United States Department of Agriculture
Economic Research Service
https://www.ers.usda.gov

United States
Department of
Agriculture
Economic
Research Service
Agriculture
and Trade
Analysis
Division

Exchange Rate Risk, Dollar Appreciation, and U.S. Export Credit Programs

Timothy M. Baxter
Mark E. Smith

EXCHANGE RATE RISK, DOLLAR APPRECIATION, AND U.S. EXPORT CREDIT PROGRAMS. By Timothy M. Baxter and Mark E. Smith, Agriculture and Trade Analysis Division and Commodity Economics Division, Economic Research Service, U.S. Department of Agriculture. ERS Staff Report No. AGES 870430.

ABSTRACT

Exchange rates clearly influence U.S. agricultural exports. One particular area of concern is the influence of exchange rate risk and dollar appreciation on the Commodity Credit Corporation's (CCC) export credit guarantee programs. This report examines whether it would be worthwhile to institute an exchange rate guarantee program covering credit repayments under the CCC's export credit programs. Using the GSM-102 program experience during fiscal years 1980-85 as a guide, the evidence suggests that an exchange guarantee program probably should not be adopted.

Keywords: Export credit programs, exchange rate guarantee programs, the GSM-102 program, GSM-102 trade, exchange rate risk.

ACKNOWLEDGMENTS

Many thanks to Jerry Rector for his counseling and to our reviewers, John Dunmore, Dick Kennedy, Bill Kost, Steve Magiera, Mechel Paggi, Vern Roningen, and Jerry Sharples. Linda Beeler provided statistical assistance. Shirley Brown typed the report.

1301 New York Avenue, NW.
Washington, DC 20005-4788

September 1987

CONTENTS

SUMMARY

Exchange rates hold a central place in almost any discussion of international trade, with special concern focused on how dollar movements affect the competitiveness of both U.S. exports abroad and import-competing goods at home. Rightly or wrongly, a substantial portion of the blame for the deficit in merchandise trade ($132.2 billion in 1985), along with the decline in the agricultural trade surplus (down 65.8 percent in 1985 from its 1981 high), is attributed to the high value of the dollar.

One facet of the exchange rate question that has received considerable attention is the effects of exchange rate variability, uncertainty, and risk on trade. In this vein, exchange rate risk and dollar appreciation are important issues when examining U.S. trade conducted under export credit programs. The central question of this report, mandated by Congress, is whether an exchange rate guarantee program, that places a ceiling on the rate of exchange to be used in the repayment of dollar loans, would make export credit programs, such as GSM-102, more effective.

The Commodity Credit Corporation (CCC) has operated a wide variety of export credit programs. These credit programs in effect help alleviate the cash-flow and foreign exchange constraints faced by importers of American agricultural goods. Since its inception, GSM-102 has been the CCC's principal export credit program and this report focuses on it. GSM-102 provides private creditors with substantial insurance against the risks of overseas agricultural credits, at minimal costs to the creditors and importers, and with minimal direct government participation in commercial credit and export markets. Points made about GSM-102, exchange rate risk, and the exchange rate guarantee program apply to other export credit programs.

Countries whose importers use export credit guarantee programs generally operate in world markets under strong foreign exchange or income constraints. GSM-102 and other export credit programs address these constraints. Though the argument is somewhat controversial, providing an export credit guarantee can be seen as enhancing demand for imports in a foreign country (the import demand curve shifts), since it eases an exchange or income constraint. This implies that prices would also rise should world demand increase significantly. Conversely, price-subsidy programs seek to boost U.S. exports through reduced prices (moving one along the import demand curve).

Effects of a change in the dollar's value on a foreign country's import demand are similar whether trade occurs under a subsidy or demand-enhancing program. In either case, a dollar appreciation lessens the benefits of the programs, foreign-currency import prices rise, and import demand falls. A dollar depreciation produces a subsidy-like effect, reinforcing the export-enhancing nature of either program. As a result, it matters little whether one characterizes export credit guarantees as demand-enhancing or price-subsidizing.

