sup>7</sup> The bond sale gave rise to the recent SALOMON BROTHERS scandal.

<sup>8</sup> McAFEE, McMILLAN, p.702.

<sup>9</sup> MILGROM, p.8.

<sup>10</sup> SMITH, p.945.



Before tackling the question of revenue it is important to note the difference between a bid and a valuation of an item (or used synonymously willingness to pay). The distinction becomes intuitively clear when one analyzes the bidding strategies in the English auction. Suppose only one item is to be auctioned.

Bidding stops when only one bidder remains. The winning bidder is awarded the item at a price equal to his bid, which is, in most cases, slightly above the willingness to pay of the second highest bidder.<sup>11</sup> The winner's valuation, however, usually strictly exceeds his bid and the bidder thus gains an economic rent (the bidder's or consumer's rent).<sup>12</sup> If his valuation equals his bid, he is indifferent as to whether or not he obtains the good. To repeat, there is usually a difference between the winner's valuation and his bid, but in the case of the second-highest bidder (as well as any other bidder), bid and valuation are identical. How can this observation be explained? In the English auction, the dominant (i.e. optimal) bidding strategy is to bid up to one's valuation. Lowering one's bid below one's valuation involves the risk of not obtaining the item, thus foregoing the rent to be earned otherwise – i.e. the difference between one's valuation and the second highest bid<sup>13</sup>, if one succeeds in claiming the item. Likewise, increasing one's bid above one's valuation involves the risk of claiming the good at a price higher than one's willingness to pay which is similarly irrational. Since the winning bidder is the one who values the item most, the allocation is clearly PARETO-optimal.

**The Monopoly Paradox.** In an auction sale such as the English auction, a single seller faces many buyers. This market constellation seems to perfectly conform to the textbook model of monopoly, or rather to a monopoly – oligopsony situation, if there are only a few bidders. How then is it possible for the winning bidder to gain an economic rent (the difference between his valuation and his bid)? And why is the 'monopolist' unable to extract the rent? How is this idea compatible with the fact that – undoubtedly – many of these auctions are regarded as a fair and 'competitive' market place by the market participants?

The solution to this monopoly paradox lies in the auction rules: the seller, the 'monopolist', commits himself to selling the item at a price slightly above the second highest bid, which is in most cases strictly below the highest valuation. It would be in the seller's interest to change the rules (ex-post) and ask for a price exceeding the highest bid, and it would be in the interest of the winning bidder to agree, as long as the negotiated price is still below his valuation.<sup>14</sup> Even so, the seller does not know what the winner's valuation is. Thus, the commitment of the seller to abide with the rules of the auction and the asymmetry of information work in favor of the buyer.

Coming back to the revenue question, the answer is sensitive, as we shall see, to the assumptions that are made with respect to the preference structure of the bidders. The following assumptions underlie what may be referred to as the basic bidding model:

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11 VICKREY, p.14.

12 McAFEE, McMILLAN, p.708.

13 The winner's bid and the second highest bid are assumed to be equal on the margin.

14 McAFEE, McMILLAN, p.707.

- a) **Single-item auction:** There is only one item to be auctioned.
- b) **Independent-private-values assumption.** The bidders' valuations of the item are based on a common probability distribution, but they are (statistically) independent of each other. Private valuation means that every bidder has his own conviction about the value of the item. Even if he knew somebody else's valuation, it would not influence his valuation. His knowledge might affect, however, his bid, which he is willing to signal in order to get the item.<sup>15</sup> Independence means that there is no common and unobserved factor that affects all of the bidders' valuations.<sup>16</sup>

What does the private-values assumption imply if imposed on the tea industry? It corresponds to a situation in which all the bidders (buyers in tea traders' parlance) have orders from their principals. This, in turn, implies the absence of tea traders among the buyers. Secondly, there are no traders among the principals. Why? Unlike a collector (not a dealer) who knows what a van GOGH painting offered at SOTHEBY'S is worth to him regardless of its worth to others, tea traders are influenced by the judgement of other traders. This is not necessarily true for tea blender-packer companies, 'blenders' for short. Private valuation means that they value a particular lot according to their own cost calculation (cost calculation of a blend), a fact that allows them to ignore the calculations of their competitors.<sup>17</sup> This is not to say, however, that a 'blender' may ignore the competitors' cost of production. It only means that a particular tea may seem cheap to one blender whereas it may not to another.

- c) **Bidders' valuations are symmetric.** This assumption implies that the bidders take their valuations from the same probability function, which is known to everybody. It rules out the case in which one group of bidders has systematically different valuations in comparison to another group of bidders.<sup>18</sup>
- d) **Bidders are risk neutral.** The bidders are assumed not to have a preference for high-stake transactions, that is, they are assumed to be neutral with respect to the risks associated with bidding and (perhaps) claiming the item.<sup>19</sup>
- e) **Payment of bidders depends only upon the final bid.**<sup>20</sup> This assumption rules out the case in which payments are a function of the bid, in addition to the ultimate market value of the good (such as royalties).
- f) **No collusion.** It is assumed that the bidders do not collude.<sup>21</sup>

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<sup>15</sup> McAFEE, McMILLAN, p.705.

<sup>16</sup> MILGROM, p.4.

<sup>17</sup> MILGROM, p.4.

<sup>18</sup> McAFEE, McMILLAN, p.706.

<sup>19</sup> McAFEE, McMILLAN, p.706.

<sup>20</sup> McAFEE, McMILLAN, p.706.

<sup>21</sup> VICKREY, p.15.

On these assumptions, VICKREY first discovered that it does not matter which of the auction mechanisms the seller chooses: each yields, on average, the same revenue. This is known as the revenue-equivalence theorem. Even if one considers the simplifying assumptions, this is a surprising result. In order to elucidate the theorem, a step by step procedure seems appropriate: that is, to first compare the English auction with the second-bid sealed auction, then to compare the Dutch auction with the first-bid sealed auction, and finally establish equivalence among both couples. (The double auction will not be considered here).

Given that in the English auction, rational bidders bid up to their valuation, the final auction price approximately equals the valuation of the last bidder, who has dropped out. Is it also optimal to bid up to one's valuation in the second-price sealed-bid auction? This is indeed the case, since a bidder, who lowers his bid below his utmost willingness to pay, risks to be outbid by somebody else. He may therefore not receive the item. Thus, even the winner will reveal his valuation, but he will (only) pay as much as the second-highest bidder values the item. In fact, he is a price-taker, since the price which he agrees to pay is determined by his competitors.<sup>22</sup> In conclusion, both auction mechanisms are behaviorally isomorphic leading to a PARETO-optimal allocation.<sup>23</sup> Moreover, the English auction and second-price sealed-bid auction are equivalent in terms of expected revenues.

The decision process, which the bidders are facing in the Dutch auction is technically a "game", since each bidder has to take into account what he knows or presumes about his competitors' bids. VICKREY analyzes the interdependent decision problem: *"To put in a bid as soon as the price has come down to the full value of the object to the bidder maximizes the probability of obtaining the object, but guarantees that the gain from securing it will be zero; as the announced price is progressively lowered, the possibility of a gain emerges, but as the gain thus sought increases with the lowering of the point at which a bid is to be made, the probability of securing this gain diminishes. Each bidder must thus attempt to balance these two factors in terms of whatever knowledge he has concerning the probable bids of the others."*<sup>24</sup>

The Dutch auction and first-price sealed-bid auction also yield the same expected revenue, since the decision which the bidders are facing are equivalent in both situations: each bidder has to submit a bid independent of the other bidders (not of course independent of their bids). His bid is the price which he will have to pay if he wins, regardless of how much his competitors are bidding. The bidder may estimate the difference between his own valuation and the valuation of his closest competitor, the result of which will affect his bid. He will also shade his own valuation to allow for a profit. But regardless of how the bidder approaches the task of calculating his bid, he will have to submit the highest bid which he can afford to pay.<sup>25</sup>

So far, revenue equivalence has a great deal of intuitive appeal, yet, it seems a paradox that the first-price sealed auction would yield the same expected revenue to the seller as the

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<sup>22</sup> MILGROM, p.8.

<sup>23</sup> SMITH (1982), p.140.

<sup>24</sup> VICKREY, pp. 14-15.

second-price sealed auction. It is plausible that if the bidders in the second-price auction know in advance that they shall have to pay (only) a price equal to the second-highest bid, they will bid more aggressively, as compared to the first-price auction.<sup>26</sup> Revenue equivalence thus hinges on the question, "*Is the profit margin deducted by the bidder in the first-bid auction greater or less than his expected profit when he wins in the second-bid auction?*"<sup>27</sup> By way of mathematical proof, MILGROM and others are able to show that a bidder, who submits a fraction of his own valuation in the first-price sealed auction, indeed agrees to pay the same expected price as the second-highest bidder in the second-bid auction.<sup>28</sup> MILGROM concludes: "*The English and the sealed-bid auctions yield exactly the same expected profit for every bidder valuation and the same expected revenue for the seller. Indeed, every auction that allocates the goods efficiently and offers no profit to a zero valuation bidder has the same expected profits for every bidder valuation and the same expected revenue for the seller.*"<sup>29</sup>

To sum up, the revenue equivalence theorem holds that under strong, limiting assumptions, the open and the sealed auctions yield the same expected revenue to the seller. It is not claimed, however, that revenue is equal in every single auction, rather it is equal on average.

### 2.3 Break-down of Revenue Equivalence

The basic model needs a shot of realism. Hence, several of the above assumptions will be relaxed or replaced in turn, while the other assumptions remain unchanged (*ceteris-paribus* analysis). The objective is to analyse how each change affects the conclusions with respect to the seller's revenue and allocative efficiency.

**Risk aversion.** In an environment in which the bidders are risk-averse rather than risk-neutral as was assumed above (assumption c), bidders in the Dutch auction claim the item at a higher mean observed price. Risk-averse buyers will not wait as long as risk-neutral buyers to stop the clock, for the fear of being outbid by some other anxious bidder. The Dutch auction "*exploits risk averse buyers' greater fear of loss*".<sup>30</sup> As a result, risk-aversion cuts in on the bidders' margin or profit. By contrast, risk-aversion has no effect upon the final price in the English auction, since the optimal bidding strategy remains bidding up to one's valuation.

Hence, sellers who are free to determine the auction mechanism, should opt for the Dutch auction rather than the English auction, if the bidders are risk-averse (*ceteris paribus*).

**Asymmetrical Bidders.** The symmetry assumption (assumption c) is in many instances questionable, particularly if applied to the tea auction buyers, whose demand tends to be

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<sup>25</sup> McAFEE, McMILLAN, p.710.

<sup>26</sup> McAFEE, McMILLAN, p.707.

<sup>27</sup> MILGROM, p.9.

<sup>28</sup> McAFEE, McMILLAN, p.710.

<sup>29</sup> MILGROM, p.10.



highly segmented. The symmetry assumption rules out, for instance, what can be observed in the Indian tea auctions: the valuations of domestic buyers are systematically different from the valuations of foreign principals. In cases such as described, the bidders' valuations are said to be asymmetric, in the sense that their valuations are 'drawn' from distinct distribution functions.<sup>31</sup>

In an asymmetric environment, the expected price in the Dutch auction (and first-bid sealed auction) differs from the other twin auctions, as the following example shows<sup>32</sup>: Given two bidders, suppose that the first bidder's willingness to pay equals DM 101, whereas the competitor has a valuation of DM 50 with a probability of 80 percent and a valuation of DM 75 with a probability of 20 percent. The first bidder is aware of the (asymmetric) distribution of valuations but he does not know the ultimate valuation of his competitor. If the first bidder signals a bid of DM 51, his expected profit is DM 40 ( $0.8 \times (DM 101 - DM 51)$ ). If he bids DM 62 or more, he may make a profit of DM 39 (or less) so that he will never bid more than DM 61. Thus, the optimal strategy of the first bidder is to bid between DM 50 and DM 61. What about the competitor? Given the first bidder's strategy, he claims the item with a probability of 20 percent, if his valuation happens to be the higher one. In this case, the allocation is inefficient in the PARETIAN sense.

By contrast, asymmetrical estimates do not affect the (PARETO-optimal) allocation of the English auction and the second-bid sealed auction: the award of the item goes to the bidder who values the item most.

In summary, when the bidders' estimates are asymmetric, the Dutch auction and the first-bid sealed auction result in inefficient allocations "*with some positive probability*."<sup>33</sup> As the example above shows, the expected payment to the seller may be higher or lower than in the English and the second-bid sealed auctions.<sup>34</sup>

**Successive Auctions of Homogeneous Goods.** So far, it was assumed that each bidder has a take-it-or-leave-it option to claim a single item (assumption a). This assumption is realistic in such cases where a work of art is being auctioned or where large, indivisible Government tenders are being floated. The single-item assumption fails to be realistic for most agricultural commodity auctions, where literally hundreds of lots are auctioned successively. Although many bidders may intend to purchase several lots or items, technical reasons generally preclude that the lots can be lumped together into bigger chunks: the lots put on auction may be owned by different sellers or there may be small buyers needing only small quantities. Often there are subtle quality differences which call for price differentiation. Therefore, the goods have to be auctioned successively. Although lots for sale in agricultural practice are

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<sup>30</sup> RILEY, p.48.

<sup>31</sup> McAFEE, McMILLAN, p.714.

<sup>32</sup> The example has been taken from MILGROM, p.9.

<sup>33</sup> MILGROM, p.9.

<sup>34</sup> VICKREY, p.21.

heterogeneous, they are homogeneous enough to allow arbitrage between them. If this were not the case, the successive auction could be analysed analogous to the single-item case.

Bidding in a successive multi-item auction is, in fact, a repeated game with 'self-collusion', since a bidder has the option of purchasing an item in the first auction or wait and secure it in any of the following auctions. As VICKREY observes with respect to the English auction, "... *an element of speculation or strategy is present during the auctioning of all but the last item, as each bidder must consider whether he should push the bidding up higher on the current item or sign off in the hope that a subsequent item will become available at a lower price. This situation has characteristics similar to that of the Dutch auction.*"<sup>35</sup>

To illustrate, consider the English tea auctions. Bidding is a relatively simple, that is mechanistic task, if the buyer has an order by his principal to claim a specific lot of tea subject to the principal's reservation price. In general, however, the bidders have to consider a vast amount of variables and process their changing parameters with lightning speed. Indeed, the functioning of tea auctions remains a marvel to the author. For example, it depends on the general market assessment whether a bidder (a trader) has a preference ex-ante to bid in "today's" or rather in "tomorrow's" auction. Of course, the intertemporal decision is also a function of the market prices development in "today's" auction. The same intertemporal trade-off applies to the bidding behavior within "today's" successive auction. These decisions, in turn, are a function of the decisions of the competing bidders. Thus, any bidder who has to make an educated guess as to which point in time a competing bidder is keen on claiming a particular lot, an estimate of his competitor's orders is necessary. The decision process is made more complicated by strategic behavior: there is a host of motives such as rivalry among bidders, which induces them to push prices up, to test the competitor's financial stamina etc. For instance, if market prices are falling during the course of the auction, a bidder who claimed a lot early on in the auction would appear to have bought dearly at the end of the auction day. Hence, he has a motive to push prices up in order to sustain the market prices. The bidders' decision frontier is further complicated by the fact that at each point in time there is not a single price for tea but rather a concertina of prices of different tea qualities whose price spreads have to be considered simultaneously.

Unfortunately, it is not clear how the successive multi-item auction affects the comparative performance of the English and the Dutch auction. However, if bidders have asymmetrical estimates, the allocation may be inefficient also in the English auction.<sup>36</sup>

**The Winner's Curse.** Occasionally, an auction winner may realize that he won a Pyrrhic victory. The winner may feel cursed rather than blessed with the good he had successfully claimed. He may have to admit to himself that, because of the aggressive bidding on the part his competitors, he was pushed to a price level too high to yield a profit. This phenomenon has been referred to as the winner's curse. It conflicts, however, with the independent private-values assumption (assumption b), in which a bidder does not heed how his competitors value the good. Here, a rational bidder does not get pushed beyond his valuation, given

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<sup>35</sup> VICKREY, p.24.

his preference structure. Yet, the fact remains that the winner's curse has a great deal of intuitive appeal. WILSON notes that the winner's curse "*is distressingly common in practice as well as in experiments*"<sup>37</sup>.

To explain the phenomenon, an alternative behavioral assumption has been suggested, the so-called common-value assumption. As before, the valuations are 'drawn' from a single probability distribution. In this case, there exists only one uncertain value, but one which is common to all bidders (say, the anticipated resale value in an overseas market). Each bidder is trying to make an estimate of the market value, and if other bidders' valuations were leaked to him, the information would probably affect his own valuation.<sup>38</sup> The salient point of the common-value models is that the bidders' dependent estimates are unbiased (i.e. correct on average) but their estimation errors are independent.<sup>39</sup> The result is that "*the maximum of several unbiased estimates is biased upward.*"<sup>40</sup> That is, the highest bid is too high, on average, to yield a profit.

Prima facie, the above statement runs counter to the received wisdom on the rationality of homo oeconomicus. Yet, all that the model offers is an explanation for an occasionally observed phenomenon which is more likely due to a 'naive' bidding strategy rather than irrationality on the part of bidders. MILGROM concludes, "*The most important lessons to be learned from both the theory and the experiments are that the returns in bidding come from cost and information advantages, that naive bidding strategies can squander these advantages, and that bidders without some advantage have little hope of earning much profit, but could with a little bit of carelessness suffer large losses.*"<sup>41</sup>

In the tea business, the common-value assumption would allow for tea traders (as bidders) only. To explain, each individual tea trader is in fact guessing or speculating what a particular lot is worth on the market. Moreover, a trader who obtains insider knowledge from an experienced and successful trading company (envied for their market forecasts), would most certainly adjust his estimate of the market value of the tea.

**Correlated beliefs.** When the estimates of the bidders are positively correlated, their valuations are said to be 'affiliated'. With the help of a model, which incorporates affiliated preferences, while the good may have either a common value, a private value or be a mixture, MILGROM finds that the English auction yields more revenue to the seller (on average) than the Dutch auction.<sup>42</sup> Is this proposition plausible? In practice, the estimates of the bidders are in fact often correlated, and amongst the bidding mechanisms, the English auction stands out as the institution in which a correlated 'feeling' of how the market prices develop is most

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<sup>36</sup> VICKREY, p.25.

