

An Analysis of Increasing Costs to Gulf of Mexico Shrimp Vessel Owners: 1971-75

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INTRODUCTION

The shrimp industry in the Gulf of Mexico is undergoing a difficult transition period at present. Lower shrimp prices coupled with rapidly escalating prices for fuel and other input items have brought about a cost-price squeeze that has literally put the vessel owners in a struggle for economic survival. The energy crisis had the most devastating impact on an industry beset by low production in 1973 and 1974. Fishing is a highly fuel-intensive industry and with high and rising fuel costs the immediate future promises continued economic hardship for the shrimp industry.

This report is intended to provide current information on the economics of owning and operating a shrimp vessel in the Gulf of Mexico. Cost and returns estimates in this report are based on 1971 and 1973 data collected from shrimp vessel owners. More specifically this report includes: 1) Estimated break-even annual shrimp catches with various ex-vessel shrimp prices for 1971, 1973, 1974, and 1975; and 2) Evaluation of expected cost and returns in 1975.

DATA AND METHOD OF ANALYSIS

Data Description

Cost and return and financial data used in this study were gathered by personal interviews with shrimp vessel owners and/or managers operating from ports in Florida, Mississippi, and Texas. Additional financial information was obtained from officials of various lending institutions which engage in shrimp vessel financing. Cost and return estimates for 1971 used in this re-

port are based on a sample of 29 vessels from 53 to 72 feet in keel length and constructed of wood, steel, or fiberglass¹. Cost and return estimates for 1973 used in this report were based on a sample of 115 vessels. Vessels from the 1973 sample were constructed of wood or steel, with a keel length from 54 to 78 feet². Costs for 1974 were calculated by increasing all 1973 cost items (fixed and variable) by 20 percent³, except fuel which was increased from 18 to 32 cents per gallon. Inflation is expected to continue at a rate between 10 and 20 percent; therefore, 1975 costs were increased by 15 percent over 1974 levels.

Method of Analysis

Cost and return data provide a basis for investigating the price-quantity relationships that will allow the vessel owner to just break even. For a given price per pound of shrimp landed, break-even analysis determines the quantity of shrimp that must be landed so that the revenue from sale of shrimp is just equal to the costs incurred for landing the shrimp. Costs may include both variable and fixed cost, depending on the type of break-even analysis considered.

Four different types of break-even analysis are presented in this report. They are: 1) break-even net returns; 2) break-even cash flow with loan payment; 3) break-even cash flow without loan payment; and 4) break-even cash flow just meeting variable cost. Break-even net return analysis is concerned

¹For a complete description of this data see Lacey et al. (1974). The data in the original publication was broken down into two groups; however, for this report they were combined into one group.

²For a complete description of the data see Wardlaw and Griffin (1974).

³Based on wholesale price index for 1974 (Board of Governors of the Federal Reserve System, 1974).

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with the profitability of the vessel, whereas the other three analyses are concerned with meeting cash outflow for operating the vessel. All four of the break-even analyses include variable cost, which takes into account the expense items as a result of going fishing, such as ice, fuel, repair and maintenance, crew shares, etc. Fixed cost included in the break-even analysis: net revenue analysis includes insurance, overhead, depreciation⁴, interest⁵, payment on borrowed capital and owners return to equity capital; cash flow with loan payment includes insurance, overhead, and principal and interest payment on borrowed capital; and cash flow without a loan payment is insurance and overhead. For these break-even calculations, it is assumed that variable operating costs were constant because most of the costs (except crew shares, payroll taxes, and packing charges) would be incurred before the vessel sailed, once a decision to leave port had been made.

BREAK-EVEN ANALYSIS

Break-Even Net Returns

Break-even net returns⁶ for alternative ex-vessel prices and pounds landed for operating a vessel in the Gulf of Mexico in 1971 and 1973 and estimated

⁴Depreciation charges were calculated using the straight line method, based on the estimated new replacement value for each vessel, and using an 8-year depreciation life with 35 percent book salvage value.

⁵For the amortization schedule the equivalent new vessel costs were used with 67 percent of that value financed for 8 years at 9 percent interest, and 12 equally amortized payments per year.

⁶Break-even net returns include a 9 percent return to owner's equity capital.

