Chapter 9

THE PERFORMANCE OF DOUBLE-AUCTION AND POSTED-OFFER MARKETS WITH ADVANCE PRODUCTION

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Mestelman and Welland (1988) argue that laboratory environments which use double-auction and posted-offer trading institutions typically do not require producers to incur production costs prior to entering into contracts to deliver units of their product to consumers. They add to the available information about the performance of these institutions by introducing an advance production condition, under which producers must incur production costs before entering into contracts to deliver their product to consumers. The markets they examine are markets for perishable goods. Inventories of unsold goods may not be carried from period to period. The decisions made by producers and consumers in this environment are influenced by the inability of producers or consumers to carry goods from one period to another.

The sunk cost incurred in the advance production environment, coupled with the inability of sellers to lower prices within a trading period in the posted-offer institution leads to lower prices in markets with advance production than in posted-offer markets with production to demand. The added complexity of the advance production environment leads to a reduction in the share of the gains from trade realized by participants in these markets from that realized in the less complex, production-to-demand environments. The double-auction institution, however, continues to perform better than the posted-offer institution with respect to the gains realized from trade.

Mestelman and Welland (1991a) extend their earlier work to consider an environment in which producers must make production decisions in advance of sale, but in which they are able to carry inventories of their products costlessly from period to period. The ability to carry inventories should offset the uncertainty associated with advance production, and should aid producers in realizing the potential gains from trade.

Increased market efficiency is not generally realized with the introduction of inventory carryover. The performance of the double-auction institution does improve when inventories may be carried. Inventory carryover, however, introduces a level of complexity which does not permit efficiency gains to be realized by traders in the posted-offer institution.

The laboratory sessions run by Mestelman and Welland (1988, 1991a) use subjects who are inexperienced with the trading institutions within which they must make production and consumption decisions. This inexperience is a possible source of the inefficiencies realized by traders in the posted-offer environments. Another source of inefficiency in the posted-offer institution, relative to the double-auction institution, is provided by the small amount of price information available to producers and consumers

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in posted-offer environments. Mestelman and Welland (1994) present a new set of laboratory sessions which reproduce the results of the earlier work and extend it by adding experienced traders and by introducing a second price-posting (clearance sales) in the posted-offer environment.

The introduction of experienced traders does not have a substantial effect on the performance of either market institution. This suggests that repeated trading provides enough experience to traders that the participation in more than one session of trading may not be necessary for subjects to benefit from learning effects in laboratory environments. The second price posting does, however, improve the performance of the posted-offer institution. This added price flexibility provides sufficient information to producers and consumers to permit producers to effectively manage any inventories that may accumulate. In addition, sufficient price information is revealed – and sufficient opportunity to vary prices exists – with a second posting that the posted-offer institution will generate trade gains matching those in double-auction markets (which permit multiple, and nearly continuous, price postings).

Figure 1 summarizes the price performance of double-auction and posted-offer markets generated in 120 laboratory sessions and more than 1800 trading periods. It shows that the mean contract price differences between double auction and posted offer institutions, which are common in production-to-demand markets, narrow with production in advance of sale. Furthermore, the consideration of inventory carryover in advance-production markets results in a further reduction of contract prices. Finally, the introduction of a second price posting in the posted-offer markets tends to reduce the contract prices in these markets and together with trading experience generates prices in the posted-offer environment comparable to those in the double-auction market with advance production and inventory carryover. At this point, price performance differences between the two trading institutions disappear.

Figure 2 shows that the efficiency of the posted-offer institution with a single price posting is systematically lower than the efficiency of the double-auction institution regardless of production characteristics, whether inventories may or may not be carried or trader experience. The efficiency of the posted-offer institution is improved significantly, however, if sellers are permitted a second price posting in each trading period. Although this is very different from the continuous price posting and contract formation by both buyers and sellers characteristic of the double-auction institution, it ultimately leads to comparable efficiency levels in both double-auction and posted-offer markets when production is in advance of sale, inventories may be carried from period to period, and traders are experienced.