The preceding suggests that an exchange rate guarantee (as opposed to an export credit guarantee) can operate as a price subsidy when exchange rates are expected to, or actually, appreciate. The program would fix the maximum value of the dollar exchange rate to be used in loan repayment, guaranteeing that an importer will always face an exchange rate below an expected or actually appreciated value of the dollar, essentially buying down the importer's local currency price (cost). New agricultural exports are

generated through the subsidy effect. The amount of new agricultural exports generated will be central to determining whether the exchange rate guarantee program is worth pursuing.

A worthwhile exchange rate guarantee program must produce significant additional GSM-102 exports, most of which must not displace, either directly or indirectly, any other U.S. agricultural exports. If this condition holds, the program has additionality; that is, there is a net addition to total overseas U.S. sales directly attributed to the program. Additionally, the program needs to be cost effective, in the sense that the value of net new exports generated exceed the cost of operating the program. Failure to meet at least these criteria would suggest against pursuing the program.

The exchange rate guarantee program theoretically increases GSM-102 exports through a price-subsidy effect, which is induced in one or both of two ways. First, guaranteeing a maximum exchange rate for repaying credits eliminates the implicit costs, or risk premium (faced by importers of U.S. goods) that arise strictly from uncertainty about the future value of the dollar. This produces a risk subsidy that lowers the implicit import price (cost) facing the importer, thereby raising U.S. exports. Second, given an expected or actual dollar appreciation, the exchange guarantee program induces a direct subsidy. The difference in this case is that the importer could face an actually lower local currency-denominated import price, instead of the removal of some implicit price. This also should induce more exports under the GSM-102 program.

Evidence indicates that the risk-subsidy effect, if it even exists, is small and would have added only about $300 million in new GSM-102 exports during FY's 1981-85 (equaling 5.6 percent of unused credit allocations). The direct-subsidy effect potentially raises GSM-102 exports by a significantly higher amount. For analytical purposes, the potential gains in GSM-102 trade from direct-subsidy effects were assumed to be $1.7-$2.3 billion (equaling 75-100 percent of unused credit allocations for FY's 1981-83).

Under these direct-benefit assumptions, this report finds that the expected average yearly cost of operating the program may well be under 20 percent of the value of credit extended in any particular year, but that the level of additionality needed to break even would be quite high. At a minimum, more than 60 percent of new GSM-102 exports would have to be additional for the guarantee program to be cost effective, with 80 percent a more realistic estimate. The research indicates that such high levels of additionality are unlikely.

In short, while there does appear to be some potential for increased GSM-102 exports under an exchange rate guarantee program, the entire program authorization is not likely to be used in any given year. Moreover, countries with potential for additional GSM-102 exports show the greatest potential for displacing other U.S. commercial exports. This indicates that an exchange rate guarantee program has little likelihood of being cost effective, suggesting in the end that the program should not be pursued.

Exchange Rate Risk, Dollar Appreciation, and U.S. Export Credit Programs

Timothy M. Baxter
Mark E. Smith

INTRODUCTION

Exchange rates hold a central place in almost any discussion of international trade, with special concern focused on how dollar movements affect the competitiveness of both U.S. exports abroad and import-competing goods at home (34,6,7). 1/ Rightly or wrongly, a substantial portion of the blame for the deficit in merchandise trade ($132.2 billion in 1985), along with the decline in the agricultural trade surplus (down 65.8 percent in 1985 from its 1981 high), is attributed to the high value of the dollar (4,27,31,10).

One facet of the exchange rate question that has received considerable attention is the effects of exchange rate variability, uncertainty, and risk on trade (3,18,24,25,9,29). In this vein, exchange rate risk and dollar appreciation are clearly important issues when examining U.S. trade conducted under export credit programs. The specific concern is this: Does exchange rate risk hold down the volume of trade conducted under Commodity Credit Corporation (CCC) export credit programs? The central question of this report, mandated by Congress, is whether an exchange rate guarantee program, that places a ceiling on the rate of exchange and that is based on a nominal, multilateral exchange rate, would make export credit programs, such as GSM-102, more effective. 2/ This report also assesses the possible costs and benefits (as defined in the text) of the program, which would essentially insulate importers of goods covered by CCC credit guarantees from U.S. dollar appreciation.

