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Some Factors Relevant to the Evaluation of

Export Potential Resulting from Devaluation

for Individual Products

by

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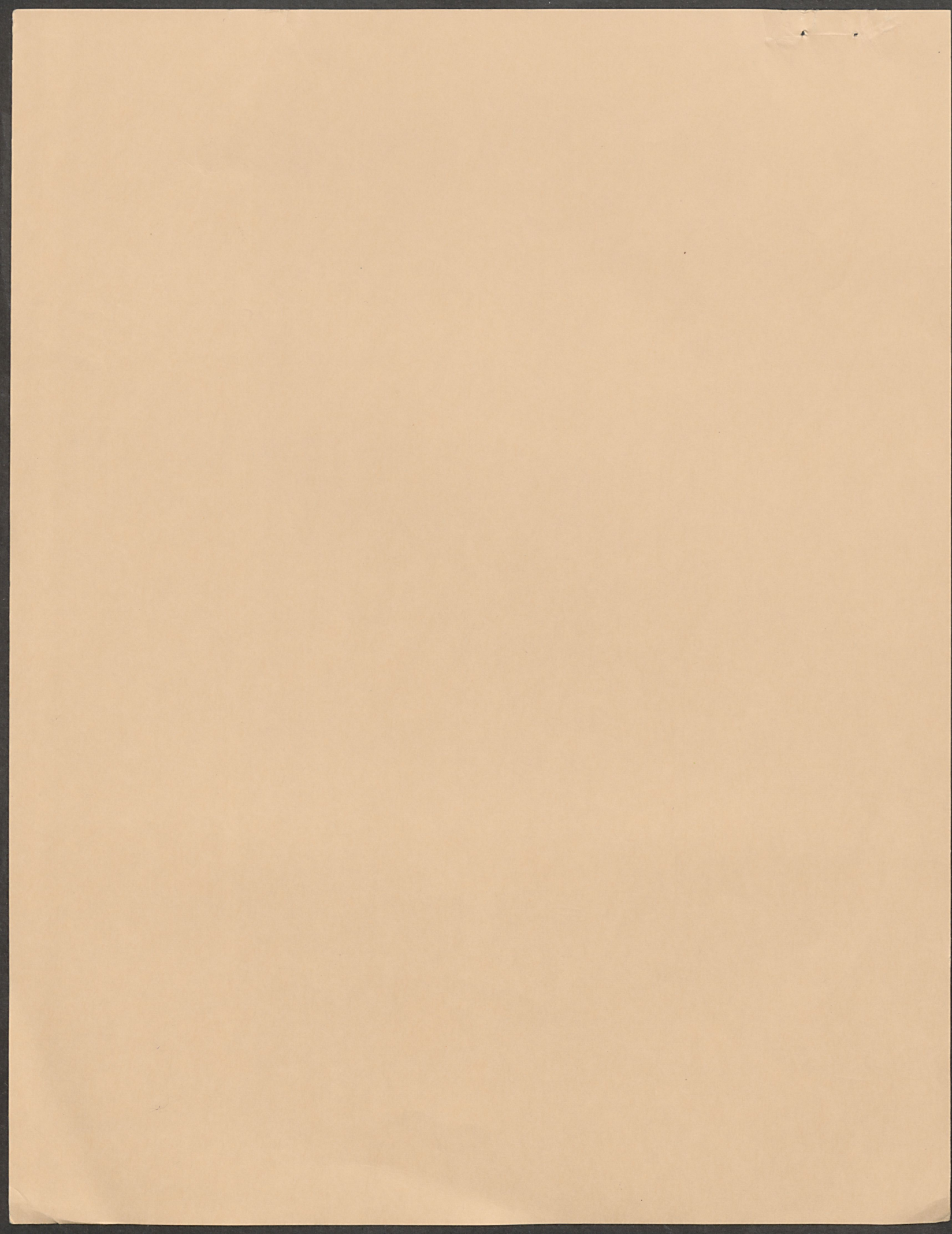
SOME FACTORS RELEVANT TO THE EVALUATION OF