The success of the posted-offer markets with a second price posting is best understood by comparing the pattern of inventories summarized in Figure 3. When traders are inexperienced, significantly more inventories are carried by sellers in posted-offer markets than by sellers in double-auction markets. In these environments, the perfect foresight, competitive equilibrium production for the market is eleven units. Nothing should be carried as inventories from period to period. With inexperienced traders, inventories in posted-offer markets (with single price postings) tend to be at least twice as large as in

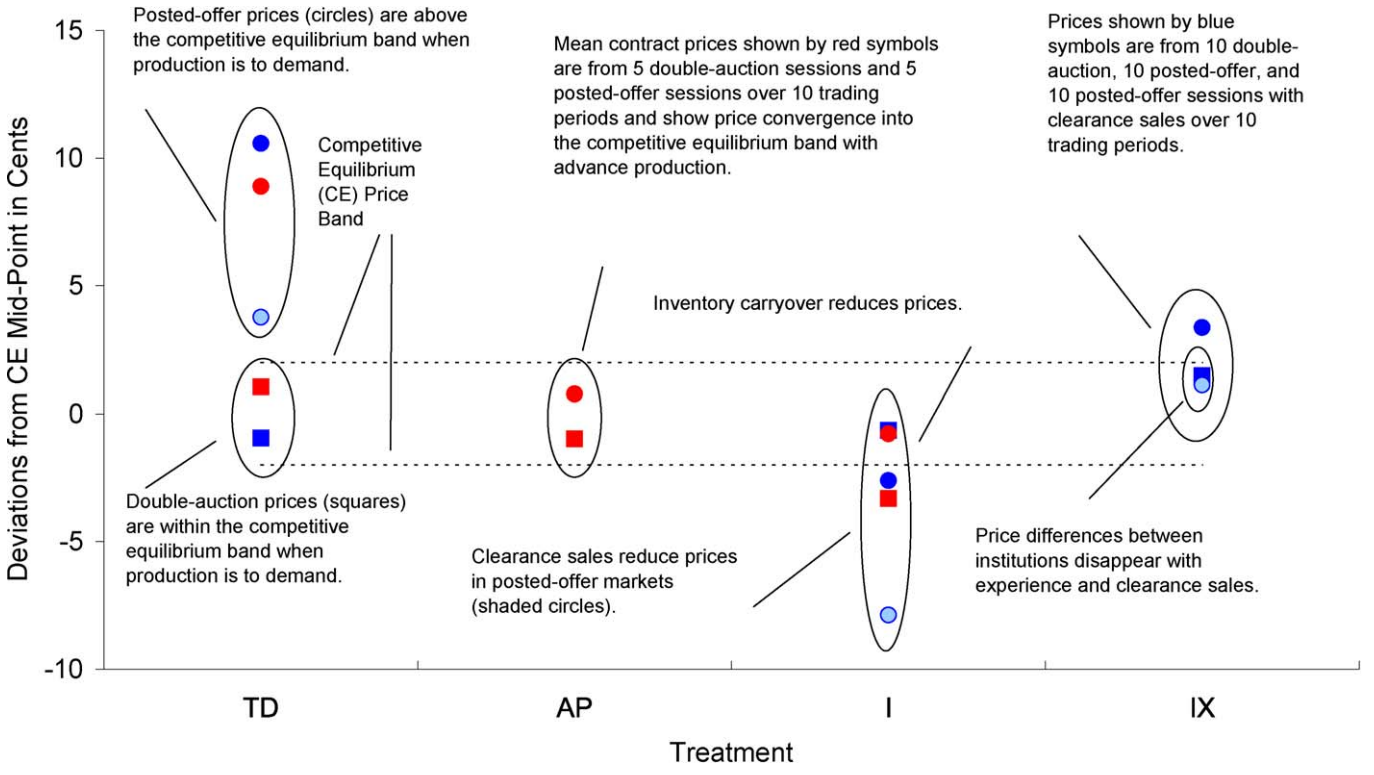

Figure 1. Mean contract price differences between double-auction and posted-offer institutions in production-to-demand markets narrow with advance production and disappear when clearance sales are introduced into posted-offer markets with experienced traders.