The next section describes the institutional and historical workings of CCC export credit promotion programs, and in particular the GSM-102 program. Also covered are the historic aspects of trade under the GSM-102 program, and the effects of exchange rate movements on demand enhancement and price subsidization programs. A description of how the exchange rate guarantee system would work is also included. The third section contains a brief review of what is meant by exchange rate risk, as well as a discussion of the problems encountered in selecting an exchange rate measure that accurately reflects the dollar's value. The fourth section discusses the costs of an exchange rate guarantee program, and the possibility of the program leading to

1/ Underscored numbers in parentheses refer to literature cited in the References section.

2/ See (26) for theoretical evidence, not specific to agriculture, that such a program would positively affect the volume of trade.

additional U.S. commercial exports. In this regard, there is a brief review of the findings of some representative research on exchange rate risk and its relationship to international trade, and a discussion of some of the other factors that might lead to increased exports. The fifth section briefly covers some of the institutional questions that should be considered when deciding whether to pursue an exchange guarantee program. The questions revolve around the willingness of private banks to participate, the ability of the CCC to administer the program, and the reactions of countries whose exports compete with those of the United States in international markets. The implications of the research are summarized in the final section.

GSM-102 AND OTHER U.S. EXPORT CREDIT PROGRAMS

The CCC has operated a wide variety of export credit programs over the years. These credit programs in effect help alleviate cash-flow and foreign exchange constraints faced by importers of American agricultural goods. 3/ The Export Credit Sales Program (GSM-5), one of the first programs, operated during fiscal years (FY) 1956-80 and in FY 1984. 4/ Under GSM-5 the CCC provided credit at commercial rates for up to 3 years.

To reduce budgetary outlays, the CCC began promoting exports in 1979 by guaranteeing repayment of privately issued credit, rather than by issuing credit itself. The Noncommercial Risk Assurance Program (GSM-101) guaranteed repayment of credit in the event of default due to noncommercial events such as embargoes on imports, freezing of foreign exchange, revolutions, and wars. In FY 1981, the CCC extended coverage to commercial risks, including defaults occurring for economic reasons, through the Export Credit Guarantee Program (GSM-102). The GSM-102 program continues, but the GSM-101 program ceased operating in FY 1981.

The CCC absorbed much of the risk associated with U.S. agricultural export credit sales covered under the GSM-101 and GSM-102 programs. Assuming such risks allowed private creditors to provide more credit, often at a lower interest rate than would otherwise be charged. Private credit would probably not have been extended to many countries without the CCC's guarantee. Like GSM-5, these programs provided coverage for up to 3 years.

The Blended Credit Program, another short-term credit program, was a response to the 1982 buildup of stocks, and was initially targeted at developing countries purchasing wheat, rice, corn, vegetable oil, soybean meal, and cotton. Later the program was principally used for wheat exports to North Africa. (21, p. 195) Active in FY 1983 through part of FY 1985, this program blended together GSM-5 and GSM-102. The CCC under GSM-5, directly extended roughly 15-20 percent of the credit needed to cover a sale with the rest provided privately under GSM-102. The GSM-5 portion of the package was

---

3/ Export credits are just one of several programs designed to increase U.S. exports by shifting foreign demand upward. Other demand-enhancing programs provide export market development and investment credit assistance. There are also programs, such as exporter and producer payment programs, whic attempt to boost agricultural exports through price subsidies. See (20,21) for an expanded discussion of both export credit, and other export promotion programs. The theoretical difference between a demand shift and a price subsidy is discussed elsewhere in this report.

4/ The fiscal year currently runs from October 1 through September 30.

interest-free, so the entire package was financed at rates below normal U.S. commercial levels. This program was suspended in February 1985.

GSM-102 covers credit extended for a relatively short period. A new and similar program, the Intermediate Export Credit Guarantee Program (GSM-103), covers credit extended for over 3 and up to 10 years. The Food Security Act of 1985 authorized GSM-103, which began operating in FY 1986.