EXPORT POTENTIAL RESULTING FROM DEVALUATION

FOR INDIVIDUAL PRODUCTS

BY

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Introduction[1]

Recent devaluation of the U. S. dollar is part of an effort to overcome U. S. balance of payments and international monetary problems. Possible effects on businesses interested in exporting individual products are considered here, not aggregate balance of payments or other effects for the nation or world as a whole. Part of the model generally associated with the aggregate (national or world) discussion has been adopted for this single product discussion.[2] A simplified, two-country, single-product, static economic model is used to show the effect on a product's equilibrium price and quantity under various possible demand and supply conditions. This limited framework is not sufficient for the businessman who wants to expand export sales or establish new foreign markets.

Even with static export stimulating price effects usually expected with a devaluation, other static and dynamic factors may work against export expansion, such as high expenses to establish product form and markets, rapid domestic compared to foreign inflation, dependence on imports (which are increased in cost by the devaluation), slow domestic compared to foreign productivity and technological change, and so on.

1/ Prepared in relation to a request from the NMFS Plans and Policy Development Staff; first draft, April 9, 1973; revised, May 24, 1973. Helpful comments were provided by Richard Kinoshita and David Mazer.

2/ For a presentation of the aggregate model, see for example Mordechai E. Kreinin, International Economics: A Policy Approach (New York: Harcourt, Brace, Jovanovich, Inc., 1971).

Derivation of the Export Supply and Import Demand

As shown in Diagram 1, the export supply and import demand curves for a country are derived from the domestic demand and supply curves for a given product. In the absence of trade, the domestic equilibrium price is P_3. At higher prices domestic producers would be willing to supply quantities in excess of what domestic consumers would be willing to buy, such as the amount Q_1 at price P_1, and this amount is available for export. Similarly, at prices below the domestic equilibrium price in the absence of trade, domestic consumers would be willing to buy more than domestic producers are willing to supply, such as amount Q_2 at price P_2. By selecting a range of prices the country's export supply and import demand curves can be derived.
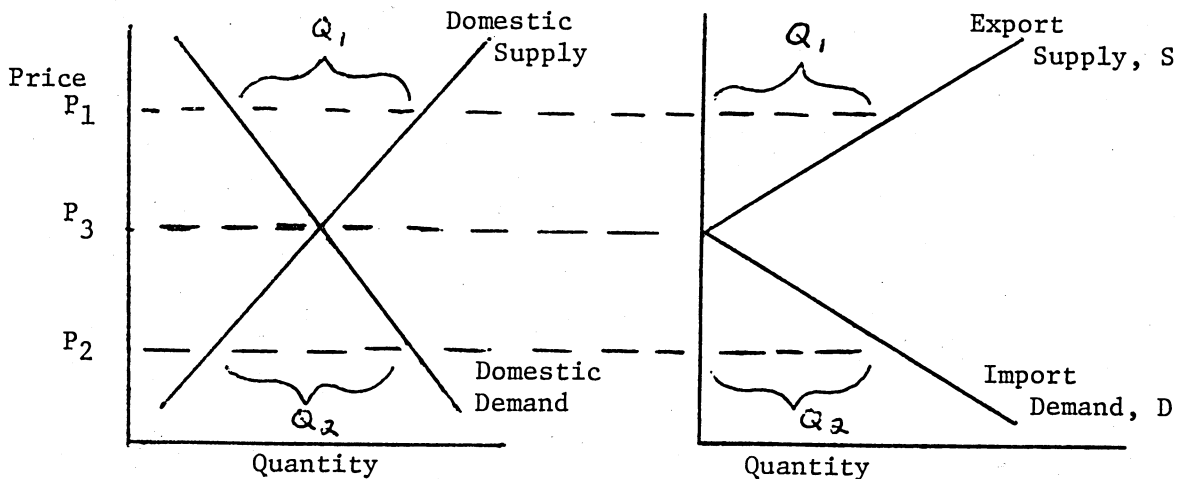