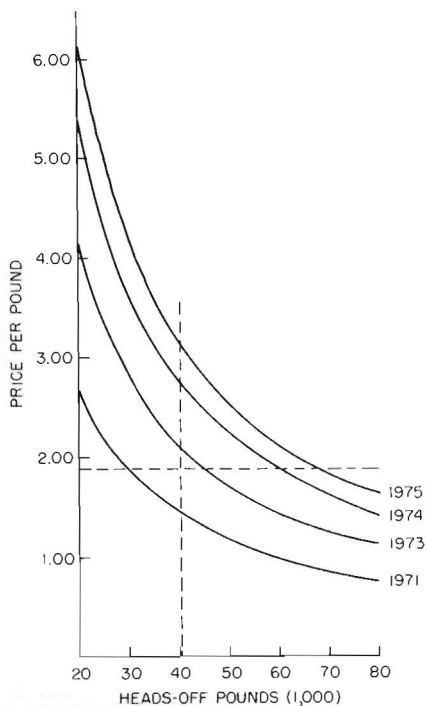


Figure 1.—Break-even net returns for alternative ex-vessel prices and pounds landed for operating a vessel in the Gulf of Mexico in 1971 and 1973 and estimated for 1974 and 1975.

for 1974 and 1975 are presented in Figure 1. For comparison purposes, the vertical dashed line indicates the 1973 average landings for all vessels and the horizontal dashed line indicates the average ex-vessel price per pound received by the 115 vessels in the 1973 data sample.

As Figure 1 illustrates, holding the average price constant at \$1.88 per pound, break-even quantity landed would have to be approximately 27,000 pounds in 1971, 45,000 in 1973, 60,000 in 1974, and an expected 68,000 in 1975. At an ex-vessel price of \$1.88 per pound, the required pounds landed to have break-even net revenue increased 18,000 pounds from 1971 to 1973. However, it should be pointed out that the average pounds landed in 1971 was slightly over 52,000 pounds, and the average price received was \$1.20. Hence, actual vessel production had declined 12,000 pounds from 1971 to 1973.

At an ex-vessel price of \$1.88, the 1973 average vessel production level was 5,000 pounds less than that needed to break even. Thus, the average vessel owner had negative net returns from vessel operations in 1973.

At an ex-vessel price of \$1.88, the required pounds landed would have to

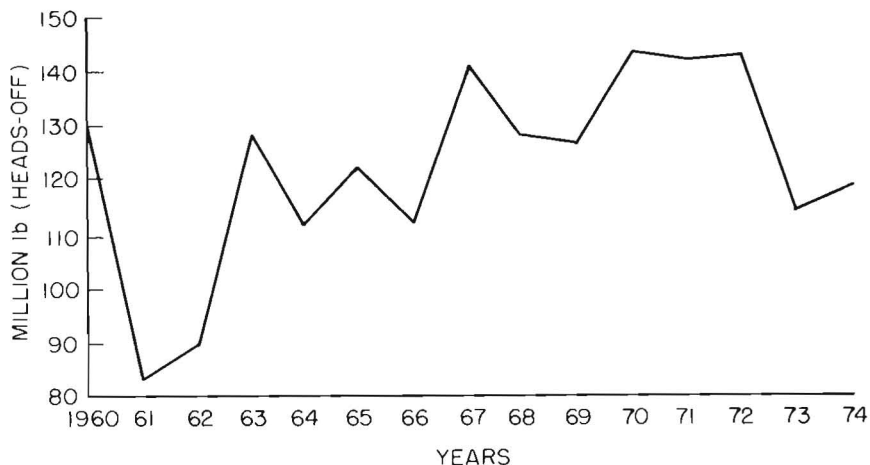


Figure 2.—Total shrimp landings in the Gulf of Mexico for years 1960-74. Landings for 1974 are estimated.

increase approximately 15,000 pounds (20,000 pounds above actual 1973 production) from 1973 to 1974 to have break-even net revenue. However, in Figure 2, which shows the total shrimp landings in the Gulf of Mexico for the years 1960-74, landings in 1974 were only about 4 percent above 1973 landings. This implies that landings per vessel probably did not increase substantially in 1974 over 1973. Hence, at an ex-vessel price of \$1.88 per pound, substantial negative net returns occurred in 1974.