GSM-201 and GSM-301, two other intermediate-term programs that allowed the CCC to provide credit directly, sought to enhance longrun export demand for U.S. agricultural products. Credit under the GSM-201 program could be extended for purchases of U.S. breeding stock, hopefully encouraging the export of U.S. feed grains. GSM-301 credit financed imports of U.S. commodities that, when resold in the importing country, generated proceeds that were to be used in financing investments that enhanced a country's import capability, such as grain handling and shipping facilities. Neither program has been used extensively and neither has operated since FY 1982.

This report focuses on GSM-102 since it is the only credit program still operating that has any historical record. However, points made about both exchange rate risk and an exchange rate guarantee program in relation to GSM-102 apply to other export credit programs.

GSM-102 and Its Importance to Agricultural Trade

Since its inception, GSM-102 has been the CCC's principal export credit program, accounting for just over 89 percent of all CCC export credit trade during FY's 1981-85. Table 1 displays a capsule history of the program and U.S. agricultural exports under GSM-102.

The GSM-102 Program

The authorized ceiling for expenditures under the GSM-102 program (except in FY 1984) rose steadily from $2.3 billion in FY 1981 to $5 billion in FY 1985. In each of these 5 years, the CCC allocated credit guarantees equaling at least 85 percent of the budget authorization. Allocation means that a credit guarantee is available for use, but actual use of the allocations has been erratic. In fiscal years 1981, 1983, and 1984, use of the allocations averaged 93.3 percent, while use fell to 69.4 percent and 56 percent in FY 1982 and FY 1985. FY 1982 use was low mainly because of increased or reallocated guarantees. The Soviet grain embargo provided pressure for an increase in guarantee allocations, an effort meant to restore lost Soviet exports through other avenues. Significant guarantees covering exports to Poland in FY 1981 appear to have been allocated for use on exports going to other countries after Poland imposed martial law. It is not clear that either the increased or reallocated guarantees were completely used. Exports to Brazil, Iraq, Mexico, and Portugal accounted for 60 percent of the shortfall between allocated and used guarantee allocations in FY 1985. Brazil harvested a record wheat crop, Iraq experienced balance of payments difficulties due to its war with Iran, Mexico was diversifying its sources of supply, and demand in Portugal for red meats dropped significantly, decreasing its demand for feed grains. Some importers may have also delayed GSM-102 purchases in FY 1985 anticipating lower export prices under the Export Enhancement Program.

Table 1--The GSM-102 program and GSM-102 agricultural exports

Item	Fiscal year				
	1981	1982	1983	1984	1985
	Millions of dollars				
The GSM-102 program:					
Authorization	2300.0	2500.0	4800.0	4500.0	5000.0
Credit guarantees allocated	2189.0	2224.6[1/]	4080.0	4125.6	4485.2
Credit guarantees used	2082.0	1543.3	3709.3	3887.3	2512.8
GSM-102 trade:					
Total exports[2/]	1743.6	1386.5	3420.2	3239.7	2709.6
Principal commodities--					
Wheat	447.3	611.5	950.8	1201.2	1146.8
Feed grains	529.1	252.2	1086.2	1111.4	528.3
Cotton	223.7	251.4	167.1	285.4	385.9
Oilseeds	94.5	132.8	620.5	91.9	84.3
Rice	177.6	4.8	78.6	206.0	132.6
Principal countries--					
Korea	428.4	436.9	415.4	461.5	453.9
Mexico	0	0	1164.7	644.7	175.9
Portugal	149.4	301.1	529.1	438.9	282.0
Brazil	197.9	283.2	310.8	282.7	443.4
Iraq	0	0	205.2	454.1	385.8

1/ Excludes an unused $1 billion guarantee allocated for Mexico in the final weeks of the fiscal year. 2/ Total exports do not equal credit guarantees used due chiefly to late shipments.
Source: USDA, FAS, General Sales Manager's Office.

GSM-102 Exports

Goods worth about $1.7 billion were shipped during the program's first year of operation. By FY 1983, GSM-102 program exports peaked at $3.4 billion and declined to $2.7 billion by FY 1985.