Diagram 1

The following explanations are based on restricted use of export supply and import demand curves. In a more complete static model, such things as transportation costs, trade barriers, and other country supplies must

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be diagrammed. <u>These and other factors are ignored here for simplicity</u>, <u>but they may be of overriding importance to what is shown here.</u>

<u>Effects of a Hypothetical Fifty Percent Devaluation</u>
<u>Expressed in Domestic Currency Units</u>

The following explanation employs a hypothetical 50 percent devaluation of the U. S. dollar, static export supply curves, static import demand curves (for the foreign buyers expressed in units of dollars), and some simplifying, restrictive assumptions. Price and quantity are expected to increase, although other outcomes will also be diagrammed.

In the hypothetical example in Diagram 2, the pre-devaluation price is $3.00 ($P_1$). Regardless of price, devaluation allows foreign buyers to offer 50 percent more in terms of their willingness to pay expressed in our currency units. That is, the U. S. export demand function (foreign
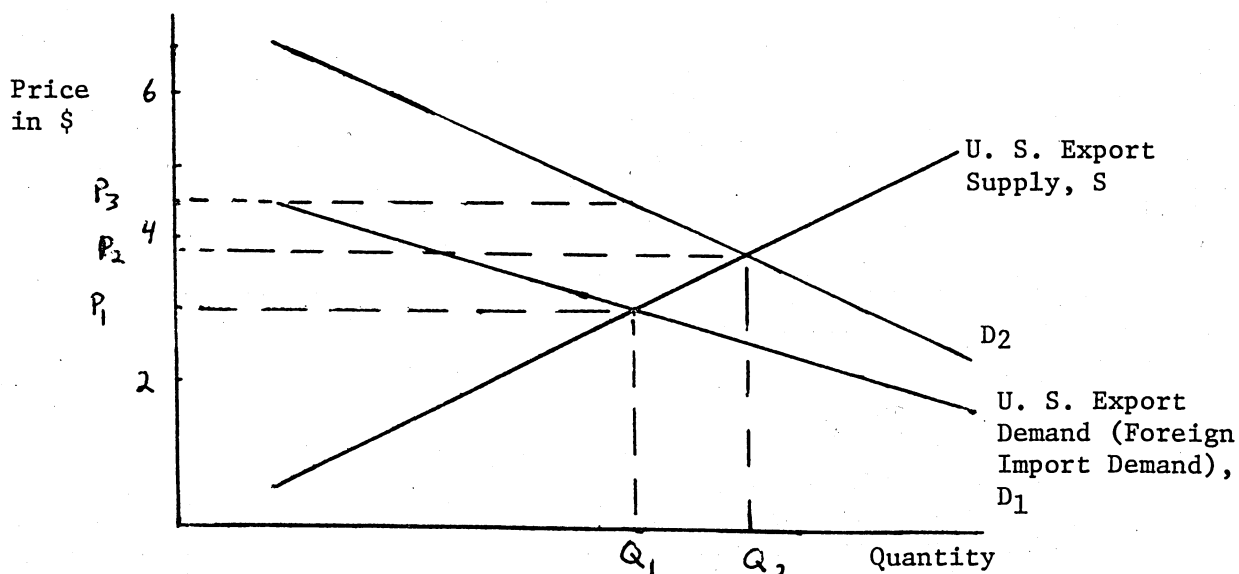

Diagram 2

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import demand function) is shifted upward, but not in parallel fashion.[3]
The post-devaluation equilibrium price, just under $4.00 (for Q_2), is not
50 percent higher than the old price, $3.00 per unit, even though the
foreign buyers would have been willing to pay 50 percent more, $4.50
(for Q_1).