<sup>37</sup> WILSON, p. 240. The Winner's curse has been said to exist in auctions for offshore oil rights and auctions for contracts involving technological uncertainty, see McAFFEE, McMILLAN, p.721.

<sup>38</sup> McAFFEE, McMILLAN, p.705.

<sup>39</sup> MILGROM, p.5.

<sup>40</sup> WILSON, p.240.

<sup>41</sup> MILGROM, p.6.

<sup>42</sup> MILGROM, p.16.

clearly voiced. MILGROM notes that the theoretical results provide "a possible explanation of why English auctions are so much more prevalent than sealed-bid auctions"<sup>43</sup>.

**Additional considerations.** VICKREY points to the technical efficiency of auctions. According to VICKREY, the bid-preparation costs (transaction costs) in the Dutch auction exceed the costs in the English auction, given a private value, single-item environment. In order to prepare his bid in a Dutch auction, each bidder needs to assess, in addition to calculating what the item is worth to himself, what the item is worth to his competitors. Even more effort is necessary in an asymmetric environment as compared to a symmetric environment. If the bidders fail to do so, the chances increase that the final allocation is inefficient.<sup>44</sup> By contrast, this investment in the general market appraisal is unnecessary in the English auction. MILGROM stresses that the existence of a particular auction type should not be explained by the revenue aspect alone: "*The common auction institutions are all simple and robust, working well in a variety of environments, used by desperate sellers as well as by those with market power bordering on a monopoly, and usually leading to a tolerably efficient allocation of the items being sold. Comparisons of robustness, efficiency, transaction costs, and immunity to cheating offer an important alternative to the revenue-based approaches for explaining the popularity of specific auction institutions*"<sup>45</sup>.

To summarize, from the viewpoint of a seller seeking to maximize auction receipts, risk aversion would tend to strengthen the case for the Dutch auction as well as the first-price sealed auction. If, on the other hand, the valuations by the bidders are correlated, the English auction is more favorable to the seller. It is an open question, however, which factor is dominant. How then can the comparative prevalence of the English auction as a bidding mechanism for the sale of agricultural commodities be explained? According to MILGROM, "*at least for fixed quantity environments, the English auction possesses a variety of characteristics that help to explain its popularity. It generates more receipts on average than the Dutch/sealed-bid auction. It leads to efficient outcomes in a wider range of environments. And, it economizes on information gathering and bid preparation costs*"<sup>46</sup>.

## 2.4 Experimental Economics

Surprisingly, theoretical research on auctions exceeds by far the empirical studies, as McAFEE and McMILLAN observe.<sup>47</sup> They hint to the fact that bidding theories such as the revenue equivalence theorem are sensitive on the underlying assumptions and conclude that

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<sup>43</sup> MILGROM, p.16.

<sup>44</sup> VICKREY, p.22.

<sup>45</sup> MILGROM, p.17.

<sup>46</sup> MILGROM, p.17.

<sup>47</sup> McAFEE, McMILLAN, p.726.

"this theorem cannot be meaningfully be tested until some way is found to test for independent private values against affiliated values"<sup>48</sup>.

This deficiency proved to be a challenge to the economic science of laboratory experiments, in short experimental economics. As SMITH notes, "*laboratory microeconomies are real live economic systems, which are certainly richer, behaviorally, than systems parameterized in our theories.*"<sup>49</sup>

In systems theory the components of a microeconomic system are defined as follows<sup>50</sup>:

- Environment. The environment includes the economic agents and resources (commodities). Each agent is characterized by a utility function and a certain endowment of technological know-how and resources.
- Institution. According to SMITH, "*It is the institution that defines the rules of private property under which agents may communicate and exchange or transform commodities for the purpose of modifying initial endowments in accordance with private tastes and knowledge.*"<sup>51</sup>
- Messages. The messages are the 'language' which the agents use. They do not choose a resource allocation directly, but rather choose messages which will be processed by the institution to yield an allocation.<sup>52</sup> For instance, in the English auction the messages are the bids which the agents signal to the auctioneer.

Since laboratory experiments are carried out in a controlled environment, it is possible to test the limits of a theory by modifying the environment, the institution or the message (so-called boundary experiments).<sup>53</sup> Boundary experiments are in a sense a 'sensitivity analysis' with respect to the general validity of the underlying theory. For instance, in auction experiments the double auction proved to a very robust institution yielding PARETO-optimal results in a 'competitive' environments as well as in a tight oligopoly environment with only 6 buyers and 2 sellers.<sup>54</sup>

One line of experimental methods in economics pursues the study of resource allocation in alternative pricing institutions.<sup>55</sup> The hypotheses, the design and the results of a series of laboratory experiments (1,500–2,000 auctions), as summarized by SMITH, will be briefly presented.<sup>56</sup>

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48 McAFEE, McMILLAN, p. 727.

49 SMITH (1982), p.923.

50 SMITH (1982), p.924.

51 SMITH (1982), p.924.

52 SMITH (1982), p.926.

53 SMITH (1982), p.942.

54 SMITH (1982), p.945.

55 SMITH (1982), p.923.

56 SMITH (1987), p.141 ff.



Hypotheses. In the private-value experiments the following hypotheses were formulated:

- $EP(\text{English}) = EP(\text{Second}) < EP(\text{Dutch}) = EP(\text{First})$ , where EP is the expected price of the respective bidding mechanism. Assumption: bidders are risk-averse.
- $100 = EFF(\text{English}) = EFF(\text{Second}) > EFF(\text{Dutch}) = EFF(\text{First})$ , where EFF is the efficiency of the respective auctions, measured by the percentage probability that the bidder with the highest valuation claims the item. Thus, it is hypothesized that the introduction of risk aversion (as opposed to risk neutrality) does not affect negatively the (optimal) allocation in the English as well as second-bid auctions.

Experimental design. Each of the (5 up to 8) bidders was assigned a value at random from a single distribution function (symmetry assumption), whose parameters were known to everybody (private values assumption). The winning bidder was paid in cash the difference between his valuation and the final auction price.

Results. Firstly, the mean observed prices in the English and the second-bid auctions were converging over time, which was explained by fact that bidders had to learn to bid up to their valuation. Secondly, there was no revenue equivalence of the Dutch auction and the first-bid auction: the latter yielded a higher mean observed price. There are several explanations for this surprising result: bidders derive a non-monetary utility from the suspense of waiting in the Dutch auction<sup>57</sup>; the Dutch auction discourages bid preparation, when the stakes are small.<sup>58</sup> In terms of efficiency, the English and the second-bid auction allocations were nearly PARETO-optimal, whereas efficiency was somewhat lower in the first-bid auction (88 percent) and still lower in the Dutch auction (80 percent).

The intractability of the assumptions for empirical testing of bidding theories also presents a problem in auction experiments. For example, in most environments common-value experiments certainly approximate reality better than private-value experiments. However, bidding behavior in common-value experimental auctions showed a great diversity of bids (asymmetrical bids), which in effect implied the rejection of the common-value model with affiliated values.<sup>59</sup>

In summary, the above experimental results offer no insights as to the comparative performance of agricultural commodity auctions (Dutch or English), where the bidders' valuations can be assumed to be correlated and asymmetric rather than symmetric, independent private values.

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<sup>57</sup> SMITH (1982), p.944.

<sup>58</sup> MILGROM (1989), p.7.

<sup>59</sup> SMITH (1987), p. 143.

### 3. The Organization and Performance of the Tea Auctions

The framework of this chapter is the structure-conduct-performance paradigm of industrial organization theory. The main lines of this chapter pursue the question of how the organizational and structural characteristics, as well as the conduct of the market participants, affect the performance of the tea auctions.

#### 3.1 Introduction to the Controversial Issues

To set the stage for the analysis, the controversial issues are introduced and highlighted by conflicting statements on the part of tea market researchers. A recurring question is whether selling tea by auction is in the best interest of the developing countries: Is not the world tea market dominated by a handful of powerful buyers who keep the auction prices at "artificially" low levels? In light of the concentration of tea buyers, an UNCTAD study recommends: "*In relation to the marketing of bulk tea, assistance, primarily of a technical nature, would be useful in increasing the existence and extent of surveillance of marketing methods, both of auctions and of direct sales, to help to ensure that fair prices are paid and that the companies involved are not taking advantage of their position in the industry.*"<sup>60</sup> On the other hand, a Sri Lankan researcher diagnoses with respect to the Colombo auction: "*The concentration of buying power is a fact. From this fact, however, the inference has sometimes been made that the small number of large buyers regularly connive among themselves to keep prices low. This inference has not been supported by evidence.*"<sup>61</sup>

This statement takes us to the next issue: competitive conduct. If, in addition to being powerful, the big buyers were to collude, the producing countries might in fact be "exploited" through collusive (monopsonistic) pricing. Another Sri Lankan researcher notes: "*But the bidders are so few and so powerful and have such common areas of interest and social interaction that collusion may be implicit at every stage, indeed may well be so embedded in the system as to be unavoidable, despite the best intentions of the colluders to avoid collusion.*"<sup>62</sup>

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<sup>60</sup> UNCTAD, p.47.

<sup>61</sup> JAYAWICKRAMA, p.67.

<sup>62</sup> CASPERZ, p.18.

Finally, there are alternatives to the existing tea auction system, such as a potential Dutch tea auction, privately negotiated contracts, or a (so far non-existent) tea futures market. The merits of the Dutch auction will be discussed in this chapter and direct sales in the next, while discussing tea futures market would be beyond the scope of this paper.

### 3.2 The Tea Auction Rules

The conditions of sale differ in detail from one auction centre to another. However, there are common "rules of the game", which are sketched here.<sup>63</sup>

**Sampling.** Unlike other commodities, tea is generally not sold by description. Rather it is a commodity traded by sample. There are a few exceptions, however: Chinese black tea is one. Some tea traders praise the meticulously homogeneous China tea: i.e. the Chinese offer almost 'standardized' grades with very little quality variation over time. The institutionalized pattern of sampling and the distribution of tea samples among the market participants is an important pre-requisite for the functioning of the tea auctions with respect to pricing and distribution. In the container age, the unit of sale is a palletized lot (or used synonymously break). A typical lot comprises either 20 or 40 chests (also called packages), each weighing some 50 to 60 kgs net. Before the arrival of the lots at the warehouses in the auction centre, the tea producer sends a sample of each lot to his broker, who eventually auctions the tea. Hence, the broker or selling agent also acts as auctioneer. The broker, in turn, distributes samples to the tea buyers (the bidders) about two weeks before the tea lots are coming up for auction. This arrangement leaves time for the tea buyers to look at the tea, to taste the brewed tea (infusion) and to attach a price indication. The price indication is the anticipated market price and hence the suggested bid-price, which the tea buyer forwards including a sample to those (overseas) principals who signal interest to buy the particular grade and quality. The principal (importer), again, tastes and values the tea and forwards a buying order to his agent, which usually includes a price limit (reservation price). The buying order may not refer precisely to the lot of which he had tasted a sample, it may often refer to a similar tea which matches the sample. In this case, the principal is said to buy by standard.

In any event, most of the tea buyers (bidders) survey the entire national tea supply the week or the week-end before the lots are auctioned. By tasting hundreds of teas and examining the dry leaf and the appearance of the infusion, they establish their individual market estimate. The technique of valuing tea or any other natural product with one's senses is aptly referred to as organo-leptic pricing. The buyers mark their valuations in the so-called tea catalogues which are issued by the brokers.

**Tea catalogues.** The brokers publish the lots on offer in catalogues. This step is referred to as printing (printed teas are teas for auction sale). Since the weekly and seasonal tea supply

<sup>63</sup> This is not the place to go into the many very important conditions of sale concerning the terms of delivery, payment, claims and other disputes.

varies considerably in some countries, the brokers may curb the supply which comes up for auction once the quantities reach a predetermined limit.

**Bidding.** The tea auctions are English ascending bid auctions, where the bids advance by stipulated rates and the lot is knocked down to the highest bidder. Bidding proceeds in local currency in all auction centres worldwide, save the Jakarta auction where the unit of sale is US-dollars. There are a few particularities to the tea auctions. In most auction centres, bidders are permitted to submit a joint bid: this practice is referred to as lot division (see below). The auction sale is subject to withdrawal by the seller: the broker may withdraw a lot during the bidding process if, for instance, the price has not reached the producer's reservation price. Withdrawn lots may be purchased outside the auction as out-lots until the following day.<sup>64</sup> This practice leaves time for the tea buyer to consult his principal as to whether or not he is willing to buy the lot at the seller's reservation price. Unsold out-lots are either re-offered on a later auction (re-prints) or sold privately.

### 3.3 Dutch Tea Auctions

Time and again, the question has been pondered in the tea producing countries of whether switching to the Dutch auction would lead to higher producer prices.<sup>65</sup> Yet, the Dutch auction method has never been tried so far.<sup>66</sup>

There is no particular merit of the Dutch descending bid auction for the purpose of selling bulk tea, due to the following reasons:

- In the English tea auctions, an important bidding tactic is 'pushing'. Pushing means to bid even though the bidder is not keen on claiming the lot. He is bidding because he does not want his competitor to get away with the item too cheaply, because he may want to strain his competitor's liquidity, or for a number of other motives. It is in fact a gamble, and the bidder may end up with tea for which he has no immediate disposal. Pushing has two effects: it stabilizes the market (i.e it smoothes the irregularity of prices) and it raises the average price level. There is no such merit to the Dutch auctions.
- As has been discussed above, a seller stands to gain from the Dutch auction if the buyers are risk-averse (private-valuations model). But most tea traders agree that the world tea market is a buyer's market most of the times, and hence there is no particular risk of not being able to buy required quantities. By contrast, if the item is very valuable or amounts to a considerable portion of a company's turnover or assets (e.g. large construction

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<sup>64</sup> There is no sale of out-lots in India.

<sup>65</sup> see GOVERNMENT of INDIA, p.113; JAYAWICKRAMA, p.69; CTTA, p.57.

<sup>66</sup> This chapter analyzes the relationship between alternative institutional arrangements of the tea auctions (market organization) and their performance.

contracts), the buyers are not indifferent as to whether they claim or do not claim the item (or contract). In this environment, risk-aversion is more likely.<sup>67</sup>

- The international tea community praises the technical efficiency of the tea auctions. In fact, it can be surmised that the popularity of the English auctions as a method of sale for agricultural commodities is last but not least due to their technical efficiency (in terms of bid preparation costs etc.). Certainly, the multi-item auctions in both variants involve thorough market appraisal and assumptions about the competitor's bidding behaviour and valuations. However, a Dutch tea auction would be considerably more demanding on the bidders because very little bidding information is revealed. Thus, the chances increase that the allocation is inefficient.<sup>68</sup> Why then is the Dutch auction for cut flowers in Holland successful? My answer is a conjecture rather than based on settled knowledge: Cut flowers are quickly perishable and if they are not auctioned "today", they are of no value "tomorrow". In fact, unsold flowers are destroyed. Hence, price discovery is simplified because there is no (intertemporal) storage function.<sup>69</sup> The bidders are whole-sale flower merchants rather than traders (who speculate on the cash market), and as merchants they submit their bids on the basis of their immediate requirements. In conclusion, the nature of the product makes bid calculations fairly easy.

Is there a market constellation that would be conducive to a Dutch tea auction system? In principle, the Dutch auction lends itself to the top market segment. Here, the (overseas) buyers are eager to purchase the teas because these teas have no substitutes. At least, this market segment is the one where risk-aversion is most likely. According to my observations, the top quality tea is a very lucrative business for the importers suggesting that economic rents are to be earned. In other words, there is scope for the tea producers to capture these (quasi-monopoly) rents. In conclusion, the Dutch auction is worth trying for top quality teas such as Darjeeling tea or the top quality ex-estate teas in Sri Lanka.

### 3.4 Competitive Conduct: The Practice of Lot Division

Lot division is as old as the tea trade itself, a fact that speaks for itself, some teamen claim. Yet to the layman, the practice of lot division appears to be a gentleman-like and nonchalant art of collusion. Lot division is a bidding practice which permits two or three tea buyers to submit a joint bid and, in case the lot is knocked down to the couple or triumvirat, to share the lot.<sup>70</sup> Far from being a malpractice, lot division is approved by most tea traders' associations. Clearly, lot division concerns the conduct of the tea community and hence the ultimate performance of the sub-sector as a whole.

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<sup>67</sup> McAFFEE / McMILLAN, p.726.

<sup>68</sup> VICKREY, p.22.

<sup>69</sup> see McAFFEE / McMILLAN, p.729.

<sup>70</sup> In the Cochin auction in Kerala, South India up to four bidders may divide a lot depending on the size of a lot.



How does lot division work in practice? There are several variants. At the beginning or during the bidding process, one buyer may turn to another bidder and publicly ask him whether he is willing to share a lot. If the latter agrees, the former refrains from bidding, while the latter continues to increase the now joint bid. Either of the partners may back out of the informal agreement if the ascending bids exceed his willingness to pay. New bidding coalitions may then form. A slightly different variant is that the deal is struck near the equilibrium price. For instance, when the price converges towards equilibrium, three bidders will remain and eventually only two: instead of pushing up the price, the two competitors may agree to divide the lot.

The author's observations suggest that lot divisions are very frequent practice in the London auction, particularly between smaller buyers and big buyers. Divisions are also very common in the Colombo auction<sup>71</sup>: surprisingly, even big, i.e. financially potent buyers frequently share lots. In particular, BROOKE BOND and LIPTON share lots whenever they can. The sharing of lots is also permitted in the Indian auctions: notably in the hectic Indian 'bazaar' auctions with its many small domestic buyers, divisions are the rule rather than the exception. By contrast, there is no lot sharing among buyers in the Jakarta auction.

We now turn to the analysis. The two questions which are of interest here are whether lot division leads to lower producer prices (c.p.), and whether allocative efficiency is impaired.