The major commodities exported under the GSM-102 program included wheat, feed grains, cotton, oilseeds, and rice, constituting just under 88 percent of all shipments made under the program. Wheat comprised just under 33 percent of all GSM-102 exports, while feed grains accounted for about 28 percent.

Korea, Mexico, Portugal, Brazil, and Iraq have been the major destinations of exports shipped under the program, importing about 66 percent of all goods shipped under GSM-102 during FY's 1981-85. These countries had a slightly larger share of the program's trade in the latter 3 of those years, averaging just over 70 percent. Korea's GSM-102 trade was the most important for the entire 5-year period, averaging nearly 18 percent of the program. However, Mexican importers were by far the most important program participants in FY 1983 and FY 1984, with GSM-102 imports equaling roughly 34 percent and 20 percent of program trade.

GSM-102's Share of Agricultural Trade

Aggregate exports under GSM-102 averaged just over 9 percent of total U.S. commercial agricultural exports during FY's 1983-85 (table 2) -- not a substantial share of U.S. overseas agricultural sales. However, exports of individual commodities or to individual countries under GSM-102 can be significant.

Table 2--GSM-102 exports' share of U.S. commercial agricultural exports

Item	Fiscal year				
	1981	1982	1983	1984	1985 1/
	Percent				
All GSM-102 exports	4.1	3.7	10.2	8.9	9.2
Principal commodities:					
Wheat	6.6	8.8	17.7	20.0	30.7
Feed grains	5.2	3.7	17.0	14.1	8.1
Cotton	10.1	11.8	10.0	12.0	19.9
Oilseeds	1.5	1.9	10.0	1.5	2.0
Rice	13.0	0.5	11.1	27.1	23.3
Principal countries:					
Korea	20.0	27.2	24.3	25.4	32.4
Mexico	0	0	65.5	33.0	11.7
Portugal	19.9	51.9	82.9	62.5	56.3
Brazil	23.5	49.1	77.7	69.0	82.0
Iraq	0	0	63.5	100	100

1/ Based on unrevised data.
Source: USDA, FAS, General Sales Manager's Office.

Wheat exports under the GSM-102 provisions rose steadily, until almost a third of U.S. commercial wheat exports were shipped under the program in FY 1985. GSM-102 rice, though its trend is less smooth, accounted for nearly a quarter of all FY 1985 commercial rice exports. At least 10 percent of cotton exports were shipped under the program in all years, with nearly 20 percent shipped in FY 1985. Almost 10 percent of commercially exported feed grains were shipped under the program during the 5-year period ending in FY 1985, although the percentage has fallen since FY 1983. Other commodities depending on GSM-102 include wheat flour, averaging 40 percent of commercial exports, and soybean oil, averaging 20 percent. Oilseeds, while one of the top five crops exported under GSM-102, accounted for only 2 percent or less of all commercial oilseed exports in every year except FY 1983, when it accounted for 10 percent.

GSM-102 is also clearly a significant factor in several countries' imports of U.S. agricultural products. The credit guarantee program covered over half of Brazil's, Iraq's, Portugal's, El Salvador's, Hungary's, and Poland's commercial agricultural imports from the United States. GSM-102 covered roughly 60 percent of Brazil's commercial agricultural imports from the United

States, slightly more than 25 percent of Korea's imports, and about 22 percent of Mexico's imports. Of the top five destination countries, Iraq particularly depends on GSM-102, with credits covering 100 percent of their U.S. imports in FY's 1984-85.

How GSM-102 Works

The GSM-102 program acquired importance by providing private creditors with substantial insurance against the risks of overseas agricultural credits. The insurance is provided at minimal costs to creditors and importers, and with minimal direct government participation in commercial credit and export markets. Daily government involvement and operating costs are limited as well, with the CCC responsible only for allocating credit guarantees, approving individual applications, and monitoring trade under the program. However, the CCC has faced substantial costs arising from missed payments. Over $1.7 billion in claims were made during FY's 1981-85, just over 12 percent of the value of all credit covered under the program.