While various possible situations can be diagrammed, two extremes are often
shown using the perfectly elastic export supply curve (elasticity of supply
is infinite) and perfectly inelastic export supply function (elasticity of
supply is zero). Diagram 3 illustrates a situation resulting in quantity
increase only and no price increase for the domestic industry, and
Diagram 4, a price increase and no quantity increase. Both situations
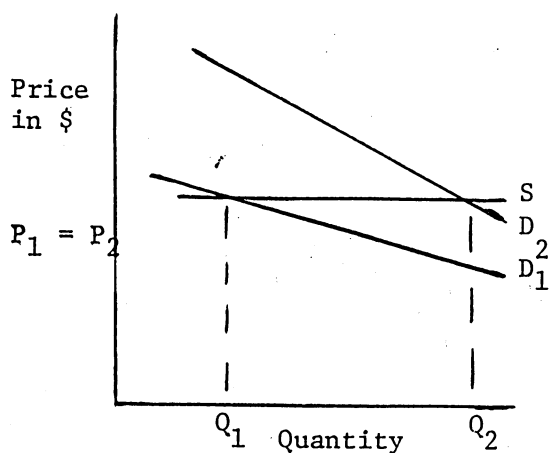result in more revenue to the domestic industry.

Diagram 3
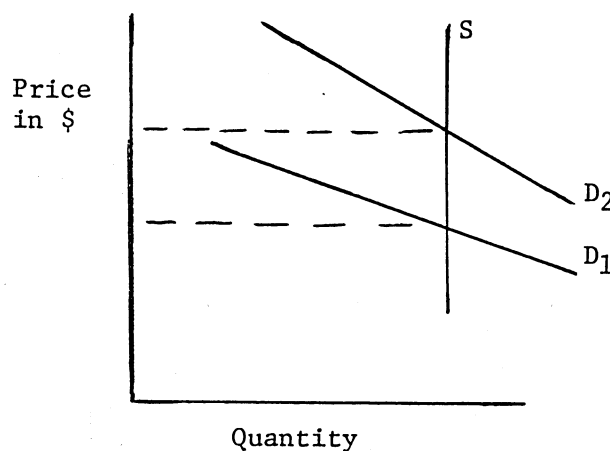
Diagram 4

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[3] A parallel shift in the demand curve would show equal differences in price between the old and new curves, regardless of price. With the constant percentage change, the change in price between the two curves is proportional to price. In the simplified model used here, the foreign demand for imports (expressed in foreign currency units) differs from the domestic demand for exports (expressed in domestic currency units) only in terms of currency units.

Diagram 5 shows a situation in which the export demand function (foreign import demand) does not shift as a result of the devaluation. In this case the demand curve is perfectly inelastic (elasticity of demand is zero). No change in price or quantity occurs for the domestic producers.[4]

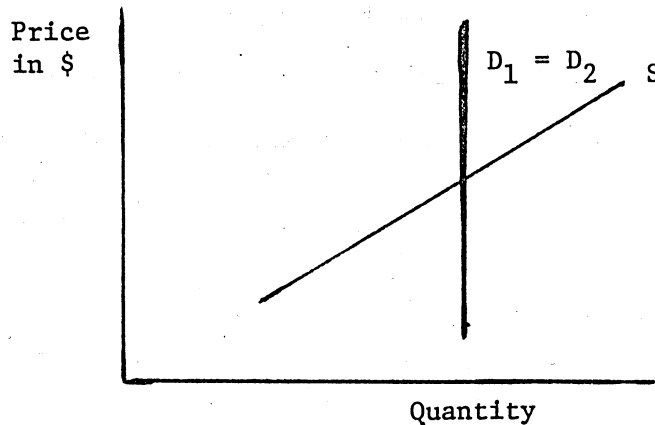Diagram 5

Price in $

$D_1 = D_2$ S

Quantity

Effects of a Hypothetical Devaluation Expressed in Foreign Currency Units

Static export supply and import demand functions may be employed to show the effects of devaluation in foreign currency (foreign exchange) units. In contrast to the situation in domestic currency units, the price is ·expected to fall. Quantity is expected to increase in both countries. Again, extreme situations will be diagrammed (that do not support these expectations), along with the more usual situation, although actual conditions may be described by any of these or some other diagram.