The *prima facie* diagnosis is straightforward: lot division reduces bidding competition. What is the effect of less competition on the expected price? A proposition of auction theory is that as the number of bidders decreases, the expected price to the seller decreases as well (given the assumptions of the basic model).<sup>72</sup> This proposition has been confirmed by empirical studies on contract bidding.<sup>73</sup> Some tea traders argue, however, that the practice of lot division does not, on average, bias prices downward, but rather leads to less price volatility. Otherwise, it is claimed the auction would tend to start bullish because those buyers who are faced with the risk of not fulfilling their orders, would seek to purchase their requirements in the beginning of the auction. The pressure on prices would then subside in the course of the auction. Thus, auction sellers at the end of the queue would be disadvantaged *vis-à-vis* preceding sellers. In essence, this argument holds that lot division reduces the risk with respect to needed quantities. But if the quantity risk is greater without lot division the tea buyers would have to bid more aggressively. Thus, expected prices would tend to be higher.<sup>74</sup>

It has been argued that lot division strengthens competition and sustains prices rather than undermining competitive pricing.<sup>75</sup> Without the possibility of sharing lots, small buyers would not be able to compete at all, because their principals require only a portion of a lot (i.e. a few

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71 This observation refers to the auction of the ex-estate catalogues.

72 McAFFEE, McMILLAN, p. 711.

73 McAFFEE, McMILLAN, p. 729.

74 Furthermore, since tea auctions are 'repeated games', it is hardly credible that the tea buyers would not learn to take advantage of any downward bias in tea prices.

75 see UNCTAD, p.13.

chests of tea). In other words, the average lot size constitutes a market entry barrier for small competitors. This argument would, however, lead one to recommend smaller tenders rather than lot division. Furthermore, this argument does not justify lot divisions among large buyers which frequently occurs.<sup>76</sup>

A third argument contends that if lot splitting was not permitted, lots would be divided after prices are knocked down. This practice would, in turn, foster suspicion of outright collusion among bidders. Therefore, lot division helps to guarantee that pricing and sharing of lots is overt and not covert. This argument sounds apologetic. However, the English auction is particularly vulnerable to collusion among bidders. Of course, the practice of lot division is not an antidote to tacit agreements among buyers (based on mutual restraint in bidding activity) but it serves as a disincentive to collude and it definitely contributes to the transparency of auction pricing.

So far, the comparative-static "with-without" comparison suggests that, on balance, the practice of lot division depresses auction prices, collusion aside. Whether the price effect is significant or negligible, remains an open question. In the short-run (where the supply curve is inelastic), there is no indication that lot division distorts the auction allocations from PARETO-optimal results: those bidders with the highest willingness to pay claim the item. In the long-run, however, lower auction prices may lead to a deadweight welfare loss attributable to inefficiencies caused by a change in output.

The above conclusion hinges on the assumption that abolishing the practice of lot division would not affect the transaction costs (i.e. the cost of auctioning tea). Clearly, this is not the case. One alternative to lot divisions is to decrease the lot size. This step would cause considerable costs in terms of additional sampling, tea tasting, bidding time, invoicing etc. To illustrate, in Colombo, the trade is proud to finish the tea auction within two days. If the lot size were halved, the managing directors, who in most cases do the bidding personally, would have to spend even more time in the arena. In short, smaller lots would reduce the technical efficiency of the auction system. Hence, abolishing the practice may possibly lead to higher auction prices (c.p.). On the other hand, the marketing costs of the auction system (brokering etc.) would definitely be higher. These costs are deducted from the auction prices to arrive at the producer price. Both effects are countervailing with respect to the derived producer prices. Thus, on balance, the tea producer has not much to gain (if at all) from a change of the current auction system.

### 3.5 Market Structure and Performance

So far, the analysis of the tea auctions was general in character. To differentiate, however, the tea auction centres which constitute the world tea market will be surveyed in turn in an attempt to diagnose their competitive performance.

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<sup>76</sup> JAYAWICKRAMA, p.68.

There are currently 13 tea auction centres worldwide: Seven in India, one in Sri Lanka, one in Kenya, one in Indonesia, one in Bangladesh, one in Malawi, and one in the United Kingdom. Some tea auctions have ceased to exist, notably in Europe, reason enough to give a brief historical overview on the rise and fall of the auction centres.

The **London auction**. The oldest tea auction is the London auction, opened in 1839.<sup>77</sup> In the beginning, tea auctions were held once every four months and the tea was knocked down 'by the candle': the hammer fell when a certain portion of a candle had burnt down.<sup>78</sup> Times have changed and the auction is now held weekly on Mondays.<sup>79</sup> As an innovation in the tea trade, the London landed auction has been supplemented by the London offshore auction (on f.o.b. terms), launched in 1982.<sup>80</sup> Whereas in the landed auction, the packages are stored in bonded warehouses in the UK, the offshore catalogues tea is sold container-wise on an afloat basis. The tea is en route to Europe or North America during the auction (the port of destination is stated in the tea catalogue).<sup>81</sup>

The London auction and the Mombasa auction are the only auctions in the world where, traditionally, teas from different origins are auctioned. Until the 1960s, the London auction used to be the market place, where the world tea price was determined and had a meaning (i.e. the London auction average of all origins).<sup>82</sup> Yet, the London auction lost ground to the overseas auctions both in absolute and in relative terms, notably during the past decade. At the end of the 1970s, London auction sales were around 100,000 tons, but in the 1980s the turnover fell dramatically to 63,000 tons in 1985, and to 52,000 tons in 1990. In 1965, nearly 30 percent of the tea auctioned worldwide came under the hammer in London (at that time almost the same share was auctioned in Colombo). By 1990, the auction centres in the developing world had become fully 'emancipated', leaving only 5 percent of the turnover to London (see Fig. 1). In 1965, tea from 17 different countries was consigned to London and even in 1990, the number was 13. The bulk of the tea auctioned in London is Kenyan tea (42 % in 1990).<sup>83</sup>

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77 CTTA, p.58.

78 FORREST (1973), p.37.

79 There is a traditional weekly sequence of auctions around the globe whose price development the traders follow in order to establish their market assessment (see the remarks on the common-value environment).

80 FORREST (1985), p.128.

81 UKTA, pp.18ff.

82 FORREST (1985), p.128.

83 J.THOMAS (1990), p.82.

Figure 1: The Decline of the London Tea Auction

|   | 1965 | 1970 | 1975 | 1980 | 1985 | 1990 |
|---|------|------|------|------|------|------|
| London Auction Sales ('000 mt)                              | 162  | 109  | 99   | 95   | 63   | 52   |
| World Auction Turnover ('000 mt)                            | 569  | 558  | 641  | 706  | 929  | 972  |
| Quantity auctioned in London in % of World Auction Turnover | 29   | 20   | 15   | 13   | 7    | 5    |

Note: London auction sales include offshore sales  
Source: UNCTAD, p.5; J. THOMAS, "Tea Statistics" (1990), p.92.

The decline of the London auction has a number of causes. One is the changing pattern of tea imports worldwide with the consumption share in the developing countries growing considerably. However, the London auction has a number of distressing disadvantages, which suggest that it is doomed to die:

- Firstly, the producing countries face price (level) risk as well as foreign exchange risk from the moment the vessels leave the port until the proceeds are finally remitted to the country of origin. The time lag may be as much as four months.
- Secondly, the London auction sales involve outlays in hard currency, which are not incurred if the tea is auctioned in the domestic market.<sup>84</sup> These expenses include stevedoring and warehousing in the UK, as well as the fees for the selling broker in London, financing costs etc.
- The London auction is unique from a bargaining point of view. The producing countries are strategically in an extremely unfavorable position since after having shipped the tea to the London terminal market, they will, eventually, have to accept any price.
- The chances to be 'exploited' in the London auction are, of course, less if the market is competitive.<sup>85</sup> Competition mobilizes the force of arbitrage, which would tend to guarantee inter-regional equilibrium prices. This is the background of the following citation: "*In Sri Lanka today there is considerable debate as to whether shipping teas to London is beneficial to the country. This results from a general feeling that the return to the producer is lower on London auction teas. However, on balance, it appears that for comparable invoices of tea it makes little difference where the tea is sold. As the level of prices in each auction centre moves toward equilibrium, it cannot be said that a better price can*

<sup>84</sup> see UNCTAD, p.7.

<sup>85</sup> It is only fair to speak of exploitation, since some tea traders refer to the London auction as the 'London slaughter house'.

*consistently be obtained in one auction centre over another.*"<sup>86</sup> However, the market structure in the London auction is far from competitive: rather, an oligopoly with a minor fringe of competing bidders dominates the market. The four-firm concentration rate among tea buyers with respect to their off-take in the London auction was around 73 percent in 1988, which was higher than comparable figures in major overseas auctions (see Fig. 2). In addition, there is only a small number of (potentially) active buyers.

The **Indian auctions**. The oldest Indian tea auction is the Calcutta auction, established in 1861. A few days before independence in 1947, the Cochin auction in the South-Indian state of Kerala was launched. Beginning in the 1960s, a process of decentralization and specialization among auction centres set in.<sup>87</sup> In 1963, a tea auction was started in Coonoor in the Nilgiri mountains in the state of Tamil Nadu, South India. Both Cochin and Coonoor are supplied from the same production area, but moving auctions closer to the 'source' is advantageous to the producer because it improves his liquidity. Coonoor has traditionally been a domestic market, whereas Cochin is both an important export centre and a domestic market place. Next came the Amritsar tea auction (1964) in the Punjab. In 1970, another tea auction was launched in Gauhati in Assam, and in 1976 an auction was set up in Siliguri in the Terai, West Bengal. The youngest Indian tea auction, Coimbatore in Tamil Nadu (opened in 1980) is an off-spring of Cochin, specializing in small lots. In terms of turnover, the Gauhati auction is the biggest Indian auction (29 % of total auction sales in 1990), the second place is held by Calcutta (26 %) and number three is Siliguri (18 %).<sup>88</sup>

In tea circles, the Calcutta auction is considered very competitive on the buyer's side. With respect to the Siliguri auction, the Chairman of the Tea Auction Committee complained about what he referred to as the "*syndication of buying*".<sup>89</sup> In Siliguri, there is a tendency of ever fewer tea buyers of bundling the orders of several principals. The Chairman claimed that this concentration weakened the market forces (i.e. led to lower prices through market power). A striking feature of the Cochin auction was the dominance of the Soviet Union in the so-called leaf sale, i.e. tea mainly destined for export. The buying agents of the Soviet Union held a cumulative market share of nearly 50% in the first half of 1990 (see Fig. 2). Although the agents did not share lots, there was clearly a lack of competition.

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<sup>86</sup> CIDA / GOVERNMENT of SRI LANKA (1979), Vol. III, p.37. A WORLD BANK study comes to conclude: "*Despite the market structure discussed, the process of price arbitrage for tea seems to work very well across major auction markets.*" CHUNG, UKPONG, Appendix I, p.5. However, it has been shown in "*The Twists in the Indian Tea Policy*" that for certain Assam teas price arbitrage is not effective between the Calcutta auction and the London auction.

<sup>87</sup> FORREST (1985), p.33.

<sup>88</sup> J. THOMAS, p.89.

<sup>89</sup> CTTA, p.174.



Figure 2: Buyer Concentration in Selected Tea Auctions

|  | Offtake<br>in<br>mt    | Offtake<br>in %<br>of total | Four- Firm-<br>Concentration-<br>Ratio | Total<br>Number<br>of<br>Buyers |
|--|------------------------|-----------------------------|--|---------------------------------|
| <b>Mombasa (1988)</b>  |                        |                             |  |                                 |
| Biggest Buyers   | James Finlay           | 15,567                      | 20                                     | 38                              |
|  | Brooke Bond            | 7,353                       | 10                                     |                                 |
|  | Juja Coffee Exporters  | 7,007                       | 9                                      |                                 |
|  | E.A. Tea Exporters     | 6,816                       | 9                                      |                                 |
|  | Van Rees               | 4,845                       | 6                                      |                                 |
|  | Lipton                 | 4,502                       | 6                                      |                                 |
| Total Sales  | 77,038                 | 100                         |  |                                 |
| <b>Colombo (1990)</b>  |                        |                             |  |                                 |
| Biggest Buyers   | Akbar Brothers         | 21,197                      | 10                                     | 36                              |
|  | Stassen Exports        | 20,191                      | 9                                      |                                 |
|  | Unilever               | 18,511                      | 9                                      |                                 |
|  | Jafferjee Brothers     | 17,096                      | 8                                      |                                 |
|  | Hebtulabhoy Co.        | 15,935                      | 7                                      |                                 |
|  | M.J.F. Exports         | 11,489                      | 5                                      |                                 |
| Total Sales  | 215,214                | 100                         |  | 55                              |
| <b>London (1988)</b>   |                        |                             |  |                                 |
| Biggest Buyers   | Brooke Bond            | n.a.                        | 29                                     | 73                              |
|  | Lyons-Stansand         | n.a.                        | 32                                     |                                 |
|  | Meriden-Typhoo         | n.a.                        | 6                                      |                                 |
|  | Coop                   | n.a.                        | 6                                      |                                 |
|  | Thompson, L. & E.      | n.a.                        | 8                                      |                                 |
|  | J.W. Clark             | n.a.                        | 2                                      |                                 |
| <b>Jakarta (1989)</b>  |                        |                             |  |                                 |
| Biggest Buyers   | Intraport (Unilever)   | n.a.                        | 23                                     | 59                              |
|  | Padakersa              | n.a.                        | 16                                     |                                 |
|  | Primacomexindo         | n.a.                        | 11                                     |                                 |
|  | F. Nanlohy             | n.a.                        | 9                                      |                                 |
|  | Indoham                | n.a.                        | 7                                      |                                 |
|  | Sinar Maluku           | n.a.                        | 5                                      |                                 |
| <b>Cochin (Jan-Jun 1990)</b>   |                        |                             |  |                                 |
| Biggest Buyers   | Russian Buyers         | 2,857                       | 48                                     | 72                              |
|  | Brooke Bond            | 587                         | 10                                     |                                 |
|  | Kesaria Tea Co. et al. | 478                         | 8                                      |                                 |
|  | A. Tosh                | 368                         | 6                                      |                                 |
|  | Vora Brothers          | 243                         | 4                                      |                                 |
|  | Tea Trading Corp.      | 219                         | 4                                      |                                 |
| Total Sales  | 5,989                  | 100                         |  | 57                              |
| Notes: Four-Firm Concentration Ratios are calculated as the cumulated purchases of the largest 4 buyers in % of total sales (see SCHERER, p. 56). Cochin: Leaf sales only, i.e. tea destined for export<br>Sources: Africa Tea Brokers Ltd., Mombasa; Forbes & Walker, Colombo; Thompson, LLOYD & Ewart, London; P.T. Unilever, Jakarta; J. Thomas & Co., Cochin |                        |                             |  |                                 |

The **Colombo auction**. The Colombo tea auction was established in 1883 and figures as by far the most active auction in the world with a turnover of 217,000 tons in 1990.<sup>90</sup> By comparison, annual sales in Gauhati, Calcutta, and Mombasa were in the order of 120,000 to 140,000 tons. The Colombo auctions are held on Mondays and Tuesdays followed by the Jakarta auction on Wednesdays. The logic of this arrangement is that Ceylon tea (particularly mid-grown) and Indonesian teas are closer substitutes than tea of any other origin.<sup>91</sup> Jakarta auction pricing is therefore geared to the Colombo auction. The Colombo auction is, by any standard, very competitive. In 1990, the four biggest buyers claimed only a little more than a third of the auction turnover. In my own judgement, there is active bidding on each individual lot.

The **Jakarta auction**. The Jakarta auction has three predecessors, one in Amsterdam, one in Antwerp and the third in Hamburg. The Amsterdam tea auction was held until 1958 and then stopped.<sup>92</sup> The antecedent event was the nationalization of the Dutch-owned tea estates in Java and Sumatra by the newly independent state of Indonesia, the former Netherlands East India.<sup>93</sup> As the Dutch were expropriated without compensation, the Dutch Government threatened to seize any shipment of tea destined for Holland.<sup>94</sup> This decision put an end to the Amsterdam auction. Antwerp and Hamburg both stood in breach to auction tea of (exclusively) Indonesian origin, which was eventually shipped to the UK. Interestingly enough, the major buyers in Hamburg were not the German tea traders but the Dutch, who had traditional connections to the island. The Hamburg tea auction was launched in 1960 and closed in 1965. The Antwerp auction had a longer life, lasting from 1959 to 1975.<sup>95</sup>

The initiative to establish a tea auction in Jakarta came from LIPTON, a transnational corporation, which is now part of the UNILEVER concern. Previously, the Indonesian tea market had been extremely intransparent, and LIPTON made its further engagement in the Indonesian tea industry conditional on a weekly auction.<sup>96</sup>

Is the Jakarta auction a competitive auction? Judging from the concentration figures, the auction appears to be modestly competitive. The four biggest buyers held a cumulative market share of roughly 60 percent in 1989. The total number of buyers is small relative to other auction centres (see Fig. 2). The aggregate concentration figure is, however, misleading and overstating the actual competitiveness of the auction. The reasoning that follows tends to hold also the other auction centres:

- Market imperfections. The inhomogeneity of tea leads to market segmentation (or submarkets) within the tea auctions. The tea buyers have different requirements with respect to tea quality and grade depending on their customers' preferences. Thus,

<sup>90</sup> J. THOMAS, p.92.

<sup>91</sup> The tea offered on the Colombo and the Jakarta auctions is mainly orthodox tea.

<sup>92</sup> FORREST (1985), p.108.

<sup>93</sup> ETHERINGTON (1974), p.89.

<sup>94</sup> Information by W. WARNECKE, Jakarta.

<sup>95</sup> FORREST (1985), p.108.

potential competitors operating in the auction may not compete at all. PORTER pointed out that indicators of the overall industry structure may conceal actual market power: "*An industry need not be concentrated overall for a particular strategic group to have enormous market power*".<sup>97</sup> Market segmentation is one important reason why in the Jakarta auction the average number of bids per lot is only around 1.5! This means that, on average, for half of the offered lots there is only one bidder who is interested in buying, and for the other half there are two 'competing' bidders.<sup>98</sup>

- Principals in disguise. The percentage off-take of individual agents (bidders) in the auction is misleading if several agents serve one principal. To explain, in the Jakarta auction there were three agents acting as appointed exporters on behalf and in favor of the former Government of the USSR. Likewise, the Government of Egypt has three agents in the auction. These exporters never compete against each other if the buying order comes from the same principal. In fact, in the cases of the USSR and Egypt, they are taking turns. Since the USSR and Egypt are the two biggest importers of Indonesian tea<sup>99</sup>, the concentration of buyers is greater than the statistics imply.
- Collusion among bidders. The practice of lot division is not known in the Jakarta auction. Instead, disconcertingly, the bidders collude openly in front of the auctioneer. To illustrate, if there are two lots of comparable quality, one bidder may turn to another potentially interested bidder and indicate his disinterest for the up-coming lot if he may have the present one. Not surprisingly, both lots are knocked down at identical prices.