Now holding landings per vessel constant, price changes are determined to maintain a break-even position. At 40,000 pounds per vessel, the required ex-vessel price that vessel owners would have to receive to have break-even net revenue would be approximately \$1.30 in 1971, \$2.05 in 1973, \$2.75 in 1974, and \$3.15 in 1975. The actual price received in 1971 was \$1.20; thus, at 40,000 pounds a loss of \$0.10 per pound would have been incurred. In 1973 the actual price was \$1.88 per pound of shrimp landed; thus, a loss of \$0.17 per pound would have been incurred.

The ex-vessel price per pound of shrimp landed for total Gulf landings for the years 1960-1974, shown in Figure 3, indicates that the actual price received declined in 1974. Hence, in 1974 the ex-vessel price received by vessels similar to those in the sample was probably also less than the \$1.88 per pound received in 1973, implying a loss in excess of \$0.87 per pound ($\$2.75 - \$1.88 = \0.87). Expectations for 1975 will be discussed later.

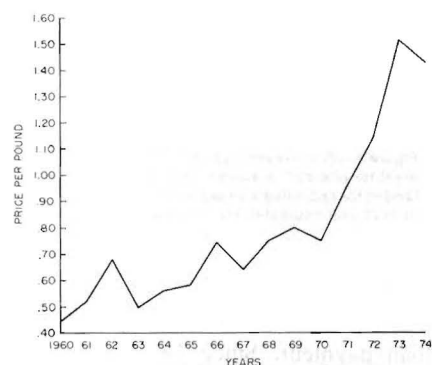


Figure 3.—Ex-vessel price for Gulf of Mexico shrimp landed (heads-off) for years 1960-74. Prices for 1974 are for January-October.

Break-Even Cash Flow with Loan Payment

Break-even cash flow requires that the cash inflow from revenue be just equal to all cash outflow for operating a shrimp vessel. Break-even cash flow, with a loan payment for alternative ex-vessel prices and pounds landed for operating a vessel in the Gulf of Mexico in 1973 and an estimation for 1974 and 1975, are shown in Figure 4⁷. The dashed lines again refer to actual 1973 pounds landed and ex-vessel price received.

At a price of \$1.88 per pound vessel owners would have had to produce 41,000 pounds in 1973, 51,000 pounds in 1974, and an expected 57,000 pounds in 1975. In 1973, vessel owners produced on the average approximately 1,000 pounds short of the actual production needed for break-even cash flow with

⁷ Adequate data were not available to calculate loan payment from 1971 figures.

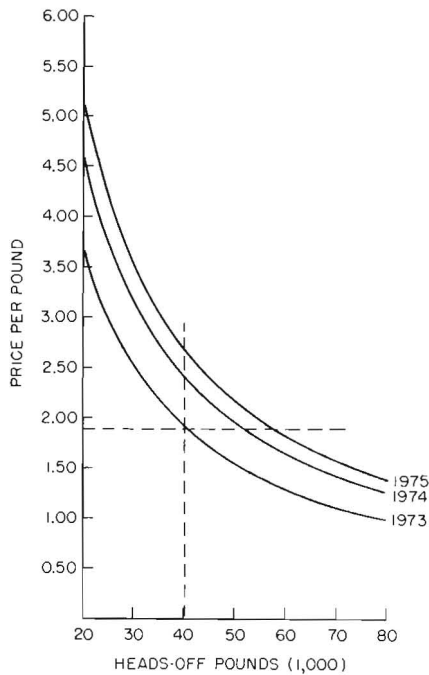


Figure 4.—Break-even cash flows with a loan payment for alternative ex-vessel prices and pounds landed for operating a vessel in the Gulf of Mexico in 1973 and estimated for 1974 and 1975.

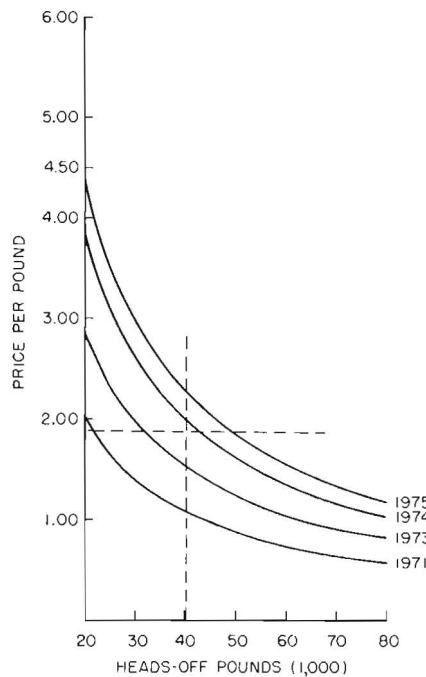


Figure 5.—Break-even cash flow without a loan payment for alternative ex-vessel prices and pounds landed for operating a vessel in the Gulf of Mexico in 1971 and 1973 and estimated for 1974 and 1975.