4/ This situation of no change in price or quantity refers to the context of the restricted static model employed. In practice even an inelastic demand curve for a given product may be shifted by the effect of devaluation on income. That is, the dollar devaluation in effect increases income (purchasing power) in the foreign country, and increased income shifts the demand curve, even though the price-effect of devaluation did not. There are, of course, many other static and dynamic effects not considered here.

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The import demand function in Diagram 6 is not shifted because it expresses

what the foreign consumers are willing to pay for various quantities

in terms of their own currency; it is our export demand function using

foreign currency on the price axis (see footnote 3, page 4). Our export

supply function is shifted to show the effects of devaluation. A downward,

non-parallel shift occurs since the constant percentage change represents
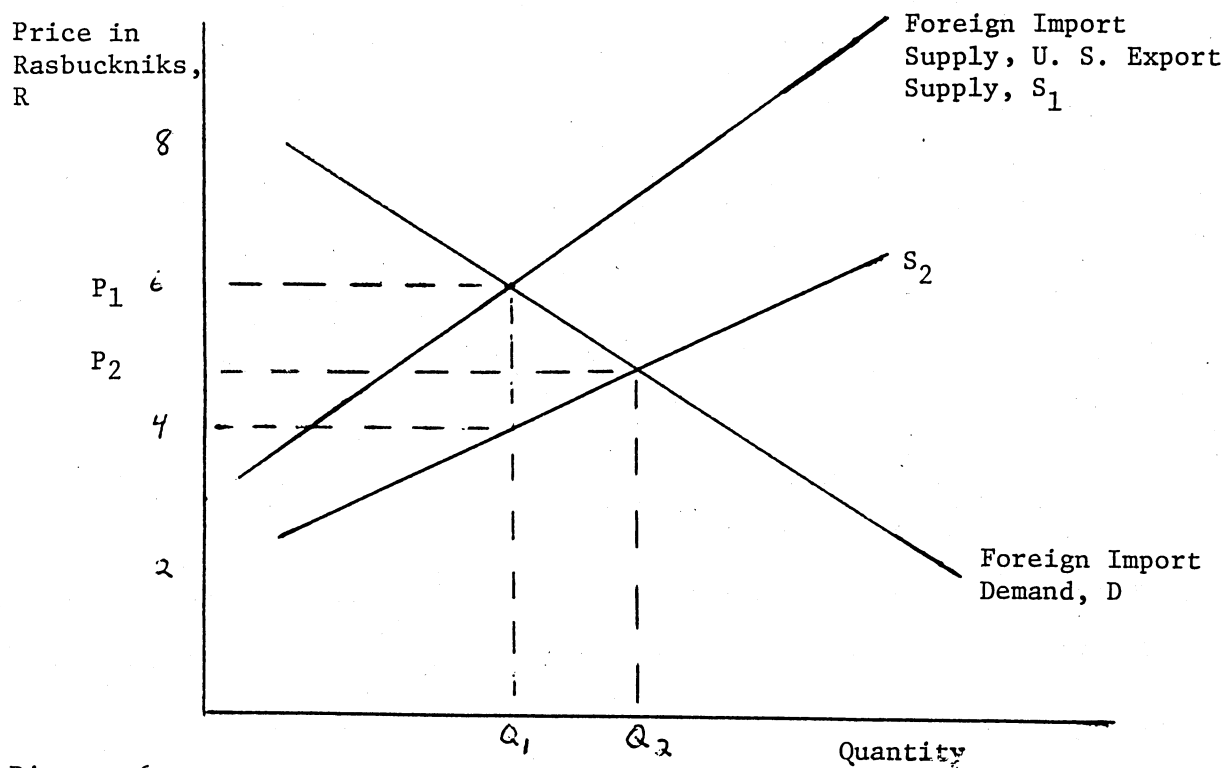
Price in
Rasbuckniks,
R