The **Singapore auction.** A short-lived experiment was the Singapore tea auction, which was started in 1981. Again, the initiative came from LIPTON. The auction was conceived as a market place for tea originating in different countries.<sup>100</sup> Even China was initially considering to auction tea in Singapore, but the Government withdrew its support thereafter. The offers came mainly from India and Kenya, but no chest came, according to official records, from Indonesia and Sri Lanka. The experiment was discontinued in 1986 due to lack of turnover.

The **Mombasa auction.** The Mombasa auction is not only Kenya's tea auction. The East African countries of Tanzania, Uganda, Burundi, Rwanda, and Southern Zaire use the Mombasa auction for price discovery and as a distribution channel. In 1970, the auction centre was moved from Nairobi, which had been established in 1957, to Mombasa.<sup>101</sup> The four-firm concentration ratio (1988) was almost 50 percent on the buyer's side which was higher than in Colombo (1990). Compared with other auction centres, however, buyer concentration in Mombasa is relatively low. There is a large number of (potentially) active

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<sup>96</sup> Information by W. WARNECKE.

<sup>97</sup> MICHAEL PORTER quoted in MARION, p.243.

<sup>98</sup> Based on the author's observation in August 1991 and evaluation of auctions.

<sup>99</sup> J. THOMAS (1990), p.104.

<sup>100</sup> LIPTON runs a blending and packing factory in Singapore, which supplies the East Asian region, hence LIPTON interest.

<sup>101</sup> FORREST (1985), p.80.

buyers, with the major buyers being UK-based corporations (such as James FINLAY, BROOKE BOND, LIPTON).

The **Chittagong auction**. The Chittagong tea auction was already established in 1949, long before the partition of the country.

The **Limbe auction**. Since 1970 Malawi runs a domestic auction which is located in Limbe.

The author's assessment of the impact of concentration on performance (in terms of efficiency) is that it matters who the dominant buyers are. To see why, consider the (Cochin) tea auction prices: they were (up to a specific point) a function of the buying pattern of the dominant buyer, formerly the Soviet Union. An erratic buying pattern is likely to cause market instability and allocative inefficiency. This argument holds whether the buying agents represent private enterprises or governments. However, notably the state-trading, autarky-oriented countries such as the former Soviet Union burden the international markets with (demand) shocks caused by domestic macroeconomic instability, whereas the large multinational enterprises tend to pursue a steady and long-term buying policy (of course they, too, are subject to the fortunes of the stability and growth of the consumer markets). Furthermore, the dominant state-trading countries are in a position to exert leverage. In fact, some are in a position to "manipulate" the terms of trade in their favor. The leverage is not visible in the auctions. So far, no cases have been reported to the author in which the market has been rigged by a large buyer. Some of these countries are, however, able to influence the terms of trade by negotiating for soft credit terms, a favorable accounting rate of exchange, reciprocal trading agreements etc.<sup>102</sup>

### 3.6 Market Entry

According to the Chicago School of antitrust analysis, four-firm concentration ratios, as calculated for the tea auctions, serve purely descriptive purposes. They are meaningless with respect to the distributive performance of the subsector. Market concentration indicates superior efficiency of the few large and dominant firms compared to the fringe of small enterprises. Superior efficiency, in turn, determines market structure. In effect, the Chicago School postulates a performance-influences-structure paradigm, thereby rejecting any structure-performance linkages.<sup>103</sup> But as the analysis of the tea auctions has shown, Chicagoans

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<sup>102</sup> see Twists in the Indian Tea Policy. Note the concerned statement in a Sri Lankan tea market report at a time when prices were extremely depressed: "It is also reported that the Russian buyer had been fairly active at the Calcutta auction last week mainly due to a bilateral agreement between the two countries concerned. It is most unfortunate (emphasis, T.F.) that an offer of six months credit to this buyer (by the Government of Sri Lanka, T.F.) had not been viewed with favour, and in turn they have diverted their attention to the Indonesian market who had granted them a 12 month credit period." See FORBES & WALKER, "Weekly Tea Market Report", Sale No.27, 15th/16th July, 1991, p.6.

<sup>103</sup> SINGLETON, pp. 47-48. By contrast, the traditional structure-conduct-performance approach is a "two-way-street" in the sense that structure determines (together with conduct) performance, but performance feeds back on industry structure.

would definitely commit a fallacy by ignoring the implications of the institutional and structural (auction) market characteristics.

In the same vein, Chicagoans would argue that:

- Even if concentration ratios are considered relatively high (e.g. as compared to other subsectors) the tea auctions will not be the *relevant* market for measurement since the distributive alternative of private sales is not taken into account (this point needs further scrutiny, see Chap. 5).
- Secondly, pricing and distributive efficiency of the auctions are ascertained by the absence of barriers to market entry, even more so in the long-run.

In fact, the issue of barriers to market entry is pivotal to the Chicago School of thought. A central premise of the "contestable market" paradigm is the absence of entry barriers other than those established through government intervention.<sup>104</sup> A case in point is the seller's side of the tea auctions: vivid competition on the buying side (in a number of auction centres) stands in striking contrast to the cemented market structure on the selling side, a consequence of government policy. The persistently small number of selling brokers (the auctioneers) is a phenomenon pervasive in most auction centres.

A selling brokers' cartel? Consider the statement of a North Indian tea producer: "*I feel that for the auction to be more successful you also need more competition among brokers (i.e. selling brokers, T.F.). In the last 100 years, possible, no new brokers have come. The last broking company was probably formed 50 or 60 years ago. I would say that to have 8 brokers or so for a place like Calcutta would be too uncompetitive a situation.*"<sup>105</sup>

The facts: In Colombo, a total of seven selling brokers had average sales of 31,000 tons in 1990. By comparison, the biggest tea buyer purchased 21,000 tons and, on average, each buyer bought only 4 tons. Broker companies in Calcutta, Cochin, and London were, on average, substantially smaller in terms of turnover than in Colombo (see Fig. 3). Whereas merchants and agents have essentially free market access to the buying side of the auction, the incumbent broking companies are sheltered from would-be competitors by government (TEA BOARD) decree. The privileged position of the brokers has led to complaints on the part of exporters but it is not clear how admission to the selling brokers' cartel is obtainable. Selling brokers are free to exit the market. In London, the number of selling brokers has decreased drastically with the decline of the London auction.<sup>106</sup> The four remaining selling brokers had an average turnover of 12,000 tons in 1988. However, some broker companies are also active as buying brokers. Thus, it happens that the auctioneer knocks down a tea lot to a bidding colleague seated next to him on the podium.

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<sup>104</sup> SINGLETON, p. 43; SCHMIDT (1987), p. 24.

<sup>105</sup> CTTA, p. 177.

<sup>106</sup> UNCTAD, p.9.

Figure 3: The Auction Sales of the Selling Brokers

| Auction Centre                    | Colombo | Calcutta | Cochin | London | Mombasa |
|-----------------------------------|---------|----------|--------|--------|---------|
| Number of Selling Brokers         | 7       | 8        | 6      | 4      | 3       |
| Annual Auction Sales in '000 mt   | 217     | 129      | 52     | 49     | 77      |
| Ratio of Sales per Selling Broker | 31      | 16       | 9      | 12     | 26      |
| Turnover of Biggest Buyer         | 21      | n.a.     | n.a.   | 14     | 16      |
| Average Turnover of Buyers        | 4       | n.a.     | n.a.   | n.a.   | n.a.    |

Note: Figures for Colombo, Calcutta, Cochin relate to 1990, otherwise 1988.  
Sources: ITC (1988), pp.126 ff; J.THOMAS, p.92.

Returning to the buyer's side, another question deserves consideration: Are barriers to markets entry actually non-existent? In a technical sense, there are indeed virtually no horizontal barriers to potential auction bidders. However, the multinational corporations such as UNILEVER (BROOKE BOND and LIPTON) are (partially) vertically integrated entities which might in effect restrict opportunities to sell for would-be bidders. Note the attribute partial because vertical integration, as defined by PERRY, "is the elimination of contractual or market exchanges, and the substitution of internal exchanges within the boundaries of the firm"<sup>107</sup>.

Hence, it might be argued that there are indirect horizontal market entry barriers which are a consequence of (partial) vertical integration and other forms of vertical control. In this instance, representatives of the Harvard School of thought, Chicagoans as well as transaction costs economists would (presumably) unanimously reject the notion of barriers to entry: for as long as tea is channelled through spot markets there is no market foreclosure. Vertical integration as such is defended on the grounds that enterprises (partially) integrate vertically if internal transactions promise to be more efficient than market transactions. Vertical integration is therefore considered a manifestation of efficiency, rather than restrictive business practices.<sup>108</sup>

<sup>107</sup> PERRY, p. 185.

<sup>108</sup> SCHMIDT (1987), p. 24.



## 4. The Tea Economies of Indonesia and Sri Lanka

This purely descriptive chapter serves as the background for the comparative analysis of auctions versus private contracts in the up-coming chapter 5. As noted already, Indonesia and Sri Lanka represent polar cases among the tea producing countries with respect to the use of auctions (i.e. those countries that use tea auctions at all).

### 4.1 Tea Production and Export Marketing in Indonesia

**Production.** Presumably, Indonesia does not come to mind immediately when you think of tea. Yet, in 1989, Indonesia figured as the fifth largest tea producer in the world with a production of 150,000 tons. In colonial times, when Indonesia was still the Netherlands East Indies, tea was one of many plantation crops established on the islands.<sup>109</sup> The tea plant was brought to Java from China by the Dutch East India Company, commonly known by its Dutch initials VOC (*Vereinigden Ostindischen Compagnie*). Tea production started in West Java in the 1820s, a few years earlier than the British East India Company set out to plant tea bushes in Assam.<sup>110</sup> As of today, there are only two islands in the Indonesian archipelago, on which tea is cultivated: Java and Sumatra.

Initially, the tea plantations were state-owned and managed by civil Servants. Whence came the plantation labourers? Following the British interregnum in the East Indies under Sir Stamford RAFFLES (1811–1816), the colonial government introduced a ruthless system of forced labour, the so-called *Cultuurstelsel* system. Under this system, a land tax was levied on the peasants, which in effect forced the tillers to surrender their labour or part of their land, since tax payment was not permitted in kind. The exploitive system stimulated critique in Holland and was eventually abandoned in 1865.<sup>111</sup> Thereafter, the privatization of the plantation sector began in Netherlands East India.<sup>112</sup> The *Cultuurstelsel* system was replaced by a system of indentured or bonded labour. In Sumatra, for instance, Bataks, Javanese, Malays, Chinese and other ethnic groups were indentured as so-called contract coolies. Once under contract, the coolies virtually spent a slave-like existence, from which there was no escape.<sup>113</sup>

In 1957, a few years after Indonesia's independence, President SOEKARNO decreed the nationalization of the plantation sector. Then, in 1966, the now President of Indonesia, SOEHARTO, seized power and immediately started to revamp the economic policy, which

<sup>109</sup> For instance, the famous Sumatra cigar stemmed from DELI, the planter colony in Northern Sumatra east of the city of Medan.

<sup>110</sup> VOLLERS, p.26.

<sup>111</sup> To put these events in historical perspective, slavery was abolished in the British empire in 1833. Yet, in the USA the dispute over slavery led to the American Civil War, and it was not before 1865 that slavery was abolished in the Southern States. See BROCKHAUS, Bd.17, p.50.

<sup>112</sup> ETHERINGTON (1974), p.85.

under SOEKARNO had proved to be a total failure.<sup>114</sup> In the wake of SOEHARTO's "New Order" policy, the holdings of the expropriated foreign investors, save the Dutch, were eventually returned (in the period from 1967 to 1972). As of today, there are three foreign-owned plantation companies, which are controlled by two British concerns and a Belgian holding.<sup>115</sup> By Indian standards, the foreign interest in Indonesia's tea production is negligible.<sup>116</sup>

In the private sector, in addition to foreign-owned tea estates, there are tea plantation companies which are owned by Indonesian corporations. Altogether, in 1987, the private tea estate sector contributed some 16% to national production (see Fig. 4). In terms of area and production, the smallholder sector was larger than the (formal) private sector. In 1987, the smallholders produced some 20% of total output. However, smallholder production and hectare figures should generally be considered only as crude estimates for the following reasons:

- Smallholders do not usually cultivate tea as a monoculture: the 'tea area' is in fact a mixed cropping system interspersed with tea bushes.<sup>117</sup>
- An unknown portion of their green leaf production is sold to private and government estates (bought leaf). Part of the smallholder production is thus hidden in the estate production figures.

Smallholder tea production exists only on Java with a concentration in West Java. The smallholders' tea manufacturing and marketing company is TEHNUSAMBA, a para-statal company which runs four factories (so-called 'bought leaf' factories).

The state sector. Indonesian tea production is dominated by state-owned plantation companies, the P.T.P.s, as they are customarily called. In Bahasa Indonesia the acronym P.T.P. stands for *Perseroan Terbatas Perkebunan*, which means Limited Company Estate. Although the P.T.P.s are state-owned enterprises, they now operate under the commercial code as (public) limited companies.<sup>118</sup> The control of the P.T.P.s is part of the portfolio of the Ministry of Agriculture / Directorate General of Estates. Each of the P.T.P.s has a President Director and a Commercial Director, a Production and a Planning Director, whose performance is subject to a supervisory board, the Board of Commissioners.

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<sup>113</sup> A stirring account on the lives of the contract coolies in Deli is Ladislao SZEKELY's semi-autobiographical novel *Tropic fever*, Oxford University Press, 1989.

<sup>114</sup> BARICHELLO, pp. 194-195.

<sup>115</sup> P.T. TATAR ANYAR INDONESIA (2500 ha), owned by a British holding company; P.T. LONDON-SUMATRA INDONESIA, formerly HARRISONS CROSFIELDS (600 ha); P.T. SIPEV INDONESIA (1850 ha), a Belgian holding.

<sup>116</sup> Based on information compiled in Indonesia.

<sup>117</sup> ETHERINGTON (1974), p.92.

<sup>118</sup> ETHERINGTON (1974), p.90.

Figure 4: Tea Production in Indonesia

| Area  | 1984             |               | 1987             |               |
|---|------------------|---------------|------------------|---------------|
|   | ('000 ha)        | (in %)        | ('000 ha)        | (in %)        |
| Total   | 118              | 100           | 121              | 100           |
| State sector  | 46               | 39            | 48               | 40            |
| Private sector, of which  | 73               | 61            | 73               | 60            |
| Smallholdings (Java)  | 51               | 43            | 50               | 42            |
| Private estates   | 22               | 18            | 22               | 18            |
| Estates on Java   | 48               | n.a.          | 58               | n.a.          |
| Estates on Sumatra  | 13               | n.a.          | 13               | n.a.          |
| <b>Production</b>   | <b>('000 mt)</b> | <b>(in %)</b> | <b>('000 mt)</b> | <b>(in %)</b> |
| Total   | 126              | 100           | 126              | 100           |
| State Sector  | 85               | 67            | 80               | 64            |
| Private Sector, of which  | 42               | 33            | 45               | 36            |
| Smallholdings (Java)  | 24               | 19            | 25               | 20            |
| Private estates   | 18               | 14            | 20               | 16            |
| Estates on Java   | 76               | n.a.          | 74               | n.a.          |
| Estates on Sumatra  | 26               | n.a.          | 27               | n.a.          |
| <b>World Production</b>   |                  |               |                  |               |
| Indonesia's Share   |                  | 5.8%          |                  | 5.4%          |
| Indonesia's Position  |                  | 7             |                  | 6             |
| Note: Number do not sum up to totals due to rounding. Regional figures do not add up to totals due to different source (ITC).<br>Source: Directorate General of Estates, "Statistical Yearbook of Indonesia 1989", pp.253-255; ITC (1989) |                  |               |                  |               |

In 1987, some 64 percent of the manufactured tea was produced by the P.T.P.s. There is a total of 31 P.T.P.s spread over Indonesia, only 7 P.T.P.s of which manufacture tea.<sup>119</sup> Each of the P.T.P.s manages several tea estates (plantations), most of which were formerly owned by the Dutch. The largest of them, P.T.P. XIII, which is located in the volcanic range around Bandung in West Java, manages 13 estates and in 1990 produced some 29.4 Mill. kgs of tea. P.T.P. VIII and P.T.P. XII were roughly on par in terms of production (24.5 Mill. kgs in 1990). The estates of P.T.P. VIII are concentrated in North Sumatra in the Lake Toba area, while the plantations of P.T.P. XII are located in West Java. By international comparison, we find that none of the above P.T.P.s is nearly as big as the largest Indian tea plantation company McNEILL & MAGOR (66 Mill. kgs in 1990); in terms of output they roughly equal the Indian tea production of the GOODRICKE concern. The remaining four tea producing P.T.P.s are P.T.P. XXIII in East Java, P.T.P. XVIII in Central Java, P.T.P. X in South Sumatra, and P.T.P. XI.

<sup>119</sup> Other important plantation crops include Arabica and Robusta coffee, cocoa, palmoil (Sumatra), rubber (Sumatra) and quinine from the chinchona tree. All of them were already plantation crops during the colonial rule.

By international standards, Indonesia's tea production showed a remarkable growth during the past two decades (see Fig.5). Production increased by 8.1 percent annually in the 1970s but in the 1980s growth slowed down to 4.4 percent. It has to be mentioned, however, that at the end of the 1960s Indonesian tea production had reached the lowest level since independence.<sup>120</sup> Interestingly enough, in 1970 Kenya started from about the same production level as Indonesia. Unlike Indonesia, Kenya sustained high growth rates also in the 1980s. As Figure 5 shows, Kenya is the number one (major) tea producer worldwide in terms of growth.