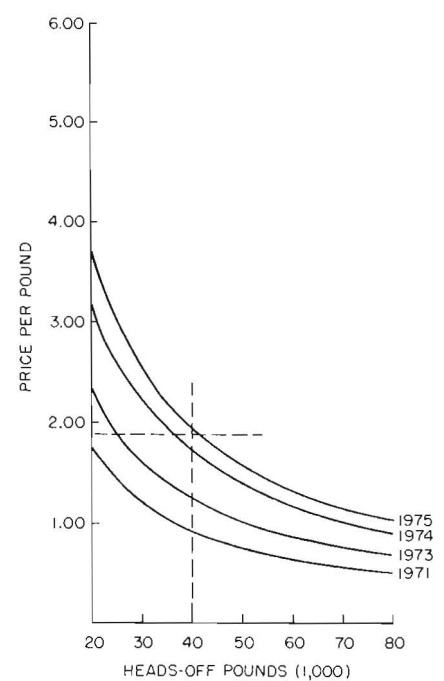


Figure 6.—Break-even cash flow just meeting variable costs for alternative ex-vessel prices and pounds landed for operating a vessel in the Gulf of Mexico in 1971 and 1973 and estimated for 1974 and 1975.

loan payment. Since 1974 total Gulf landings were only 4 percent above 1973 landings, it can be assumed that average landings per vessel did not increase significantly. Thus, production was approximately 11,000 pounds less than needed for break-even cash flow with loan payment.

Assuming production per vessel remains constant at 40,000 pounds landed, ex-vessel price received would have to be \$1.95 in 1973, \$2.40 in 1974, and \$2.70 per pound of shrimp landed in 1975. Based on prices received of \$1.88 per pound in 1973, vessel owners under conditions described above had a net cash outflow of \$0.07 per pound of shrimp landed. Since ex-vessel prices were probably below the 1973 prices, vessel owners had a net cash outflow in 1974 in excess of \$0.52 per pound of shrimp landed.

Break-Even Cash Flow Without a Loan Payment

Break-even cash flow without a loan payment for alternative ex-vessel prices and pounds landed is illustrated in Figure 5. At a price of \$1.88 per pound, vessel owners would have had to produce 20,000 pounds in 1971, 31,000

pounds in 1973, 42,000 in 1974, and an expected 49,000 pounds in 1975. Thus, at a price of \$1.88 per pound, vessel owners could have more than adequately met all their cash expenses other than loan payments in 1971 and 1973; however, in 1974 some cash expense items would be left unpaid or they would be living off cash reserves. Assuming landings per vessel were constant at the 1973 level of 40,000 pounds and 1974 prices were lower than 1973, vessel owners had a net cash outflow in excess of \$0.10 per pound of shrimp landed.

Break-Even Cash Flow Just Meeting Variable Costs

Break-even cash flow just meeting variable cost for alternative ex-vessel prices and pounds landed are shown in Figure 6. At a price of \$1.88 per pound and an assumed production of 40,000 pounds landed, vessel owners will have difficulty meeting trip expenses in 1975.

The significance of this is evidenced by observations that many vessel owners were tying up their vessels and not sending them out during the first part of 1975. Losses in the first part of 1975

were also compounded by the normal seasonality of revenue received from producing shrimp. Figure 7 shows the percent of annual revenue received each month by vessel owners during

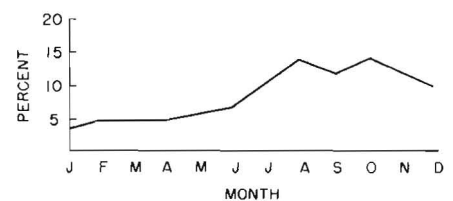


Figure 7.—Percent annual revenue received each month based on all Gulf vessels between 66-72 feet in keel length that landed shrimp in 1971.