Foreign Import
Supply, U. S. Export
Supply, S_1

8

S_2

P_1 6

P_2

4

2

Q_1 Q_2

Foreign Import
Demand, D

Quantity

Diagram 6

more money at higher prices. Suppose a hypothetical currency, Rasbuckniks,

abbreviated R, formerly exchanged for dollars at R1 = \$0.50 (\$1 = R2), and

with the 50 percent devaluation of the dollar the new rate is R1 = \$0.75

(\$1 = 1.33 Rasbuckniks). In the absence of transportation costs, we

assume the price to be the same in both countries, and the commodity

was \$3 in the U. S. market and R6 abroad. U. S. exporters would be willing

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to supply the commodity in the same amount (quantity) at R4. Instead,
they find foreign buyers respond to a price decrease and buy more goods,
the new price being somewhat over R4 per unit in Diagram 6.

There are several complications even to this static analysis, but these
will not be considered extensively here.[5/] Analogous to the explanation
using domestic currency units, we can introduce three situations using
supply and demand functions with zero or infinite elasticity.

Price in R	Price in R

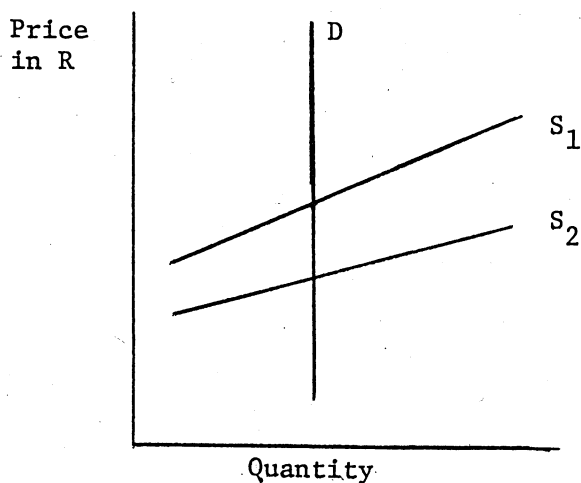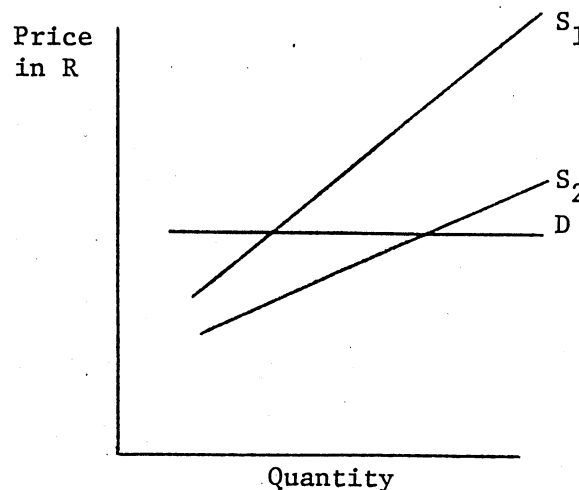Diagram 7   Diagram 8

With perfectly inelastic foreign import demand (Diagram 7), price falls,
quantity does not change, U. S. foreign exchange earnings of Rasbuckniks
decline, and U. S. producers of the commodity are not affected (see footnote

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5/   The change in foreign exhange earnings on this particular commodity
depends on the elasticity of demand for imports by the foreign country.
If numerically greater than one, earnings increase; if one, there is
no change; and if less than one, earnings decline. The overall effect
on the U. S. economy and its balance of payments requires consideration
of all goods, as well as what are called income effects. Here we are
concerned with one good, and the immediate impact on domestic producers,
an impact that is probably best understood in terms of domestic currency.

