

perception of quality). The magnitude of the price and quantity change from the shift in the demand curve is determined by the higher willingness to pay and the elasticity of demand.

In the median simulation, the amount sold in the domestic market rises by 1.6 million pounds. The benefit to industry participants is the total value of this increase in domestic sales which is the 1.6 million pound increase in quantity sold multiplied by the higher expected price level resulting from the shifting of the supply and demand curves in the simulation of marketing order impacts.

Using the median supply and demand elasticities in the simulation model, and the median compliance cost and willingness to pay figures, the computed benefit to the handler portion of the market from the reduced chance of an aflatoxin market disturbance is \$1.545 million dollars. The value of the two additional demand-side benefits is \$.392 million dollars. The total benefit to handlers is thus \$1.938 million dollars.

When the loss due to compliance-related expenses (\$490,000) is factored in, the resulting net benefit to pistachio handlers from the marketing order is \$1.448 million dollars. This \$1.448 million dollar estimate of net benefit to handlers is the key result from the witness's cost-benefit analysis.

In economic theory terminology, this part of the simulation is measuring the change in producer surplus. Viewed in terms of a supply-demand graph, producer surplus is the area below the price and above the supply curve. The \$1.448 million dollar estimate of net benefit is a measure of the difference between producer surplus at the initial equilibrium (e.g. \$1.80 average price at the handler level, or \$1.10 at the grower level) and the new higher price and quantity after the supply and demand curves have been shifted to represent the median changes in cost (supply) and willingness to pay (demand).

TABLE 1.—SIMULATION OF PISTACHIO MARKETING ORDER IMPACTS ON PRODUCERS/HANDLERS

[Annual net costs and benefits with median parameter values]

Benefit 1: Reduced chance of aflatoxin event	\$1,545,000
Benefit 2: USDA certification	178,000
Benefit 3: Improved quality perception	214,000
Total benefit	1,938,000
Impact of cost of compliance ...	– 490,000
Net Total	1,448,000

It should be noted that although the witness asserts that Benefit 2 and

Benefit 3 are conceptually distinct, one could argue that there is significant overlap between the value of USDA certification and improved quality perception on the part of pistachio buyers and consumers. However, the assumed benefits are small in both cases, and if either of the benefit figures is eliminated, net estimated benefits to handlers still exceed one million dollars.

Cost-benefit studies which use economic welfare analysis also typically include consumer impacts, and the witness's economic analysis includes a parallel set of computations for the buyer/consumer segment of the pistachio industry. The largest demand-side benefit, the reduced chance of an aflatoxin event, is estimated at \$2.586 million. The combined value of the two additional demand-side benefits is \$.655 million, yielding a total benefit estimate of \$3.241 million. Subtracting the estimated impact on buyers/consumers of introducing added costs of marketing order compliance (\$245,000) yields a buyer/consumer net benefit estimate of \$2.996 million. A key aspect of this economic analysis is that consumer willingness to pay for pistachios rises as consumer confidence improves from the higher quality standards imposed by the order. With the demand and supply elasticities used in the analysis, the benefits to the domestic buyers/consumers in this simulation are larger than benefits to the handler side of the market.

In economic theory terminology, this part of the simulation is measuring the change in consumer surplus. Viewed in terms of a supply-demand graph, consumer surplus is the area above the price and below the demand curve. The \$2.996 million dollar estimate of net benefit is a measure of the difference between consumer surplus at the initial equilibrium and the new price and quantity after the supply and demand curves have been shifted to represent the median changes in cost (supply) and willingness to pay (demand).

Summing the producer/handler and buyer/consumer net benefits (\$2.996 + \$1.448) yields a \$4.444 million median estimated value of the marketing order to the economy.

Estimated Impacts on Small Producers

The proposed marketing order would not impose any direct compliance costs on producers. The direct impact is on the handlers who would be required to pay for testing and inspection. Producers would be affected to the extent that they may have to discard more low quality nuts than previously, if they produce quantities of nuts below

the proposed size and quality standard. Witnesses stated there is no evidence that the proportion of low quality nuts is correlated with farm size.

Additionally, the record shows that handler costs of compliance are typically reflected in handler payments to producers. Witnesses stated that the anticipated benefit derived from increased consumer demand would offset the cost of compliance to producers.

Witnesses stated that most producers sell to large handlers (which handle 80 percent of production). Distinguishing among handlers by size does not indicate different economic impacts on individual farms, which are distributed broadly across handlers.

Witnesses also pointed out that there is substantial inter-handler competition in the pistachio industry, with at least 10 handlers out of 19 competing for producers' pistachios (with the remainder presumably processing for their own account). Given the distribution of producers across processing firms and the level of competition, the overall cost-benefit results may be taken as the impact on the full size range of producers.

Based on a farm price of \$1.10 and a handler price of \$1.80, producers receive about 60 percent of the revenue in the industry, and are likely (given certain supply elasticities) to receive more than 60 percent of the estimated handler net benefits. Producer total gain (out of the estimated \$1.448 million in net benefits to the handler segment) is thus at least \$870,000 per year (\$1.448 million times 0.60). This is distributed across producers in proportion to output, with no differential impact on smaller or larger producers.

Based on the hearing record, AMS therefore concludes that pistachio producers would benefit from implementation of the proposed order. Further, there is no evidence of differing economic impacts between small and large producers.

Estimated Impact on Small Handlers

Most compliance costs are uniform across handlers, but some differences could be correlated with the size of a handler's operation. Two relevant points are the number of lots ready to be tested per day and the lot size to be tested. Larger firms, which are more likely to have larger lot sizes for testing and to have more lots ready per day (up to about 5), may experience some savings relative to firms with smaller lot sizes and fewer lots to be tested at one time.

The proposed marketing order includes provisions to reduce