Both countries have considerably extended the area under tea during the period in question (by a factor of 1.9 in Indonesia and a factor of 2.2 in Kenya), although the extension in Indonesia took place almost entirely in the 1980s.<sup>121</sup>

The discrepancy in growth between the two countries in the 1980s is thus mainly due to different rates of productivity advances. Kenya steadily increased the productivity per hectare of tea land from one ton in 1980 to two tons in 1989, whereas Indonesia showed considerable fluctuation in land productivity rather than a steady upward trend (one ton per ha in 1988).<sup>122</sup>

Figure 5: The Growth of Tea Production in Selected Producing Countries

|            | Production in mt |         |         | Annual Growth Rates |         |
|------------|------------------|---------|---------|---------------------|---------|
|            | 1970             | 1980    | 1990    | 1970-80             | 1980-90 |
| Bangladesh | 31.381           | 40.037  | 45.100  | 2,4%                | 1,2%    |
| China      | n.a.             | 303.750 | 534.900 | n.a.                | 6,3%    |
| India      | 418.517          | 569.550 | 714.665 | 3,1%                | 2,3%    |
| Indonesia  | 44.048           | 98.697  | 153.000 | 8,1%                | 4,4%    |
| Kenya      | 41.077           | 89.893  | 197.008 | 7,8%                | 7,8%    |
| Malawi     | 18.732           | 29.915  | 39.059  | 4,7%                | 2,7%    |
| Sri Lanka  | 212.210          | 191.375 | 233.165 | -1,0%               | 2,0%    |

Note: Growth rates are calculated as average exponential growth rates. China production figure and growth rate refer to 1989.  
Source: Own calculations; J.Thomas (1990), "Tea Statistics", p.12.

In summary, Indonesia's growth performance in tea production is characterized by productivity increases per hectare of tea in the 1970s with the size of the tea area kept almost constant, and extensions in land for tea cultivation with productivity unchanged (on average) in the 1980s.

<sup>120</sup> ETHERINGTON (1974), p.90.

<sup>121</sup> J.THOMAS (1990), p.7.

<sup>122</sup> J.THOMAS (1990), p.10.

**Tea export marketing.** Indonesia is predominantly a tea exporter, therefore we shall focus on export marketing. During the 1980s the export share of tea was a fairly constant 70 percent, while total exports increased substantially (see Fig. 6). Indonesia's share of the world tea market was almost 10 percent during the last decade. Thus, Indonesia held its place as the world's fifth largest tea exporter. An increasingly important customer was, until recently, the USSR. The Soviet Union made its first modest appearance in the Indonesian market in 1985 but in the aftermath of the Chernobyl nuclear disaster imports boomed.

The sale of the tea originating from P.T.P. production is vested in the Head Joint Marketing Office in Jakarta, together with its regional dependences. Henceforth, it shall be referred to by the acronym K.P.B., which stands for *Kantor Pemersaran Bersama* in Bahasa Indonesia. Although officially the K.P.B. is responsible for the sales, the Managing Directors are still subordinate to the President Directors of the P.T.P.s.

Figure 6.: Indonesia's Tea Exports

|                                  | 1970 | 1980 | 1985 | 1988 | 1990 |
|----------------------------------|------|------|------|------|------|
| Production ('000 mt)             | 44   | 99   | 132  | 136  | 153  |
| Exports ('000 mt)                | 37   | 68   | 90   | 93   | 107  |
| Exports in % of Production       | 84%  | 69%  | 68%  | 68%  | 70%  |
| World Market Share               | n.a. | 8%   | 10%  | 9%   | n.a. |
| Exports to USSR in % of Exports  | -    | -    | 1%   | 7%   | 22%  |
| Auction Sales ('000 mt)          | n.a. | 46   | 39   | 35   | 33   |
| Auction Sales in % of Production | n.a. | 47%  | 29%  | 25%  | 22%  |

Source: J.THOMAS, "Tea Statistics", various issues. ITC, "Annual Bulletin of Statistics", var. issues.

There are two pricing mechanisms for the export of Indonesian tea: auction and private treaty. Unlike other auction centres, the Jakarta auction is an auction solely dealing with exports. The K.P.B. is the major seller in the weekly Jakarta auction, the remaining sellers representing THENUSAMBA and the private estate enterprises. In Indonesia, privately negotiated export contracts are referred to as free sales.

In trade theory literature, the exchange of goods and services among countries is broadly referred to as (international) trade. However, trade takes on different contractual forms, which increasingly influence the size and the direction of commodity exchange. The predominant institutional arrangements in the international tea trade are:

- Hard-currency settlement. In the tea trade, export contracts are mainly denominated in US-dollars and in Pound sterling.
- Countertrade. Countertrade is a reciprocal trading agreement between two governments to exchange goods (or services) without hard-currency exchange. It is a deal between governments in which commodities etc. of an agreed plafond of hard currency are

exchanged until the reciprocal purchase requirements are fulfilled. In the tea trade, the value of the counter-purchase requirements typically balance each other out. Technically, both governments open a so-called Clearance Letter of Credit in foreign currency.<sup>123</sup> Due to liquidity problems with respect to hard currency there is considerable demand for countertrade deals, notably in the South-South trade. For instance, in 1990 there were countertrade agreements between Indonesia and Iran and Iraq but no such agreement existed between the former USSR and Indonesia. The attempts of the Egyptian Government to enter on a countertrade deal with Indonesia have failed so far (Egypt was the second-largest importer of Indonesian tea in 1990).

- Barter trade. Barter trade is an exchange in which usually at least one party is a private trader or agent. Unlike countertrade agreements, mutual LCs (Letters of Credit) are opened and there is a reciprocal flow of hard currency. One party usually has, however, no need for the barter commodity. In that case a third party is involved, who receives the shipment. For instance, a trading company in Jakarta entered on a barter agreement of tea-against-cotton with the Republic of Usbekistan, the cotton being destined for East Asia.

A final remark concerns the regulation of exports in Indonesia. There are none that match India's or Sri Lanka's sophistication. From a bureaucratic standpoint, tea exports are less cumbersome in Indonesia. Moreover, there are no (relevant) foreign exchange controls.

## 4.2 Tea Production and Export Marketing in Sri Lanka

**Production.** Ceylon, or since 1972 Sri Lanka, is probably more than any other country in the world associated with tea. Yet, it is a misconception to conclude that Sri Lanka epitomizes a plantation tea economy:

- The contribution of bulk tea production to GNP was 2.5 percent in 1988 (at constant 1982 factor costs).<sup>124</sup> Not included in this figure is processed tea, so-called value-added tea (tea bags, packet tea, instant tea etc.). In terms of quantity, 36 percent of Sri Lankan tea exports took the form of value-added teas.<sup>125</sup> Processed commodities including tea, rubber, and cocoa added another 2.8% to GNP in 1988 (at constant 1982 factor costs).<sup>126</sup>
- Tax collections from the export duty and the ad-valorem auction sales tax on tea amounted to 2.4 % of total tax revenue of the General Treasury in 1988.<sup>127</sup> This figure

<sup>123</sup> For details on Letters of Credit see Annex.

<sup>124</sup> CENTRAL BANK OF SRI LANKA, pp.1,3.

<sup>125</sup> FORBES & WALKER (1988), p.32.

<sup>126</sup> CENTRAL BANK OF SRI LANKA, statistical appendix, Tab. 3.

<sup>127</sup> CENTRAL BANK OF SRI LANKA, p.115. In 1988, export duty collections equaled 5% of the total (fob) export value and the ad-valorem sales tax amounted to 2% of the export proceeds (the respective figures for 1989 were 2% and 3%), see SRI LANKA TEA BOARD, pp. 12,19.

understates the true tax contribution of the tea industry, however, since income tax is not included.

- In terms of its contribution to hard-currency earnings, the Sri Lankan tea economy is unsurpassed by its major competitors (see Fig. 7). In 1987, 26 percent of Sri Lanka's hard-currency receipts were from tea exports, but compared to 60 percent in 1960 the contribution has dropped considerably. In Kenya, by contrast, tea exports are gaining importance as a hard-currency earner: in 1987, the foreign exchange contribution was 21%, up from 13% in 1980.<sup>128</sup>

Figure 7: The Relative Dependence on Tea Export Earnings

|           | Tea Export Earnings in % of Total Export Earnings |      |      |      |
|-----------|---|------|------|------|
|           | 1960  | 1970 | 1980 | 1987 |
| Sri Lanka | 60  | 55   | 35   | 26   |
| Indonesia | -   | -    | -    | 0.7  |
| India     | 19  | 10   | 6    | 4    |
| Kenya     | -   | -    | 13   | 21   |
| Malawi    | -   | -    | 12   | 10   |

Source: IMF (1990), "International Financial Statistics Yearbook".

**Historical background.** Sri Lanka has a long colonial history, beginning with nearly 150 years of occupation by the Portuguese<sup>129</sup>, who were expelled and followed by Dutch colonialists for the next 150-odd years (1658 to 1796). Then came the British for another 150-odd years, before Ceylon becoming independent in 1948. During most of this time, Ceylon was famous for its cinnamon and its coffee. Even the British planters initially grew coffee rather than tea, which made Ceylon at that time one of the major coffee producers in the world.<sup>130</sup> The transformation of Ceylonese plantation agriculture towards tea production was caused by a pest called *Hemileia vastatrix*, the coffee rust (fungus). Within years, beginning in the 1860s, the coffee trees had to be up-rooted and the plantations were converted into tea estates.

In Sri Lanka, the majority of the plantation workers are natives of Tamil Nadu in South India. Originally they were migrant workers, who were needed in the coffee harvest on the plantations. With the rise of the tea industry in Sri Lanka, more and more Indian Tamils were imported and indentured as permanent, i.e. slave-like, labourers (bonded labour). "*The Indian labour was brought in and controlled by a class of middlemen, Kanganies, who were paid according to the number of workers reporting for work on an estate, who thus had a vested*

<sup>128</sup> It is customary since KUZNETS' work to denote the share, which the agricultural sector contributes to (food) production, market supply, factor supply and foreign exchange earnings of the economy as its contribution. The figures are purely descriptive and do not carry any normative connotation or degree of target fulfillment. See von URFF, pp.22-23.

<sup>129</sup> Hence so many Portuguese-sounding Sri Lankan names.

<sup>130</sup> FORREST (1985), p.45.



interest in making the harsh system work."<sup>131</sup> By contrast, the local Sinhalese population was unwilling to join the permanent labour force because the peasants had alternative income sources.<sup>132</sup> The Indian Tamils are a distinct socio-cultural section of the Sri Lankan society.<sup>133</sup> Although they speak the same language as the Sri Lanka Tamils (or Jaffna Tamils), who occupy the north and the east of the island, and although they are both Hindus, the Indian tamils are mainly lower caste Hindus -- the rigid caste system was one reason why their ancestors left South India. With Sri Lanka's independence, the social and political situation of the Indian Tamils immediately deteriorated when the Sinhalese government declared them as a state-less people without franchise. In 1964, the Indian Tamils were subject of the SIRIMA-SHASTRI Pact<sup>134</sup> between Sri Lanka and India, in which it was agreed to repatriate 525,000 families, to naturalize 300,000 families in Sri Lanka, and to divide the remaining 150,000 families ten years later. Nevertheless, the fate of tens of thousands of Indian Tamils remains unresolved even today.<sup>135</sup> The Indian Tamils currently represent nearly one million people out of 17 million.

Labour recruitment in Sri Lanka was similar to that in Assam, where the majority of the plantation workers have come from Bihar and Bengal (due to labour shortage in Assam).<sup>136</sup> Even today, there are hardly any Assamese labourers working on the tea estates. The staff, however, is predominantly Assamese. The enclave existence of British-owned tea plantation companies with a non-Assamese labour force is one of the causes of today's civil strife in Assam, which in its course led to the extortion of money from the tea gardens by ULFA (United Liberation Front of Assam).

**Nationalization.** The land reform, implemented between 1972 and 1976 under the then President Mrs. BANDARANAIKE meant a radical change in the structure and ownership of the tea plantations. It led to the nationalization of the estates and brought the British domination of the Sri Lankan tea industry to an end.

In 1952, 69 percent of the tea area was foreign-owned (notably by Sterling companies). By 1972, the area owned by Sterling Companies had decreased to 26 percent. Concurrently, the British concerns had increasingly incorporated their tea interests in Sri Lanka, thereby setting up Rupee companies (in 1972 the tea area owned by Rupee companies was 25 percent). The incorporation in Sri Lanka did not, however, affect the system of control and management of the tea estates. As in British India, the British had established an Agency House System. In 1972, the agency houses managed some 50% of the tea area and some 65% of total production.<sup>137</sup>

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<sup>131</sup> ROTE, p.249.

<sup>132</sup> BETZ, p.10.

<sup>133</sup> BETZ, p.10.

<sup>134</sup> A pact named after Mrs. Sirimavo BANDARANEIKE and the then Indian Prime Minister Lal Bahadu SHASTRI.

<sup>135</sup> STÜRZINGER, pp.17-19.

<sup>136</sup> see SIDDIQUE, pp.4, 118.

<sup>137</sup> CIDA / GOVERNMENT OF SRI LANKA, Vol. II, pp.21-22. For details on the agency house system, see "TWISTS in the INDIAN TEA POLICY".

The land reform was implemented in two stages. The first stage was the Land Reform Law of August 1972, which stipulated inter alia:

- A land ceiling of 25 acres (10 ha) of paddy land (land cultivated exclusively with wet rice).
- A land ceiling of 50 acres (20 ha) not exclusively cultivated with paddy.
- Land ceilings were applicable to personally-held land, whereas land owned by public or private (corporate) companies was exempt from the Law.
- Criteria and principles of compensation.
- Land in excess of the ceilings was vested in the Land Reform Commission.<sup>138</sup>

The land transfer to the Land Reform Commission of the Ministry of Agriculture began in 1974 and involved some 23 percent of the total area under tea (55,000 ha).<sup>139</sup>

The second stage was the Land Reform (Amendment) Law of 1975.<sup>140</sup> The law had the following salient provisions:

- Title to estate land, owned by public companies (i.e. privately-owned agricultural plantation companies), was transferred to the Land Reform Commission.
- Expropriated land was subject to financial compensation.<sup>141</sup>

Under the Amendment Act, 395 estates encompassing 96,000 hectares were transferred to the Land Reform Commission. Altogether, the two-stage Land Reform affected a total of 151,000 hectares under tea, i.e. 63 percent of the total area.<sup>142</sup>

The estates remained initially under statutory trusteeship of the former owners (predominantly agency houses), before the management was transferred to state enterprises. The lion's share of state-owned tea area was transferred to the SRI LANKA STATE PLANTATIONS CORPORATION (SLSPC) and the JANATHA ESTATES DEVELOPMENT BOARD (JEDB). Even from an international perspective, the SLSPC and the JEDB were and still are giants: in 1989, the SLSPC produced 63.3 Mio. kgs of black tea, more than twice as much as the largest state enterprise in Indonesia (P.T.P. XIII). The JEDB produced 50.9 Mio. kgs of black tea using its own leaf.<sup>143</sup> The remaining state-owned entities manage only a negligible share of the area under tea.

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<sup>138</sup> see Land Reform Law No. 1 of 1972.

<sup>139</sup> CIDA / GOVERNMENT of SRI LANKA, Vol. II, p.23.

<sup>140</sup> The second stage of the Land Reform was implemented as a result of the *Report of the Commission of Inquiry on Agency Houses and Brokering Firms*, published in 1974 and uncovering the 'exploitative' plantation management system instituted by the British (see ROTE, p.247.).

<sup>141</sup> see Land Reform Law No. 39 of 1975.

<sup>142</sup> CIDA / GOVERNMENT of SRI LANKA, Vol. II, p.23.

<sup>143</sup> SRI LANKA TEA BOARD, p.6. Total production is larger due to the contribution of bought leaf from private sources.

Figure 8: Tea Production in Sri Lanka

| Area                           | 1980             |               | 1989             |               |
|--------------------------------|------------------|---------------|------------------|---------------|
|                                | ('000 ha)        | (in %)        | ('000 ha)        | (in %)        |
| Total                          | 245              | 100           | 222              | 100           |
| State sector                   | 151              | 62            | 123              | 55            |
| Private sector , of which      | 93               | 38            | 99               | 45            |
| Private estates (4.1 to 20 ha) | 41               | 17            | 40               | 18            |
| Smallholdings (below 4.1 ha)   | 52               | 21            | 59               | 27            |
| <b>Production</b>              | <b>('000 mt)</b> | <b>(in %)</b> | <b>('000 mt)</b> | <b>(in %)</b> |
| Total                          | 191              | 100           | 207              | 100           |
| State Sector                   | 159              | 83            | 115              | 55            |
| Private Sector                 | 32               | 17            | 92               | 45            |
| Elevation                      |                  |               |                  |               |
| High grown                     | 73               | 38            | 74               | 36            |
| Medium grown                   | 56               | 29            | 50               | 24            |
| Low grown                      | 63               | 33            | 83               | 40            |

Note: Numbers do not add up to totals due to rounding. The sector-wise production figures for 1980 include production from green leaf purchases (bought-leaf production); the 1989 figures relate to "own" leaf production excluding leaf purchases.  
Sources: FORBES & WALKER; "Ceylon Tea Review", var. issues; SRI LANKA TEA BOARD, "Annual Report 1989", pp.5-6; MINISTRY OF PLANTATION INDUSTRIES; "Plantation Sector Statistical Pocket Book", p.31.

During the past decade, however, the size of the state sector shrank both in terms of tea area and production (see Fig. 8). A growing portion of Sri Lanka's tea area is cultivated by smallholders, a fact that is evidenced by a rise from 21% of the tea area in 1980, to 27% in 1989. According to the SRI LANKA TEA BOARD, family farms smaller than 4.1 ha are defined as smallholdings, and family-owned tea estates exceeding 4.1 ha up to the land ceiling of 20 hectares are counted as (private) estates. Together they constitute the private sector. In terms of production, the private sector has made great advances in the 1980s. Even if one considers that the 1980 production figures underestimate the private sector's output (because some portion of the green leaf production was sold to the state sector but not vice versa) the private sector's share definitely increased between 1980 and 1989.<sup>144</sup> Taking into consideration the green leaf transactions, the private sector's production share was 45% in 1989 (see Fig. 8).

<sup>144</sup> SRI LANKA MINISTRY OF PLANTATION INDUSTRIES, p.33.

In summary, Sri Lanka's state sector is (relatively) larger than Indonesia's in terms of hectares and presumably also in terms of black tea production on the basis 'own leaf' production (Indonesia's production figures presumably include 'bought leaf' production).