4, page 5). With perfectly elastic demand for imports in the foreign

country, as shown in Diagram 8, no price change occurs in terms of the

foreign currency Rasbuckniks, but quantity increases; U. S. foreign exchange

earnings increase and so do the number of units exported.

The third hypothetical
situation is one in which
effects of the devaluation
are not expressed in terms
of an export supply function
shift. That is, there is
no movement along the
foreign import demand
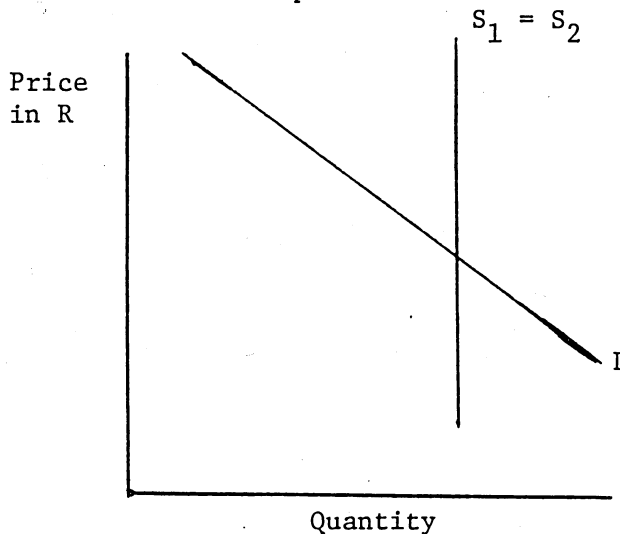function (our export demand
function); hence, no change in price or quantity expressed in terms of

the foreign currency is shown in Diagram 9.

Diagram 9

Summary and Comment

Demonstation of the effect of a hypothetical devaluation of the U. S.

dollar for a particular commodity entering foreign trade suggests an

increase in price expressed in domestic currency units and an increase

in quantity sold under several, but not all plausible assumptions of

static diagrammatical analysis. Conversely, there is a decrease in

price expressed in foreign currency units. The effects depend on the

elasticities of demand for imports abroad (our demand for exports) and

our supply of exports over the relevant range of price change. Both of these functions are derived from domestic supply and demand functions in the respective countries. This discussion could be extended by consideration of more complications and the underlying assumptions of static analysis, none of which would be a sufficient basis for investment or market expansion decisions.

The precise static effects of devaluation on the price and quantity of a commodity imported or exported require knowing estimates of supply and demand elasticities. Linear functions, as used here, have elasticities that vary along the curve (line), except for the extremes (vertical lines have zero elasticity and horizontal lines have infinite elasticity). Estimates of elasticity for such functions are frequently reported at the average of observed price and quantity. Economists of the NMFS Economic Research Division have estimated demand elasticities assuming logarithmic relationships, meaning that the elasticity is assumed constant throughout, regardless of price or quantity.[6/] Estimates have been made for several kinds of fish for the United States and other countries.

Market development based on the potential price reduction of U. S. fishery products in foreign markets in relation to recent devaluation of the U. S. dollar require rather careful consideration of several factors.

6/ See Frederick W. Bell, et. al, "The Future of the World's Fishery Resources: Forcasts of Demand, Supply and Prices to the Year 2000. . .," File manuscript no. 65-1 (unpublished; Washington, D. C.: NMFS Economic Research Division, December 1970).

Economists of the NMFS Market Research and Services Division have considered the effect of these devaluations on U. S. consumers and producers for several kinds of fish and several countries.[7]

The effects of devaluation related price increases for imported fishery products in terms of the impact on domestic fishermen and related fish stocks have also been considered.[8]

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[7] NMFS Market Research and Services Division, "Export Opportunities for U. S. Fishery Products and a Role for NMFS in Export Trade Development" (draft report to be published, May 22, 1973).

[8] Jukka A. Kolhonen, "Impact of the Devaluation of the Dollar on U. S. Fisheries," (unpublished; Washington, D. C.: NMFS Market Research and Services Division, March 9, 1972).