1971. Although profits were made in 1971, the first 5 months showed negative cash flows (Hayenga, Lacewell, and Griffin, 1974).

Expectations for 1975 Conditions

To facilitate the discussion of the current situation, the estimated 1975 break-even curves presented earlier for each set of conditions are shown in Figure 8. Based on 1973 level of production and price received, vessel owners will

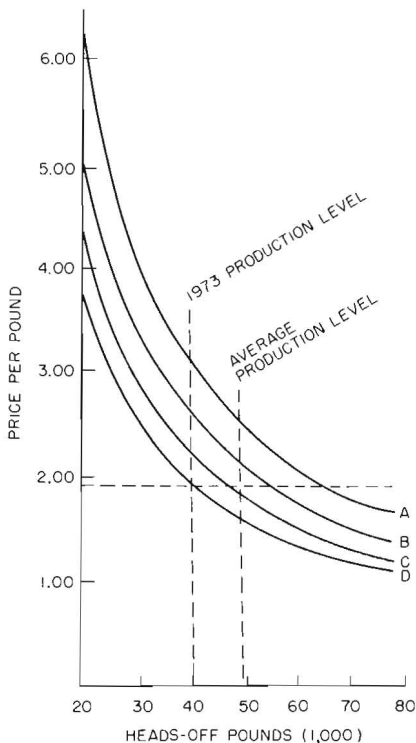


Figure 8.—Estimated break-even: a) net returns; b) cash flow with loan payment; c) cash flow without loan payment; d) cash flow just meeting variable costs for a vessel operating in the Gulf of Mexico in 1975.

not even be able to cover variable cost (trip cost) much less any of the fixed cost items such as insurance, overhead, etc. As stated in the previous section, if conditions do not improve, vessels will be tied up and the number of vessels in the industry will decline unless sufficient cash reserves or additional financing is available.

Also included in Figure 8 is a second vertical dashed line at 49,000 pounds labeled average production level. As indicated earlier, 1973 production of shrimp from the Gulf was below normal. Thus, based on a production function estimated by Nichols and Griffin (1974) for the Gulf of Mexico shrimp fleet where catch is a function of effort, average annual landings for the vessels in the sample were estimated in a normal year to be approximately 49,000 pounds. Reading from the figure, estimated break-even prices for normal production are: \$2.60 for net returns, \$2.20 for cash flow with loan payment; \$1.80 for cash flow without loan payment, and \$1.60 for cash flow just meeting variable costs. If 1975 was a normal year for production and ex-vessel price

of shrimp remained constant at \$1.88 per pound, then the average vessel owner would just have met his cash expenses without a loan payment. In 1975 the Gulf shrimp fleet continued to experience liquidity strains. If the present situation holds for a long enough period of time, a large number of the Gulf shrimp producers will be forced out of the industry.

DISCUSSION AND IMPLICATIONS

The resolution of current problems facing the Gulf shrimp industry may come about as a result of changing economic conditions and/or changes in specific policies which may or may not be initiated or suggested by the industry. A number of possible changes have been suggested which bear consideration. Among these are changes which have the basic impact to stabilize or increase returns for the shrimp landed and others which have the effect of reducing costs.

Price and Revenue Considerations

Import quotas and tariffs are one suggested alternative to the current cost-price squeeze in the industry. By controlling imports it is anticipated that supplies on the market can be reduced, thus preventing prices from being depressed below the domestic producer's costs. Two points should be noted here. The goals of free trade and stabilized or lower consumer prices may make it difficult to get the necessary controls approved through the political process. A good deal of caution will be necessary in regulating imports to prevent chaotic conditions which could be to the long run detriment of the industry, including the domestic fisher.

Market expansion and development programs have also been suggested as a means of shifting demand and increasing prices. With current conditions of declining real income and low prices for competing protein sources (red meat and chicken), it is difficult to expect a rapid shift in demand for a product such as shrimp, which has traditionally enjoyed a position as a luxury item in the market place. Market development is a long-term process and the industry should commit itself to such a program. This suggests a greater continuity of

programs than the occasional reaction to crisis situations which are evident in the recent history of the industry.