**Elevation.** The structural change between the state and the private sector becomes evident also from a different perspective. Sri Lanka's tea growing areas are customarily classified according to elevation: Ceylon tea is traditionally distinguished as to whether it is low-grown tea (below 610 m), medium-grown tea (610–1,220 m) or high-grown tea (over 1,220 m). Low-grown tea regions cover the Kandy district, which is up-country, and the south-west of the island (the districts of Galle, Matara, Ratnapura etc.). By and large, low-grown tea production is the monopoly of the smallholders. In the medium-grown areas, two-thirds of the total were state-sector production and one-third was private sector production in 1990.<sup>145</sup> High-grown teas are the domaine of the SLSPC and the JEDB. Since the elevation strongly influences the tea's flavour, the growing zones were traditionally equated with the tea's quality. High-grown tea stood for top quality tea and the low-grown teas represented plain quality.

**Seasonality.** Moreover, there is a seasonal differentiation of tea flavour within the higher elevations. There are two quality seasons in Sri Lanka, referred to as the Uva season and the Dimbula season. Uva and Dimbula are both districts in the medium and high elevation zones, the former in the western highlands, the latter in the eastern highlands. The Uva district produces its best qualities in the dry season, which coincides with the south-west monsoon because the rains in the western part of the island do not reach the Eastern highlands. The Uva season lasts, with some variation, from the end of July to mid-September. Conversely, when the north-east monsoon reaches Uva, Dimbula in the western highlands remains unaffected, at that time producing its best qualities (from January to March). In the Nuwara Eliya district, where exclusively high-grown tea is manufactured, there is less seasonal influence on tea quality.<sup>146</sup>

In 1970, the relative auction prices in Colombo reflected the old quality rule-of-thumb: average prices were SLRS 4.59 for high-grown tea, SLRS 3.55 for medium-grown tea, and SLRS 3.06 for low-grown tea.<sup>147</sup> Since then, average prices for medium-grown tea were consistently lower than low-grown tea prices. In 1989, the discount for medium-grown tea was as much as 13.4 percent of the low-grown tea price. The old quality rule was completely refuted in the 1980s when average low-grown tea prices were quoted in most years at a premium (!) vis-à-vis high-grown tea prices.<sup>148</sup>

The price incentive fuelled the expansion of smallholder tea production in the low-grown zone (see Fig. 8). The buoyant low-grown tea prices are primarily due to the changed pattern of consumer preferences which is reflected in the profile of Sri Lankan exports: the foremost

<sup>145</sup> FORBES & WALKER (1990), pp.6-7.

<sup>146</sup> Unlike Assam and Darjeeling there is no dormancy period of the tea bushes in Sri Lanka and Indonesia, therefore tea leaves are plucked all the year round.

<sup>147</sup> SRI LANKA TEA BOARD, p. 68.

importer of Ceylon tea used to be the United Kingdom. In 1970, roughly a third of Sri Lanka's tea exports were destined for the UK; in 1990, the percentage had shrunk to 5.4%.<sup>149</sup> In the 1980s, The Colombo tea market was dominated by buyers from the Middle East countries and the Soviet Union. In 1990, the five biggest buyers were Egypt, Iran, Iraq, the Persian Gulf States, and the USSR.

One reason for the decline of the medium-grown tea production (both in absolute and in relative terms) appears to be the competitive edge Indonesia had on the world market: Indonesian tea and medium-grown Ceylon tea are the closest available substitutes.<sup>150</sup>

**Export Marketing.** In Sri Lanka almost all tea production was, and still is, channelled through auctions. In 1990, some 93% of production came 'under the hammer' in Colombo and less than 2% was consigned to the London auction (see Fig. 9).<sup>151</sup> From an international perspective, Sri Lanka thus stands out as the tea producing country that relies most heavily on auctions as a pricing and distribution institution. The quasi-monopoly of the Colombo auction as a marketing institution is guaranteed by government decree.

Figure 9 : Tea Production Channeled through Auctions

| Producers  | Auctioned Tea in % of Production |         |         |
|------------|----------------------------------|---------|---------|
|            | 1982-84                          | 1985-87 | 1988-90 |
| Bangladesh | 90                               | 94      | 94      |
| India      | 66                               | 76      | 71      |
| Kenya      | 54                               | 56      | 62      |
| Indonesia  | 30                               | 26      | 25      |
| Malawi     | 47                               | 60      | 57      |
| Sri Lanka  | 97                               | 97      | 95      |
| WORLD      | 36                               | 38      | 37      |

Note: Percentages include consignments to the London auctions  
Source: J.Thomas "Tea Statistics" var. issues; ITC, "Annual Bull. of Statistics", var. issues.

In Indonesia, by contrast, the auction's share as an outlet of production was 22% in 1990, down from 29% in 1985 and 47% in 1980 (see Fig. 6). In absolute terms, the turnover of the Jakarta (export) auction dropped from 46,000 mt in 1980 to 33,000 mt in 1990. Meanwhile, exports increased from 68,000 mt in 1980 to 107,000 mt 1990 and exports as share of total

<sup>148</sup> SRI LANKA TEA BOARD, p.68. Quality tea traders might object because the top price quotations for high-grown tea still exceed top quotations for low-grown tea but, on average, the remarks are correct.

<sup>149</sup> J. THOMAS, p.103.

<sup>150</sup> Unfortunately there are neither cost of production figures nor disaggregated auction price data available to substantiate the competitive edge of Indonesian teas.

<sup>151</sup> J.THOMAS, "Tea Statistics 1990", p.90.

production remained almost constant at 70%. In brief, during the past decade there was a tendency for rising shares of production to bypass the Jakarta auction.

Surveying the remaining auction centres the following observations were made (see Fig. 9): in Bangladesh more than 90% of production was on average turned over in the Chittagong auction between 1982 and 1990. Thus, similar to Sri Lanka only a minor fraction of production bypassed the auction.

In India, the auction share in the triennium of 1985 to 1987 was 76%, up from 66% in the period 1984–87. This increase was the consequence of the Tea Marketing Control Order (of 1984), which regulates that 75% of the production for domestic consumption be auctioned.

In Kenya and Malawi, the major African tea producing countries, the auction shares were close to 60% between 1988 and 1990. Apart from North India, these countries are the main supporters of the London auctions, a fact that is reflected in their comparatively high shares of production consigned to the London auctions (roughly 10% in 1990).<sup>152</sup> In 1990, Malawi consigned the highest production share of all producing countries to the London auctions (some 12%). Given the bargaining environment in London, this distribution policy raises the question of why this is the case. Unsurprisingly, FORREST notes that in Malawi "*the estates and groups, some 40 in number, are almost entirely owned by British-based plantation companies...*"<sup>153</sup>. This information reveals an interesting parallel to the ownership structure of the tea plantation in Assam and the consignments of Assam tea to the London auction.

On a worldwide scale, a little more than one-third of world tea production was auctioned between 1982 and 1990.

It is noteworthy, however, that some of the major tea producers prefer not to sell tea by auction. China, the second largest producer of tea (predominantly green tea though) and the second largest exporter (predominantly black tea) has no domestic auction and "*sells a little tea through international auction centres*"<sup>154</sup>. Among the remaining major tea exporters only Argentina has no auction centre.

Returning to Sri Lanka's export economy, the most striking fact is that the export trade is entirely in the hands of private enterprises, whereas tea production is predominantly under state management. Even so, the government heavily regulates export trade. The details of commercial practice regarding compliance with the regulations are summarized in the Appendix.

Negligible quantities of tea exports are bypassing the Colombo auction (or for that matter the London auction as well). In 1990, 2% of tea production were sold on the basis of private (spot) contracts and 0.6% were exported via (local) forward contract.<sup>155</sup> In Sri Lanka, private contracting requires that the exporter acts as an intermediary between the tea manufacturer and the overseas importer. In fact, first the exporter concludes a local cash or forward

<sup>152</sup> J.THOMAS, "Tea Statistics 1990", p.82.

<sup>153</sup> FORREST (1985), p.83.

<sup>154</sup> ETHERINGTON and FORSTER, p.290. ITC (1990), pp.32, 36.

contractual agreement with the tea producer, and he then may negotiate an overseas private contract (involving an export permit etc., see Appendix). The crucial parameter is, of course, the contract price: the price of the local private contract is determined by a panel comprising a Central Bank official, the selling broker, the manufacturer, the exporter, and a representative of the Tea Board. Unlike local private sales, overseas forward contracting is quite common. Notably, the state-trading countries (Egypt, Libya, Syria, Tunisia, Iran, China<sup>156</sup>), float competitive tenders, calling for bids by the local export business.

## 5. A Case against Laissez-faire: the Institution of the Tea Auction

In the preceding chapters, the competitive performance of the tea auctions has been discussed, thereby having ignored alternative market clearing institutions. Now we turn to the question of how the tea auctions perform in light of privately negotiated contracts (direct sales). How does private contracting compare as an allocation mechanism in terms of efficiency and distributive impact? Is there an economic or social rationale to intervene in favor of one or the other market institutions?

Beyond mainstream economics, the most prominent schools of thought on the liberal-conservative side of the political spectrum are the Chicago School and the Austrian School.<sup>157</sup> The Chicago School advanced a coherent theoretical framework of antitrust analysis which strongly influenced US antitrust policy, in particular during the REAGAN administration.<sup>158</sup> We now turn to the Austrian School, as details of the Chicago antitrust theory have been discussed already.<sup>159</sup>

The Austrian School of competition theory is associated with the names of von MENGER, von HAYEK, von MISES, and in the United States KIRZNER and ARMENTANO.<sup>160</sup> Their representatives are staunchly opposed to the structure-conduct-performance paradigm which forms the backbone of this thesis.<sup>161</sup> Yet, for the sake of clarity, the temporary deviation to this competing paradigm is undertaken: differences appear more clear-cut when contrasted with a position as "extreme" as HAYEK's. Indeed, HAYEK has been characterized by SAMUELSON and NORDHAUS as one of "*the modern apostles of laissez-faire*."<sup>162</sup> Thus,

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<sup>155</sup> FORBES & WALKER (1990), p. 39.

<sup>156</sup> China is forward contracting in Colombo if it oversells its own production.

<sup>157</sup> Mainstream economics, as delineated by SAMUELSON and NORDHAUS, is the branch of economics based on neoclassical microeconomics, PARETIAN welfare economics and KEYNESIAN macroeconomics, see SAMUELSON and NORDHAUS, pp.761-763 or PAQUE, p.412.

<sup>158</sup> see SCHMIDT, RITTALER, p.XI. POSNER, one representative of the Chicago School has been appointed to the US Supreme Court.

<sup>159</sup> see Twists in the Indian Tea Policy.

<sup>160</sup> SINGLETON, p. 57.

<sup>161</sup> see e.g. SCHMIDTCHEN, p.128.



HAYEK's views serve as a position against which the author's counter-position shall be developed.

## 5.1 Inside the HAYEK Equation

The paradigm of HAYEK's philosophy is individual freedom. A "good society" is one in which the human beings are free to choose and in which the opportunities of the individuals are as many as possible.<sup>163</sup> According to HAYEK, this entails that the role of the state be confined to creating a set of stable rules and institutions which guarantee maximum freedom to the members of society to pursue and achieve their private goals.<sup>164</sup> Hence, the rules must be abstract, for no body politic is able to know in advance the individual preferences. HAYEK warns that the state must not formulate any concrete allocation targets. The use of coercion is only legitimate for safeguarding the abstract set of rules.<sup>165</sup>

In the chaos of individual ends and choices, the market serves as the coordinating institution to create order.<sup>166</sup> HAYEK interprets the resulting market prices as normative signals of what people ought to do. In this sense, the market is an information processing institution and exchange on which opportunities (via price signals) are revealed. Market prices serve to reveal which of the competing individual plans are right and which are wrong.<sup>167</sup> This is what von HAYEK calls the "*discovery process of competition*": some market participants' plans are remunerated, other participants' plans are disappointed. The stability of the market order is maintained through negative feedback via price-quantity adjustments. HAYEK regards the market as a self-organizing cybernetic system which needs no intervention.<sup>168</sup> With view to the issue of this chapter, we find that HAYEK rejects any specific or targeted intervention into the market order: "*An intervention, ..., is therefore by definition an isolated act of coercion, undertaken with the intention to create a particular result...*"<sup>169</sup>.

The Austrian school's concept of the competitive market equilibrium is a dynamic equilibrium, which distinguishes itself from the static equilibrium concept of the Chicago school of thought. According to KIRZNER, efficiency "*depends on the degree of success with which*

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<sup>162</sup> SAMUELSON and NORDHAUS, p.763. HOPPMANN, a German economist of the so-called ordo-liberal school developed the concept of competition — based on HAYEK's works — which he called "freedom to compete" (in German: Wettbewerbsfreiheit). see SCHMIDTCHEN.

<sup>163</sup> von HAYEK (1980), Vol.2, p.178.

<sup>164</sup> von HAYEK (1980), Vol.2, p.157.

<sup>165</sup> von HAYEK (1980), Vol.2, p.157.

<sup>166</sup> von HAYEK (1980), Vol.2, p.158.

<sup>167</sup> von HAYEK (1980), Vol.2, p.160.

<sup>168</sup> von HAYEK (1968), p.10.

<sup>169</sup> von HAYEK (1980), Vol.2, p.174.

*market forces can be relied upon to generate spontaneous corrections in the allocation patterns prevailing at times of disequilibrium*"<sup>170</sup>.

HAYEK's concept of competition (i.e. the discovery function of competition) extends beyond the narrow definition of factor and product markets to that of institutions at large. Even institutions are subject to an evolutionary process in which those which best serve the society's needs survive.<sup>171</sup>

As a general rule, the normative implication of HAYEK's paradigm is: *laissez-faire*. HAYEK does not rule out public intervention categorically. However, his idea on the role of the state is that of a minimalist state (including the provision of public goods). In the domain of competition policy, HAYEK rejects the standard performance criteria (based on the structure-conduct-performance paradigm) or what he calls the 'presumption of knowledge' (Anmaßung von Wissen).<sup>172</sup> He argues that for outsiders such as antitrust officers there is no *objective* method to assess whether profits are adequate or not, since in a dynamic economy, production costs cannot be calculated *objectively*, as these variables depend to a large extent on the expected future developments.<sup>173</sup> Moreover, according to HAYEK, oligopolies and even monopolies do not give rise to antitrust measures as long as the incumbent enterprises produce more efficiently than potential market entrants. Hence, HAYEK is sympathetic to oligopolies and monopolies on grounds of efficiency, under the premise that would-be competitors are not discriminated against to enter the market. The notion of discrimination includes market barriers established by the incumbent enterprises and the government, as well as (certain forms of) price discrimination.<sup>174</sup>

In general, BUCHANAN agrees with HAYEK — so does the author. BUCHANAN wrote in 1970s: *"If something is wrong, have the government regulate it. If the regulators fail, regulate them, and so on down the line. In part this is the inevitable result of public failure to understand the simple principle of laissez-faire, the principle that results which emerge from the interactions of persons left alone may be, and often are, superior to those results that emerge from overt political interference. There has been a loss of wisdom in this respect, a loss from eighteenth-century levels, and the message of Adam Smith requires reiteration with each generation."*<sup>175</sup>

But he cautions: *"Institutions evolve, but those that survive and prosper need not be those which are 'best', as evaluated by those who live under them. Institutional evolution may place men increasingly in situations described by the dilemma made familiar in modern game*

<sup>170</sup> KIRZNER quoted in SINGLETON, p. 59.

<sup>171</sup> von HAYEK (1980), Vol.1, pp.23-24.

<sup>172</sup> OBERENDER, VÄTH, p. 15.

<sup>173</sup> von HAYEK (1980), Vol.3, p.103.

<sup>174</sup> von HAYEK (1980), Vol.3, pp.106, 118-120. HAYEK does not specify which form of price discrimination he would dismiss as intolerable.

<sup>175</sup> BUCHANAN, p.91.

theory."<sup>176</sup> And: "*The institutions that survive and prosper need not be those that maximize man's potential. Evolution may produce social dilemma as readily as social paradise.*"<sup>177</sup>

In summary, the analysis along HAYEK's lines leads one to conclude that there is no rationale for intervention in the case of auctions vs. private bargaining. Unfettered institutional competition would, on the contrary, tend to promote efficiency. If private contracting is preferred by the tea merchants as opposed to auctioning tea, private treaty transactions are obviously more efficient. Logic commands that it must be so because otherwise it would not happen.

## 5.2 A Counterposition

This simplified reasoning will be refuted on the grounds of both efficiency and distribution considerations. The backdrop for the analysis is the institutional setting as it currently exists in Sri Lanka and Indonesia.

**Corruption.** Private contracting is susceptible to bribery. For example: In Indonesia, the state-run marketing office, the KPB, is the main seller of Indonesian tea. The person (or persons) in charge of selling tea that is produced on state-owned plantations (the PTPs), may demand or may be offered a kickback by private trader A, if a particular lot of tea is sold to him. The purchase price trader A offers is, say, 100 units, and the kickback 20 units. Competing trader B offers a price of 130 units plus a kickback of 10 units. The manager's individual utility-maximizing strategy is to sell the lot to trader A. If this happens the allocation is obviously (PARETO) inefficient. It is crucial to the example that the salesman is not the owner of the tea. Otherwise, the bribery would not make sense and the allocation would be efficient.

In Indonesia, the above pattern of allocating state-produced tea on a *free sale* basis is commonplace according to business sources. Bribery and underinvoicing is not confined to the state sector, private tea trading companies have to grapple with this problem as well, and cases in which firms are defrauded occur time and again.

By contrast, a moment's thought reveals that auctions are immune to bribery. MILGROM states: "*Bargaining is a trading institution that is best avoided when there is enough competition for auctions to be used, Coase's theorem notwithstanding... As compared to bargaining, auctions have the additional advantage of being institutions whose conduct can be delegated to an unsupervised agent. Public auctions offer fewer opportunities for kickbacks and behind-the-scenes agreements between the seller's agent and a single buyer than do negotiated agreements.*"<sup>178</sup>

By all means, MILGROM does not rule out the possibility of corruption. One reason is that English auctions are susceptible to collusion by rings of bidders, in which a representative of

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<sup>176</sup> BUCHANAN, p.X.

<sup>177</sup> BUCHANAN, p.167.

<sup>178</sup> MILGROM, p.19.

a group of bidders bids while the others refrain.<sup>179</sup> Or bidders may be bribed to exert restraint in bidding.