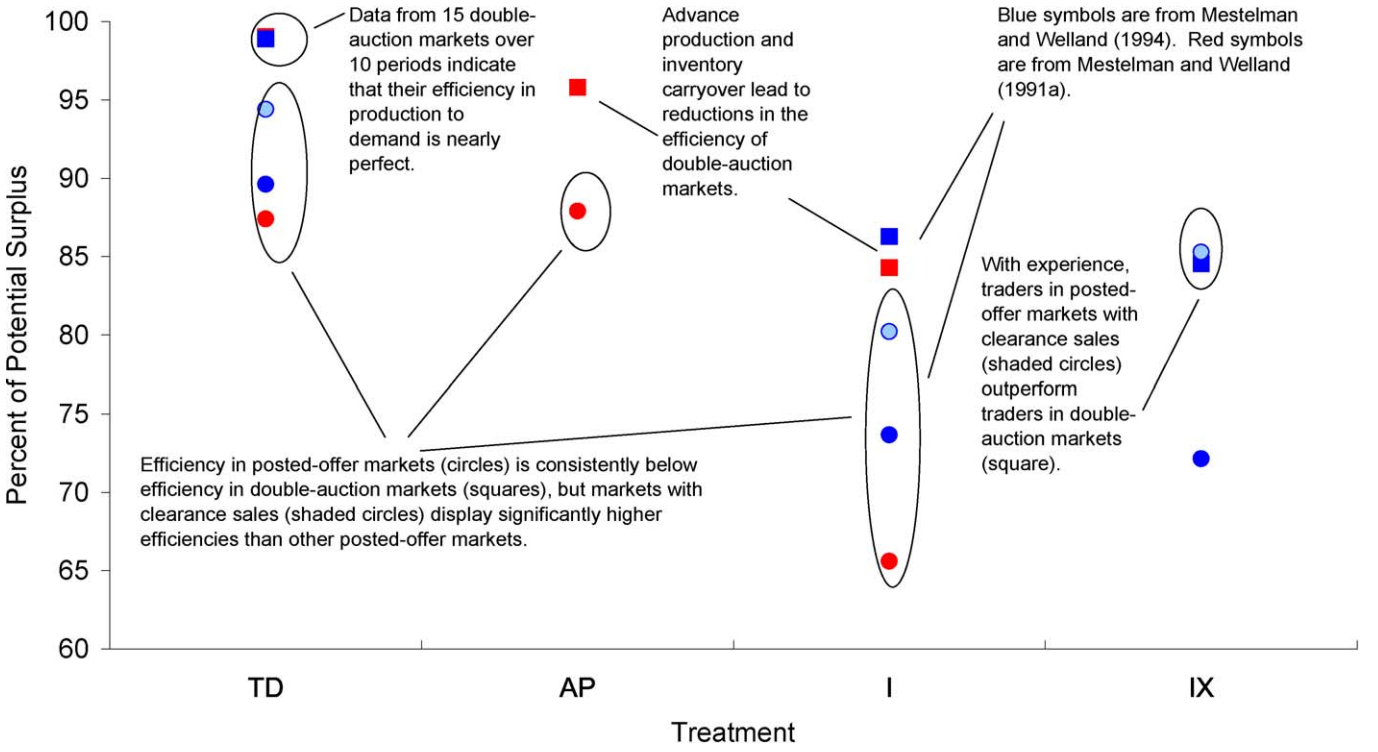

Figure 2. Market efficiency differences between double-auction and posted-offer institutions persist in environments with advance production and inventory carryover. Clearance sales temper the difference and with the introduction of experienced traders lead to the elimination of the differences between the two institutions.