Other suggestions for improving vessel revenue include the consideration of alternative fishing enterprises. These alternatives are limited in many areas of the Gulf because development has not been nearly as rewarding as shrimp trawling in the past. Perhaps seasonal shifting to other fisheries will be developed as a regular pattern and revenues to shrimp trawling vessels improved. This will be a slow process, however, as techniques are developed and market systems established.

Cost and Efficiency Considerations

Much of the current difficult industry situation can be traced to an increasing cost structure. This has resulted from both rapid price increases for inputs (fuel, nets, etc.) and declining landings. Together these factors have increased the cost of landing a pound of shrimp by as much as 100 percent since 1971.

One suggestion has been a fuel subsidy for the fishing industry. This would be a direct saving to vessel owners on the largest single input cost item. At an average 49,000 pounds of shrimp landed per vessel it would take a subsidy of from 25 to 30 cents per gallon for the average producer to break even with a loan payment when he receives an average of \$1.88 per pound for his shrimp. Chances of obtaining relief in this area are very slim. At best, the extent of such relief would likely be limited to future increases related to oil import taxes. Current fuel expenses would probably not be reduced.

Efforts to improve the efficiency of fishing operations are also a priority consideration. The operation of fishing vessels during periods of marginal profitability requires improved management and closer consideration of the effects of the day-to-day decisions in running the vessel.

Another means which has been suggested to reduce cash outflow is to finance vessels over a longer period of time to reduce the size of monthly mortgage payments. A reduction of the loan payment by one-half would have the effect of reducing break-even cash flow with loan payment by 20 cents per pound at an average landing of 49,000

pounds per vessel. This will not reduce unit costs but would permit continued ownership of the vessel through periods when cash receipts are low. This would require considerable refinancing of existing vessels through either private or government-backed agencies. In addition strong consideration should be given to making monthly payment seasonally proportional to revenue.

A much larger question should be introduced in this discussion of efficiency. The industry appears to be suffering from over-capitalization in fishing vessels. One classic solution to this is a total fisheries management scheme which includes a limited entry concept. Other conditions assumed equal, this would increase catch per unit of effort and would result in lower costs per unit of shrimp landed. This is not a short-run solution, however. It is only now being experimented within United States fisheries. A great deal of planning and information would be needed to design and implement such a program.

Long-run problems of limited entry include the possibility of creating a stagnant, protected industry which loses touch with both the consumer market and the market for resources (inputs for harvesting shrimp). In the long-run this may be more detrimental than going through periodic readjustments such as that which the industry currently faces. If it can be assumed that the relative position of the unit cost and revenue remains constant in the fu-

ture and also assumes a normal production year, then based on this sample of 115 vessels, the percentage reduction in vessels needed for break-even can be calculated. In a normal year, these 115 vessels would have landed a total of 5.6 million pounds of shrimp. For each vessel to have break-even net revenue each vessel would have to land 66,000 pounds of shrimp. Dividing 66,000 pounds per vessel into 5.6 million pounds implies that the sample total production of 5.6 million pounds could only support approximately 85 vessels or 74 percent of the vessels sampled⁸. Likewise, for break-even cash flow with loan payment each vessel would have to land 57,000 pounds of shrimp, which implies that the sample total production of 5.6 million pounds could support approximately 98 vessels or 85 percent of the vessels sampled.

CONCLUSIONS

The shrimp industry is currently undergoing considerable stress. The underlying causes relate to factors in the general economy beyond industry control and the rapid expansion in potential fishing effort which occurred during the period since the late 1960's. Means of coping with this stress include both improved management to reduce costs and

⁸It is obvious that if the total Gulf shrimp fleet was reduced to 73 percent of its current size, total production would also decrease. That is, the estimated reduction in the fleet should be adjusted with respect to the production function. Calculations using the production function made less than a 1 percent difference.

various industry-wide programs to improve prices and efficiency. The aid of various forms of government programs will be necessary to permit the implementation of some of these ideas.

Perhaps some would prefer to allow a period of significant readjustment permitting the marginal firms to leave the industry. The costs of this readjustment, both economic and social, must be considered by those who propose this solution. Several things could happen which would prevent a significant readjustment; landings could increase dramatically, the economy could recover quickly thus improving demand and prices, or input costs could decline. The chances are, however, that these things will not happen soon enough (if at all) to avoid the difficult readjustment problems which now appear likely to occur.

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