As to the distributional consequences of corruption, Indonesia's "free sale" of tea is the golden fleece for a club of privileged people. The quantities of (better quality) tea which the K.P.B. has available for free sale offer opportunities for officials to demand kickbacks from the buyers. Who stands to gain from these malpractices? Without knowing exactly how pervasive the strings of corruption and favoritism are in the Indonesian tea industry, there are allegations that some presidents of the P.T.P.s are involved. The top officials of the K.P.B. seem to be acting on behalf of the P.T.P. presidents, who are superior in the administrative hierarchy. It also seems clear that the top officials of the P.T.P.s would not be able to enrich themselves without compliance from the top officials of the superior bureaucracy, the Directorate of Estates of the Ministry of Agriculture.

As was pointed out in the last chapter, Indonesia makes the least use of the tea auctions among those producing countries that have an established spot market. Since a privileged elite gains from the status-quo of the current marketing mix, there is little hope for a change to the better. In effect, the situation is an economic and social trap.

The above described "social trap" is not analogous to the structure of the well-known Prisoner's dilemma, in which the selfish, utility-optimizing behavior of individuals (the minimax strategy) leads to a determinate solution (a NASH equilibrium) that is inefficient in the PARETIAN sense. In the Prisoner's dilemma, cooperation would improve the lot of some people without harming others.<sup>180</sup> In the Indonesian setting, however, some people would clearly stand to lose if the status-quo were to be changed.

**Hard-currency leakage.** It has been stated already that auctions are an effective barrier against the undervaluation of teas.<sup>181</sup> To specify, undervaluation means that tea is not priced according to demand and supply conditions that prevail in the producing country at a point in time. Undervalued or willfully underinvoiced tea leads to rent shifting abroad, entailing a loss of hard-currency earnings. If foreign exchange controls regulate the flow of foreign currency into and out of the economy, rent shifting goes along with a leakage of foreign exchange receipts. In Indonesia, there are currently no (relevant) foreign exchange controls. Yet, the economy definitely suffers from a loss of foreign currency earnings due to inefficiencies caused by bribery and other malpractices. By contrast, in Sri Lanka foreign currency transactions are controlled by the Central Bank. The export regime for bulk tea (entailing the auction sale of almost 100% of the production) offers considerably less scope for the leakage of foreign exchange receipts, since the auction allocation tends to be (PARETO) efficient.

**Positive externalities.** Auctions exist because people wish to use them for transactions. This is, however, not free of charge. Transaction costs are incurred which are in part reflected in the selling and buying commissions. However, the transacting partners are not able to

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<sup>179</sup> MILGROM, p.18.

<sup>180</sup> SCHERER, p.160-164, SAMUELSON and NORDHAUS, pp.556-557.

<sup>181</sup> see Twists in the Indian Tea Policy.

capture all of the benefits of their transactions. Since the transaction prices are disclosed, they can be used and in fact are, used as reference prices by people who do not necessarily transact via auction. Thus, there is a free-rider benefit associated with the pricing function of auctions. By contrast, privately negotiated contract prices are confidential. In fact, most of the private contract prices are linked to the auction prices. Whether cash or forward contract, the transacting partners customarily take an observable auction price (an average or any index) and attach a premium or a discount to it, thereby deriving the contract price. This technique is referred to as formula pricing.<sup>182</sup>

However, there are free-rider problems or hazards involved with formula pricing. One is the so-called thin market problem. If formula-pricing is gaining importance vis-à-vis the underlying pricing institution, the trading volume in the latter market gets thinner. As a consequence, transaction costs rise for the remaining trading partners with the effect that the turnover decreases even further. Moreover, increased market instability with associated inefficiencies seems likely. To explain, a given (absolute) change in quantity causes a higher percentage change in quantity in a thin market as compared to a "normal" market.<sup>183</sup> It follows that the higher percentage change in quantity weighted with price flexibility (inverse price elasticity) leads to a higher percentage change in prices. This reasoning holds because the price adjustment burden as a consequence of a quantity shock is not borne initially by the entire market including the volumes of the auction market and the private sales. It is the auction which takes the price lead, and the private contract prices follow. In summary, a thin auction market gives rise to enhanced short-run price instability when it comes to absorbing a given external demand or supply shock.

The second hazard is, as stated by MARION: "*Furthermore, firms with formula-priced contracts based on a thin market price may have an incentive to attempt manipulations of the reference price quotation.*"<sup>184</sup>

Extending the thin market problem to the various tea auctions worldwide, it can be argued that the Jakarta auction tends to become a thin market whose pricing performance is increasingly related to the pricing performance of competing auction centres, notably Colombo. In conclusion, the pricing performance of the institution "private treaty" is a function of the pricing performance of the auctions. Hence, strictly speaking it is incorrect to assess these institutions separately as alternatives since their comparative performance is close interrelated.

A second externality of the tea auctions is that of market transparency.<sup>185</sup> First of all, the bidding process has an informational content which is of value to insiders even if they do not

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<sup>182</sup> MARION, p.73.

<sup>183</sup> As an example take the demand shock in the world tea market caused by the Soviet Union following the Chernobyl disaster.

<sup>184</sup> MARION, p.74.

<sup>185</sup> The Tea Boards in the producing countries as well as the broker companies possess so far undiscovered data treasures. These institutions have vast amounts of computerized data, which lend itself to disaggregated time-series analysis, to exploratory data analysis, to empirical studies on price behavior in inhomogeneous markets

bid actively. In fact, there are always non-active bidders present in the auction halls. The bidding process is revealing with respect to demand and competition and their development in the course of the auction. For instance, as the U.S.S.R. and Iraq were important customers in India, Sri Lanka and Indonesia exporters were curious as to whether the agents of these countries were active (compare Fig. 6). They probably adjust their bids accordingly. Secondly, once the hammer falls it becomes public information *who* bought *what* at *which price*. The auctioneer, in fact, calls out the name of the buyer, who is either an agent or the principal personally. In general, the competing traders have a fair idea of who the principal is, even if an agent bids. In the case of the state-trading countries (the former U.S.S.R., Egypt, and most of the middle East countries) the agents are publicly appointed. In the London auctions, the agent and the principal are called out by the auctioneer.<sup>186</sup>

Auctions are the prototype of cash markets which efficiently aggregate and process information, ultimately leading to the confluence of supply and demand. It is most unlikely that private bargaining is as efficient informationally as well as in terms of final allocation.<sup>187</sup>

**Competitive fringe.** In my assessment, the main argument against auctions as a distribution monopoly is the potential monopolization of the auctions. As noted above, all of the auction centres worldwide are dominated by financially, very potent multi-national conglomerates, as well as by agents bidding on behalf of the state-trading companies. It has not happened so far but these entities could easily drive the competitive fringe out of business by outbidding them over a protracted period. This strategy has been referred to as the "deep pocket" hypothesis: *"An enterprise that is big in this sense obtains from its bigness a special kind of power, based upon the fact that it can spend money in large amounts. If such a concern finds itself matching expenditure or losses, dollar for dollar, with a substantially smaller firm, the length of its purse assures it of victory... The large company is in a position to hurt without being hurt."*<sup>188</sup>

The survival of small enterprises is partly due to the fact that they are more flexible in their operations than transnational companies: examples are barter trade, market niches, and deals with tea of dubious origin or other suspect deals. For instance, there is a general consensus in the international tea community that UNILEVER does not operate in suspect spheres because the conglomerate is sensitive to the public opinion and political pressure. Thus, private bargaining leaves small enterprises the opportunity to survive or even chisel at the market share of the large tea concerns.

Finally, what stance does the international tea community take on the issue? Auctions, their benefits and their relative superiority or inferiority as compared to private contracting are a

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with market power etc. The SRI LANKA TEA BOARD releases these data upon request (as probably would other Tea Boards), once they are two or three years old.

<sup>186</sup> The auctioneer may call out that a particular lot goes to MERIDEN-TYPHOO (agent-principal) or LYONS-STANSAND (principal-agent) or BROOKE-SMITH (principal-agent).

<sup>187</sup> WALRAS introduced a thought experiment into price theory to explain that there is a market equilibrium in a competitive market. A fictitious auctioneer, the WALRAS auctioneer, serves as an information intermediary between households and firms. Through a process of tâtonnement (trial and error) the auctioneer achieves that excess demand and excess supply converge via price adjustments to a competitive equilibrium, see HAHN, p.136.

perpetual and controversial issue in the international tea trade.<sup>189</sup> Understandably, the answers of my interview partners were biased because as insiders they had vested interests. But there was a general consensus that the tea auctions are performing efficiently and satisfactorily, and that they are an indispensable method of tea "disposal". However, few agree that auctions should be a mandatory institution of sale. Again, the reason is vested interests. The tea garden managers are often able to fetch better prices by selling directly to their overseas clients, thus bypassing the auction. And a number of importers would have to write off an asset in the case of an auction monopoly: the asset takes the form of the traditional, confidential and reliable relationship which they developed with the tea producers. In transaction cost economics, these exchange-bound investments are, in WILLIAMSON's terminology, referred to as asset specificity.<sup>190</sup>

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<sup>188</sup> Corwin EDWARDS quoted in SCHERER, p.335.

<sup>189</sup> see e.g. CTTA, pp.156-177. One tea conference participant remarked: *"There is no doubt that the auction system is the best system for selling teas especially when 100% of their production is sold through the system in Sri Lanka. Sir, why is this not done in India? There should not be scope for private sale which means an atmosphere of suspicion always prevails."* See CTTA, p.172.

<sup>190</sup> see PERRY, pp.213-214.

## 6. Summary and Conclusions

**Auction theory.** Bidding theory has focused on the questions of how the most widely used auction types (i.e. the English, Dutch and sealed-bid auctions) perform in terms of allocative efficiency and expected receipts to the seller (expected payment of the buyer). Auction theory offers the proposition that under strong limiting assumptions it does not matter which auction type the seller chooses if he is free to determine the pricing institution, since each bidding mechanism yields the same expected revenue. This proposition is known as the Revenue Equivalence Theorem. Moreover, each auction leads to a PARETO-optimal allocation. Revenue equivalence breaks down, however, if the underlying behavioral assumptions are relaxed. The introduction of risk aversion rather than risk-neutral bidding behavior tends to strengthen the case for the Dutch auction as well as the first-bid sealed auction. If, on the other hand, the bidders' valuations are correlated (more precisely 'affiliated'), the English auction is more favorable to the seller than the Dutch auction. Thus, the comparative performance depends on the specific environment. However, the propositions of auction theory suggest that the English auction is superior to the Dutch auction as well as the first-price sealed auction in a wider set of different environments in terms of receipts to the seller, allocative efficiency and technical efficiency (bid-preparation costs).

**Experimental economics.** Laboratory auction experiments are an alternative to empirical studies for testing bidding theories. The results confirm the revenue equivalence theorem. However, the experimental results offer no insights into the comparative performance of agricultural commodity auctions (Dutch or English), where the bidders' valuations can be assumed to be correlated and asymmetric, rather than symmetric, independent private values.

**Dutch Auctions.** From the perspective of the tea producing countries, the introduction of a Dutch tea auction has no particular merits for the following reasons:

- In the tea auctions, prices tend to be jacked up by 'pushing' on the part of rival bidders, whereas no such mechanism exists for the Dutch auction.
- Auction theory suggests that bid-preparation for Dutch auctions in an asymmetric, common-value environment (such as the tea market) is very demanding on the bidders. Deviations from the PARETO-optimum are likely to occur. The English auction tends to be less vulnerable to allocation inefficiency because the bidding competition and the market price development is revealed during the course of the auction.

Hence, in general, the tea producers would lose rather than gain from switching to the Dutch auction. There is, however, one exception. Both auction theory and the results of experimental auctions show that the Dutch auction lends itself to an environment in which the buyers are risk-averse. In the importing countries, the marketing of top-quality tea appears to be a very profitable business involving economic scarcity rents, which the tea producers should try to capture. One technique to extract the rents from the importers is the sale via Dutch auction, since for top-quality teas there is an enhanced element of eagerness (or risk-aversion) among the tea buyers (as everybody who observes a tea auction is able to witness).



Hence, a Dutch tea auction would be worth trying for the sale of top-quality teas such as Oolong tea from Taiwan or Darjeeling tea, the bulk of which is so far sold privately.

**The practice of lot division.** Lot division is an accepted trade practice used in the tea auctions permitting two or three bidders to submit a joint bid. While this practice has a flair of open collusion and anti-competitive conduct, it cannot be taken for granted that producer prices would improve if the practice were abolished. Even if auction prices were (slightly) raised the technical efficiency of the auction system would considerably suffer with the effect of increasing transactions costs (inter alia the selling and buying commissions). Per saldo, the tea producers could hardly expect to gain from an abolishment of lot division. The author does not reject the practice of lot sharing for the following reasons:

- If lot division had indeed the effect of severely distorting or rigging the market, this practice would be a controversial issue in the tea industry. In reality, it is not. It is definitely not regarded as a malpractice by tea producers and selling brokers, as they would otherwise voice their concern.
- The abolition of lot divisions would probably provoke (more) behind-the-scene-deals and collusive agreements rather than improve the competitive performance of the tea auctions.

What is most disturbing about the practice of lot division is the fact that the big buyers who dominate the auctions frequently share lots. For small buyers, divisions are a technical and financial necessity, something that is not true for big buyers. The big-buyer dominated Jakarta auction is a case in point (there is no lot division). A fair and equitable compromise which precludes "big" buyers from sharing lots, however, is hard to imagine.

**Competitive performance of the tea auctions.** A general proposition of the structure-conduct-performance paradigm (subject to many qualifications) is that market concentration has a negative effect on performance. A major conclusion from the study of the world tea market is that the available evidence corroborates this proposition.

Market concentration does not manifest itself as monopoly power in the tea auctions in the sense that individual buyers are capable of dictating prices. However, the dominant tea buyers, in particular the state-trading countries, are in a position to influence the terms of trade in their favor. These countries exert market power indirectly by negotiating for favorable credit terms, accounting rates of exchange, reciprocal trading agreements (countertrade deals) etc. Notably the former Soviet Union succeeded in playing one tea producing country off against another.

The study of tea auctions shows fundamental weaknesses of aggregate indicators such as concentration ratios, e.g.

- Market segmentation conceals the true extent of market concentration. The potential number of competing bidders exceeds the actual number of competing bidders. The Jakarta auction is a case in point: although more than 10 bidders are present, the number

of bids is 1.5 on average, indicating that (due to market segmentation) between one and two bidders are actually competing.

- Apparent market concentration figures conceal the true concentration of buyers because "big" principals tend to split their buying orders among several agents.

The conclusions with respect to individual auction centres are as follows:

- Once being the market place where the notion of the world tea price had a meaning, today the London auction increasingly suffers from a number of comparative institutional disadvantages which has led to its steady decline both in absolute and relative terms. Consignment to the London auction means a unilateral burden for producing countries in terms of price level risk and foreign exchange risk. Furthermore, auction sales in London involve expenses in foreign exchange which are not incurred in the domestic auctions. The salient point, however, is that the bargaining position of the producing countries in the London terminal market is undermined (return shipment is obviously not possible), a fact that is even more severe in view of the oligopolistic market structure in the UK tea market. My conclusion therefore is that the London auction is doomed to die.
- The Jakarta auction is by no means a competitive auction. I have particular problems to call the event even an auction. Rather, the convention resembles a privately negotiated sale between the auctioneer and a customer in the presence and with the acquiescence of all competitors.

**Institutional competition.** The proper marketing mix is a recurrent policy issue in the tea producing countries. Should every kilogram of tea pass the auction or should the auction only dominate as a marketing channel, or should it simply be a minor complement to other means of marketing tea? The analysis along HAYEK's lines leads to the conclusion that there is no rationale for intervention in the case of auctions vs. private bargaining. Unbridled institutional competition would, on the contrary, tend to promote efficiency. If the result was that the auction as a pricing mechanism and distribution channel faded away, it did not pass the test of competition.

HAYEK's individual freedom – maxim is inappropriate once the problem at hand is analysed in a wider framework of social objectives. In fact, the policy recommendation changes once the institutional setting of the tea producing countries, distributive goals, externalities, the (macroeconomic) external equilibrium of the economy etc. are taken into account. The author pleads for a tea export marketing policy stipulating that tea exports must pass auctions (whenever technically feasible), for the following reasons:

- Private contracting, the main alternative to transacting tea via auction, gives rise to bribery if the government is involved in the sale of tea. Indonesia is a case in point. The main seller of Indonesian tea is the Joint Marketing Office (KPB) of the state-owned plantation companies (P.T.P.s). The analysis shows that kickbacks are likely to distort the allocation from PARETO efficient results. In addition, private sales put the social elite in a position to enrich themselves by demanding kickbacks from tea importers. Furthermore, the current institutional structure of Indonesia's tea economy including a large state-owned tea

sector in combination with privately negotiated sales, suggest that the status-quo will be extremely difficult to change since both the privatization of the estates and a 'monopolization' of the Jakarta auctions as a distribution channel would deprive the privileged tea elite of the golden fleece. By contrast, in Sri Lanka nearly 100% of the tea production passes the Colombo auction, a distribution channel which is virtually immune to bribery. Hence, tea auctions should also be viewed as a guard against corruption.

- Given that the tea producing countries are faced with current account imbalances, tea auctions are an effective guard against a loss or leakage of foreign currency earnings that occurs when tea is sold via private treaty at a price below its current spot market value. Despite regulations to prevent undervaluation and underinvoicing there is no effective method against it, notably in an environment of vested interests.
- The institution of the tea auction yields the external benefit of market transparency, which is a prerequisite for subsector policy. Moreover, the price information is used for formula-pricing of private contracts. This function is impaired if the use of auctions is eroded through private sales for two reasons. Firstly, because in a thin market manipulations are encouraged if contract prices are linked to auction prices. Secondly, because thin auction markets are likely to give rise to increased price volatility since the auctions bear the price adjustment burden initially in reaction to a given supply or demand shock before privately negotiated contract prices follow. Hence, in times of enhanced market instability thin auction markets, as well as private contract prices are likely to show a poor pricing performance.

## Appendix: The Commercial Practice of the Tea Export Trade in Sri Lanka

This Appendix sketches some aspects of daily life in the tea export business in Colombo. Buying tea in the Colombo auction is one thing, but getting the tea on board of a vessel is another thing. The procedure involves a number of regulatory hurdles which shall be described here. An equally intricate matter involves the arrangements for payment. Therefore, some of the customary terms of payment in the tea commerce will be dealt with.