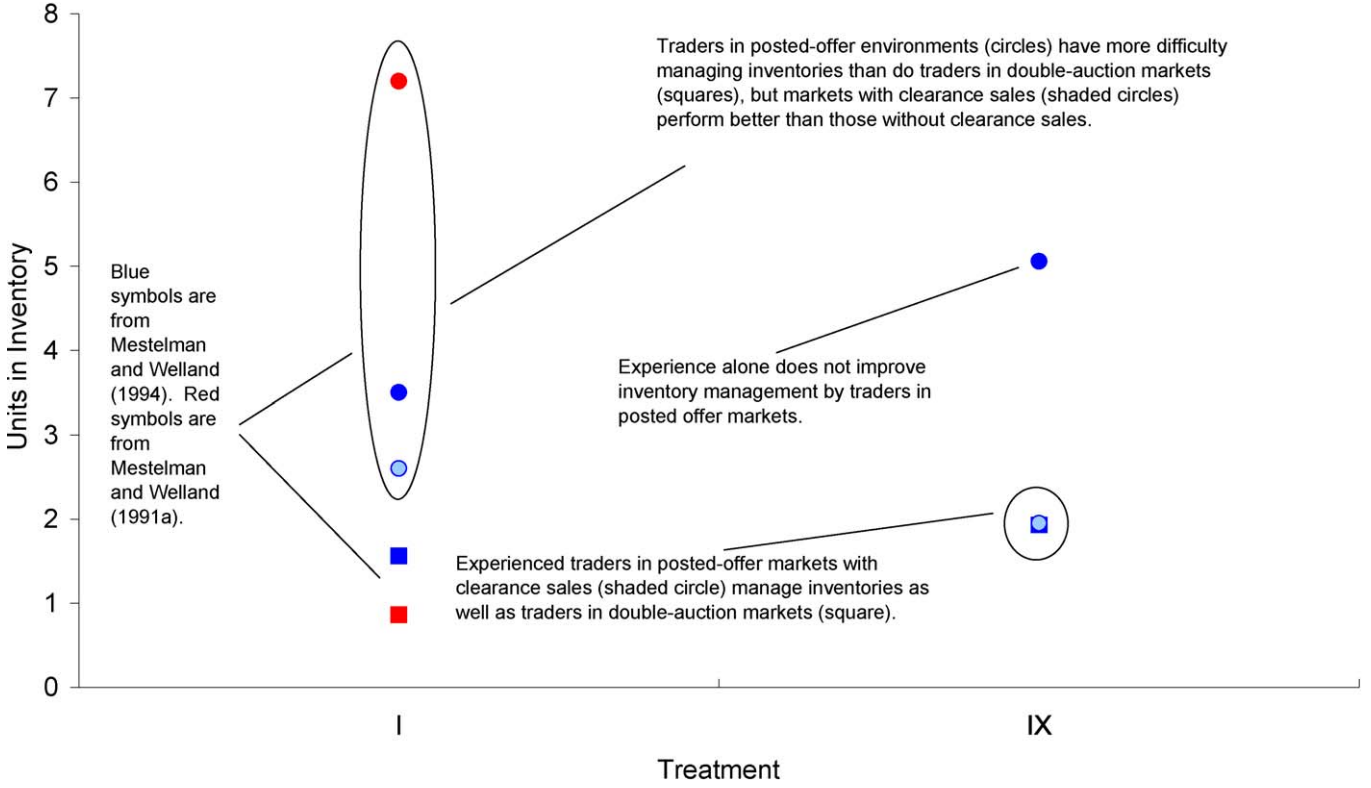

Figure 3. Clearance sales result in improved inventory management in posted-offer markets and with experience lead to performance comparable to that in double-auction markets.

double-auction markets. The introduction of a second price posting in posted-offer markets with inexperienced traders results in fewer units carried in inventory. When traders are experienced, the second price posting leads to reductions in inventories carried to the level realized by experienced traders in double-auction markets. It is interesting to note that average inventory carryover did not fall when experienced traders were used in the posted-offer markets with a single price posting.

The series of laboratory sessions reported in these papers suggest that trader experience may not be an important factor in explaining differences between the performance of double-auction and posted-offer trading institutions. The additional characteristics of the environment into which these institutions are placed are substantially more important.

Advance production leads to an elimination of the advantage sellers enjoy in posted-offer markets relative to double-auction markets. This is reflected by the convergence of the time series of prices (for additional analysis of rent asymmetries see Mestelman and Welland, 1991b). The introduction of inventory carryover does not improve market efficiencies in double-auction markets, but substantially reduces the efficiency of posted-offer markets. Laboratory sessions suggest that the management of inventories is a particularly difficult task in the posted-offer environment. Experience does not improve the management of inventories, but the ability to post a second price during a production period does substantially improve efficiency. The second price posting (or clearance sale) in the posted-offer institution is sufficient to lead to efficiency gains which rival those realized by experienced traders in double-auction markets who must make advance production decisions and who may carry inventories. In this environment, the double-auction trading institution no longer dominates the posted-offer institution.

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