**Regulations.** The regulatory functions of the Sri Lankan tea industry are vested in the SRI LANKA TEA BOARD. The TEA BOARD has several branches (research, promotion), one of them being its regulatory arm, the Tea Commissioner's Division. The Tea Commissioner's Division is authorized under the Tea (Tax & Control of Exports) Act of 1959 to issue the Tea Export Permit, which the exporter needs to obtain in order for the tea to pass entry at the customs.

The application form (EXP 11) lists the details of the underlying commercial export treaty, including the buyer's name, the auction price in Colombo, the F.O.B. price as per invoice, the contract price in foreign currency, the quantity and grade contracted, the terms of delivery (e.g. C. & F.), the terms of payment, etc. Two points are noteworthy here: the details of the private contract, which are otherwise considered confidential, are disclosed. Secondly, the information reveals the exporter's margin (the difference between the F.O.B. price and the auction price).<sup>191</sup> Since this information is of potential value to competitors, exporters are understandably reluctant to disclose this kind of information to the Tea Board, notably in an environment of corruption.

A second important certificate is the Export Licence, which is issued by the Central Bank. In the application for a Licence to Export Goods on a Commercial Basis under the Exchange Control Act, the following information is, inter alia, required: identity of the exporter, the consignee and agent (if any); technical details of the cargo and shipment; terms of payment; F.O.B. price and invoice value in SL rupees.

In addition, the Central Bank requires the declaration of the so-called agency commission rate: this is a commission (of up to 5% of the C. & F. value) which the exporter may reserve for his overseas client. Why this? Suppose the overseas client acts as an agent for a principal (the consignee). By letting the exporter reserve a commission, the overseas agent is able to conceal the commission that he is charging his principal. The reserved agency commission is included in the total invoice value and is eventually remitted to the overseas agent.

Usually, a clearing agent (or wharf clerk) serves as intermediary between the exporter and the customs. The clearing agent submits the following documents to the customs:

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<sup>191</sup> The exporter's margin has to cover the following items: freight, insurance, harbour dues, export duty and cesses, packing charge, cases (tea chest), hessianing, hopping / wiring, telex, postage & petties, debit tax, buying commission, bank interest, profit / loss.

- Tea Export Permit (from Tea Board)
- Export Licence (from Central Bank)
- Shipping Note
- Sri Lanka Customs Export Entry and Specification form. This includes the information of the Application for Export Licence.

Only if the port's authority (customs) accepts the above documents, is the tea "cleared": that is, the exporter is authorized to move the freight from the warehouse to the customs. Next, the cargo is put onboard by the exporter's stevedoring company. After freight and other charges have been paid to the shipping company, the shipper releases the final Bill of Lading (BL) to the exporter. The BL serves as a formal receipt of the freight by the shipper and it is also a title of ownership, which the consignee needs for clearing his cargo at the customs.

Next, the exporter submits the commercial invoice, the Certificate of Origin of the tea concerned (issued by the Chamber of Commerce), the BL, and the insurance policy to his house bank, and the house bank forwards these documents to the overseas client's bank. This takes us to the monetary side of the transaction.

**Terms of Payment.** The terms of payment are gaining importance in the world tea trade. This development is a corollary of cash-flow problems on the part of the former U.S.S.R. and many developing countries, high interest rates, and customers not honoring their contractual obligations. Thus, the crucial questions are, who finances the transaction and who bears the credit risk.

There are essentially two modes of payment prevailing in the tea trade: documents-against-payment (D/P) and letter of credit (L/C). Under D/P terms, the buyer promptly pays after the above named documents have been presented to him (via his house bank). The arrangement involves the risk that the overseas customer refuses to accept the cargo, if for instance the price of the commodity has slumped during shipment. In this case, the contract is, de facto, void! Since the exporter alone bears the credit risk, cash-against-documents terms are only customary among trading partners whose relationship is one of mutual trust. A variant of D/P terms is documents-against-acceptance (D/A), terms which are even more friendly towards the buyer because he may check the tea before paying.

The definition of 'letter of credit', as given in a business dictionary, reads like this: "*Instrument drawn by a bank, known as the credit-issuing bank (and eventually the drawee bank), in behalf of one of its customers, known as the principal (who guarantees payment to the issuing bank), authorizing another bank at home or abroad, known as the credit-notifying or negotiating bank (and usually the payer bank), to make payments or accept drafts drawn by a fourth party, known as the beneficiary, when such beneficiary has complied with the stipulations contained in the letter.*"<sup>192</sup>

<sup>192</sup> SCHÄFER, Wilhelm (1986): *Wirtschaftswörterbuch*, Band 1, München, p.374.

In laymen's terms, a letter of credit is a commitment of a bank on behalf of the buyer to make a payment to the seller's house bank provided the conditions of the contract are fulfilled by the seller. Hence, it is the buyer who requests the L/C to be opened or issued subject to the conditions of the physical transaction. These requirements usually include the Bill of Lading, the invoice, the packing list, and the final day of shipment.

Letters of credit are classified as sight L/C or time L/C (usance L/C). Under L/C with sight terms, the exporter is credited upon presenting the shipping documents to the credit-notifying bank. For instance, an exporter will negotiate for L/C with sight terms when the contract is made if he is short of financing or if the local interest rates are higher than the overseas rates, at which the importer is able to finance his imports. Likewise, under time L/C terms the exporter is immediately credited with the proceeds of the sale. The difference consists in the credit which is extended to the overseas buyer: i.e. payment is due only after a stipulated period of time, say 40 or 60 days. In the case of Sri Lanka, the financing cost of the exporter is imputed in the exchange rate which is applied to the foreign exchange remittance.

A second distinction is between a revolving L/C and a straight L/C. To simplify transactions, L/Cs are sometimes opened covering several (revolving) shipments instead of only one. Moreover, letters of credit may be either revocable or irrevocable.

A number of state trading countries such as Syria, Libya, Jordan, China and Iran, procure their tea by floating public tenders. The resulting contractual commitment between the Sri Lankan exporting firm(s) and the foreign government are mostly fixed-price forward contracts extending from two months up to a maximum of six months into the future. Under these conditions, the market may well move against the seller and he might thus be tempted to discard his contractual obligation. Therefore, the buying countries often require a so-called bid bond or performance bond, which is a performance letter of credit opened in favor of the buyer. The beneficiary's bank keeps a certain percentage of the transaction value (some 5%) as an assurance that the required quantities are forthcoming.<sup>193</sup>

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<sup>193</sup> For commercial details in the cocoa trade, see INTERNATIONAL TRADE CENTRE (UNCTAD/GATT), "Cocoa: A Trader's Guide", 1987, Geneva.

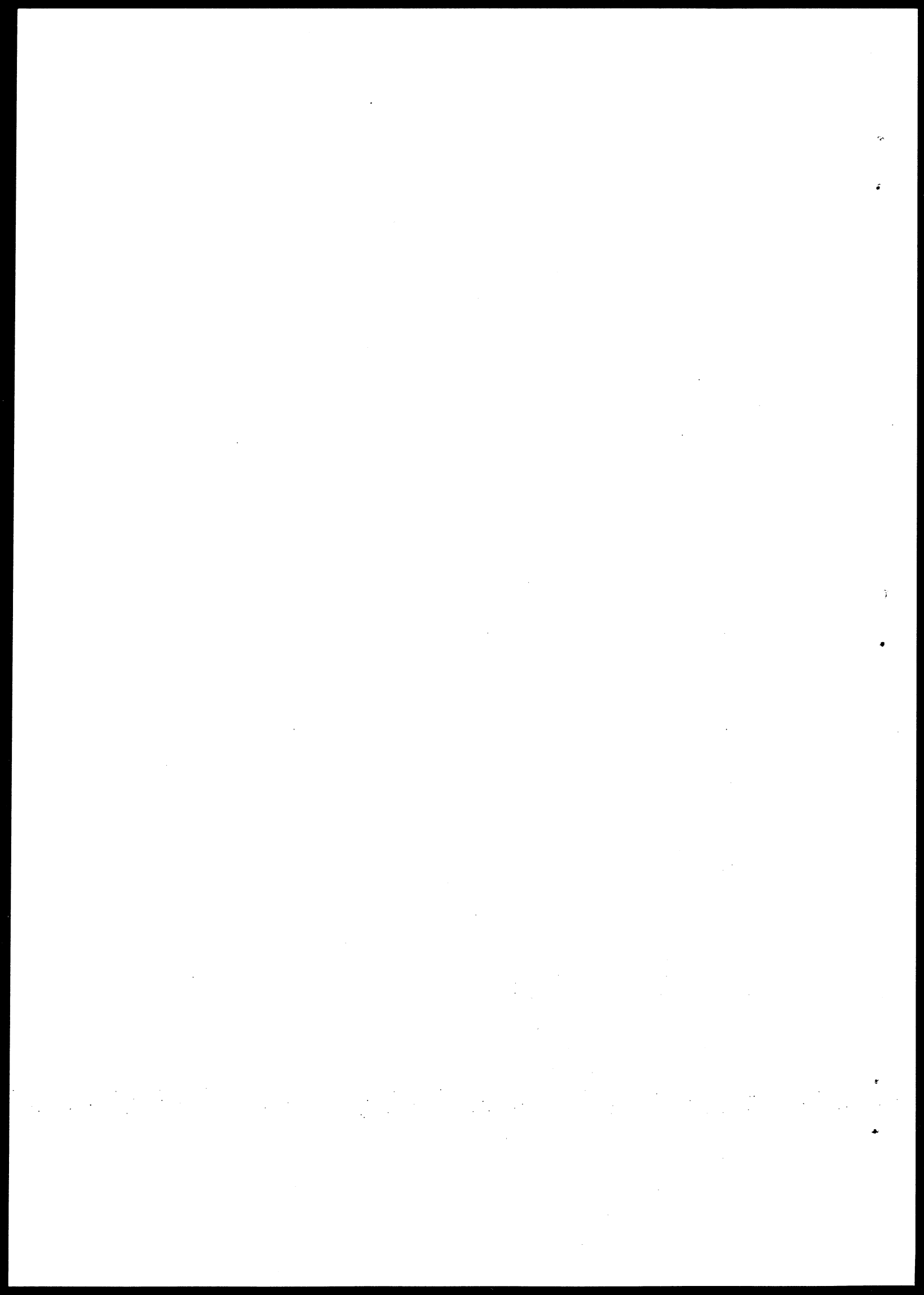
## References

- BARICHELLO, Richard R. (1989): "Political Economy of Agricultural Policy in Asia", in: MAUNDER, A. and A. VALDES (eds.), *Agriculture and Governments in an Interdependent World*, Proceedings of the 20th International Conference of Agricultural Economists, Dartmouth, pp.189-203.
- BETZ, J. (1987): *Teepolitik in Sri Lanka*. Hamburg.
- BOULDING, Kenneth E. (1966): *Economic Analysis: Vol. 1 Microeconomics*, New York.
- BROCKHAUS (1989): "Sklaverei", in: Brockhaus Lexikon, München, pp. 50-51.
- BUCHANAN, James M. (1975): *The Limits of Liberty: Between Anarchy and Leviathan*. Chicago.
- CASPERZ, Paul (1976): "Sri Lanka and the Changing World Tea Economy", in: *Marga Quarterly Journal*, Vol.3, pp.1-22.
- CIDA / GOVERNMENT of SRI LANKA (1980): *Tea Master Plan*. Vol. I-III. Colombo.
- CENTRAL BANK of SRI LANKA (1990): *Annual Report*. Colombo.
- CHUNG, Choeng-Hoy and G. UKPONG (1981): *The World Tea Economy. An Econometric Model of its Structure, Performance and Prospects*. World Bank staff commodity working paper No.6, Washington.
- CTTA, THE CALCUTTA TEA TRADERS' ASSOCIATION (1986): *CTTA Centenary Tea Today*. Vol. 6, No. 384. Calcutta.
- DIRECTORATE GENERAL of ESTATES (1989): *Statistical Yearbook of Indonesia 1989*. Jakarta.
- ETHERINGTON, Dan M. (1974): "The Indonesia Tea Industry", in: *Bulletin of Indonesian Economic Studies*, Vol. 10, No. 2, pp. 83-113.
- ETHERINGTON, Dan M. and Keith FORSTER (1989): "The Complex Case of the Chinese Tea Industry", in: *Food Research Institute Studies*, Vol. XXI, No. 3, pp. 265-308.
- FAR EASTERN ECONOMIC REVIEW (1991): "More Haste less Speed". August 29th, Hongkong, pp. 42-44.
- FORBES & WALKER (1988): *Sri Lanka Tea Review '88*. Colombo.
- FORBES & WALKER (1990): *Sri Lanka Tea Review '90*. Colombo.
- FORREST, Denys (1985): *The World Tea Trade*, Cambridge.
- GOVERNMENT of INDIA (1978): *Report of the Committee on Tea Marketing (Tandon Committee Report)*. Calcutta.
- HAHN, F. (1987): "Auctioneer", in: *The New Palgrave Dictionary*, pp. 136-138.
- HAYEK, Friedrich A. von (1968): "Der Wettbewerb als Entdeckungsverfahren", in: *Kieler Vorträge* No. 56, pp. 3-20.
- HAYEK, Friedrich A. von (1980): *Recht, Gesetzgebung und Freiheit (Law, Legislation and Liberty)*. Vol. 1-3. München.
- IMF, INTERNATIONAL MONETARY FUND (1990): *International Financial Statistics Yearbook*, Washington.
- ITC, INTERNATIONAL TRADE CENTRE (1987): *Cocoa: A Trader's Guide*. Geneva.

- ITC, THE INTERNATIONAL TEA COMMITTEE (var. years): *Annual Bulletin of Statistics*, London.
- JAYAWICKRAMA, S.S. (1976): "The System of Marketing Tea – Improvements or Alternatives", in: *Marga Quarterly Journal*, Vol.3, No.4, pp.63–75.
- J. THOMAS & Company PVT Ltd. (1990): *Tea Statistics*, Calcutta.
- MARION, Bruce W. (1985): *The Organization and Performance of the U.S. Food System*. Heath and Company.
- McAFEE, R. Preston and John McMILLAN (1987): "Auctions and Bidding", in: *Journal of Economic Literature*, Vol.XXV, June, pp.699–738.
- MILGROM, Paul (1989): "Auctions and Bidding: "A Primer", in: *Journal of Economic Perspectives*, Vol. 3, No. 3, pp.3–22.
- OBERENDER, Peter and Andreas VÄTH (1989): "Von der Industrieökonomie zur Marktökonomie", in: OBERENDER, PETER (ed.): *Marktstruktur und Wettbewerb in ausgewählten Branchen der Bundesrepublik Deutschland*, München, pp.1–27.
- PAQUE, Karl-Heinz (1985): "How Far is Vienna from Chicago?", in: *Kyklos*, Vol. 38, No. 3, pp.412–434.
- PERRY, Martin K. (1989): "Vertical Integration: Determinants and Effects", in: SCHMALENSSEE, R. and R.D. WILLIG (ed.), *Handbook of Industrial Organization*, Vol.I, pp. 183–255.
- RILEY, John G (1989): "Expected Revenue from Open and Sealed Bid Auctions", in: *Journal of Economic Perspectives*, Vol.3, No.3, 1989, pp.41–50.
- ROTE, Ron (1986): *A Taste of Bitterness. The Political Economy of Tea Plantations in Sri Lanka*. Amsterdam.
- SAMUELSON, Paul A. and William D. NORDHAUS (1985): *Economics*. New York.
- SCHÄFER, W. (1986): *Wirtschaftswörterbuch*, Vol.1, München, p. 374.
- SCHERER, F.M. (1980): *Industrial Market Structure and Economic Performance*, Chicago.
- SCHMIDT, Ingo (1987): *Wettbewerbspolitik und Kartellrecht*, Stuttgart.
- SCHMIDT, Ingo and Jan RITTALER (1989): *A Critical Evaluation of the Chicago School of Antitrust Analysis*. Dordrecht, Boston, London.
- SCHMIDTCHEN, Dieter (1988): "Fehlurteile über das Konzept der Wettbewerbsfreiheit" (Misconceptions about the Antitrust Concept of Freedom to Compete), in: *Ordo*, Vol. 39, pp. 111–135.
- SIDDIQUE, Muhammed Abu, B. (1990): *Evolution of Land Grants and Labour Policy of Government*, New Delhi.
- SINGLETON, Ross C. (1986): *Industrial Organization and Antitrust: A Survey of Alternative Perspectives*. Columbus, Ohio.
- SMITH, Vernon (1982): "Microeconomic Systems as an Experimental Science", in: *American Economic Review*, Vol. 72, No. 5, pp. 923–955.
- SMITH, Vernon (1987): "Auctions", in: J. EATWELL, M. MILGATE, and P. NEWMAN (eds.), *The New Palgrave: A Dictionary of Economic Theory*, London, pp.138–144.
- SRI LANKA MINISTRY of PLANTATION INDUSTRIES (1990): *Plantation Sector Statistical Pocket Book*. Colombo.
- SRI LANKA TEA BOARD (1989): *Annual Report*, Colombo.



- STÜRZINGER, Martin (1991): "Bitterer Tee", in: *Transit Magazin*, No.3, Zurich.
- THE ECONOMIST (1991): "Privatising East Germany". Sept.14th-20th, pp. 21-24.
- UKTA, THE UNITED KINGDOM TEA ASSOCIATION (1989): *Tea Auctions: Conditions of Sale*, London.
- UNCTAD (1984): *The Marketing and Processing of Tea: Areas for International Co-Operation. Studies in the Processing, Marketing and Distribution of Commodities*, Geneva.
- URFF, W. von (1982): "Die Rolle der Landwirtschaft in der wirtschaftlichen Entwicklung", in: BLANCKENBURG, P. von: *Handbuch der Landwirtschaft und Ernährung in den Entwicklungsländern*, Vol.1, Stuttgart, pp. 19-37.
- VICKREY, William (1961): "Counterspeculation, Auctions, and Competitive Sealed Tenders", in: *Journal of Finance*, Vol. 16, No.1, pp.8-37.
- VOLLERS, Arend (1987): *Indonesien*. Paul SCHRADER & Co., Bremen.
- WILSON, Robert (1987): "Bidding", in: J. EATWELL, M. MILGATE, and P. NEWMAN (eds.), *The New Palgrave: A Dictionary of Economic Theory*, London, pp.238-242.



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