Allocation of Credit Guarantees

The GSM-102 program is directed at countries where credit guarantees are needed before private export financing can be secured. The destination country must be financially strong enough to provide a reasonable expectation that foreign exchange reserves will be available for the scheduled payments. A foreign government generally requests the guarantee allocation, though a U.S. exporter or a private foreign buyer also may petition the CCC. The guarantee is then issued for a stated level of coverage and for specific U.S. agricultural commodities. The CCC generally extends coverage to 98 percent of the port value of the commodity, either free-on-board (f.o.b.) or free alongside ship (f.a.s.), plus a portion of the accrued interest. 5/ In certain cases the CCC will also extend coverage to cover the costs of insurance and freight. The CCC releases notice of the allocation, indicating the destination country and commodities involved.

Issuance of Guarantees

The U.S. exporter must register the sale with the CCC, pay a nonrefundable guarantee fee, and receive a payment guarantee before shipment of the commodity under an export credit sale. After shipment, the exporter must notify the CCC within 30 calendar days of the shipment. The guarantee generally is then assigned to a U.S. bank financing the sale, which then notifies the CCC of the assignment. Finally, the exporter receives payment for the exported goods from the U.S. bank. The risk of default at this point lies with the CCC and the financing institution. Alternatively, the exporter may finance the transaction itself. In all cases, the holder of the guarantee must be either an exporter or a financing institution.

Payments and Defaults

The guarantee holder collects from the foreign bank according to the payment schedule outlined in the credit agreement. Principal payments are either annual or semiannual, though interest payments may be scheduled more

---

5/ The f.a.s. designation represents the transaction value of the good on the dock, at the port of export. The f.o.b. designation essentially equals the f.a.s. valued trade plus stevedoring charges.

frequently. Should a default occur, the CCC pays the covered amount to the guarantee holder. The holder must notify the CCC within 10 days of the payment due date and then submit a claim to the CCC treasurer within 30 days of this notification to secure payment. After a claim has been filed and paid, the CCC is responsible for collecting on the amount defaulted.

Demand Enhancement, Price Subsidies, and Exchange Rates 6/

Countries whose importers use export credit guarantee programs generally operate in world markets under strong foreign exchange or income constraints. GSM-102 and other export credit programs address these constraints. Though the argument is somewhat controversial, providing an export credit guarantee can be seen as enhancing demand for imports in a foreign country since it eases an exchange or income constraint. Put another way the credit-issuing country exports more goods because of an induced parallel, upward shift in the importing country's import demand curve, with the importer desiring more foreign goods at any given price. (See (20) or (1) for a more thorough analysis of how credit programs affect a foreign country's import demand.) If an export program truly enhances demand, it can be typified by this upward shift in the import demand curve. Implicit is the suggestion that prices would also rise should world demand increase significantly.

By way of comparison, price subsidy programs, such as the Export Enhancement Program, seek to boost U.S. exports through reduced prices. Rather than moving the import demand curve, such programs are typically seen as shifting the export supply curve facing the importer outwards. This supply shift moves the importer down its demand curve. The subsidy raises the quantity of imports demanded by essentially reducing the export price faced by the importer.

Exchange Rate Effects

Dollar appreciation, acting like a tax, raises the foreign currency price of all U.S. exports. Dollar depreciation, acting like a subsidy, lowers the foreign currency price of all U.S. goods. During periods of strong dollar depreciation, U.S. agricultural exports should tend to rise. During periods of strong appreciation, they should tend to fall (Fig. 1). (Other factors, such as the level of economic activity or perhaps population, also help determine the level of agricultural exports.)

It follows that dollar movements will affect a foreign country's import demand under subsidized trade the same way they will affect it under demand-enhancement programs (31, 22). In either case, dollar appreciation taxes away the benefits of the programs, the foreign currency price of imports rise and import demand falls. Conversely, dollar depreciation reinforces the export-enhancing effects of either type of program. For this report, then, characterizing export credit guarantees as demand-enhancing or as price-subsidizing will not alter the findings.

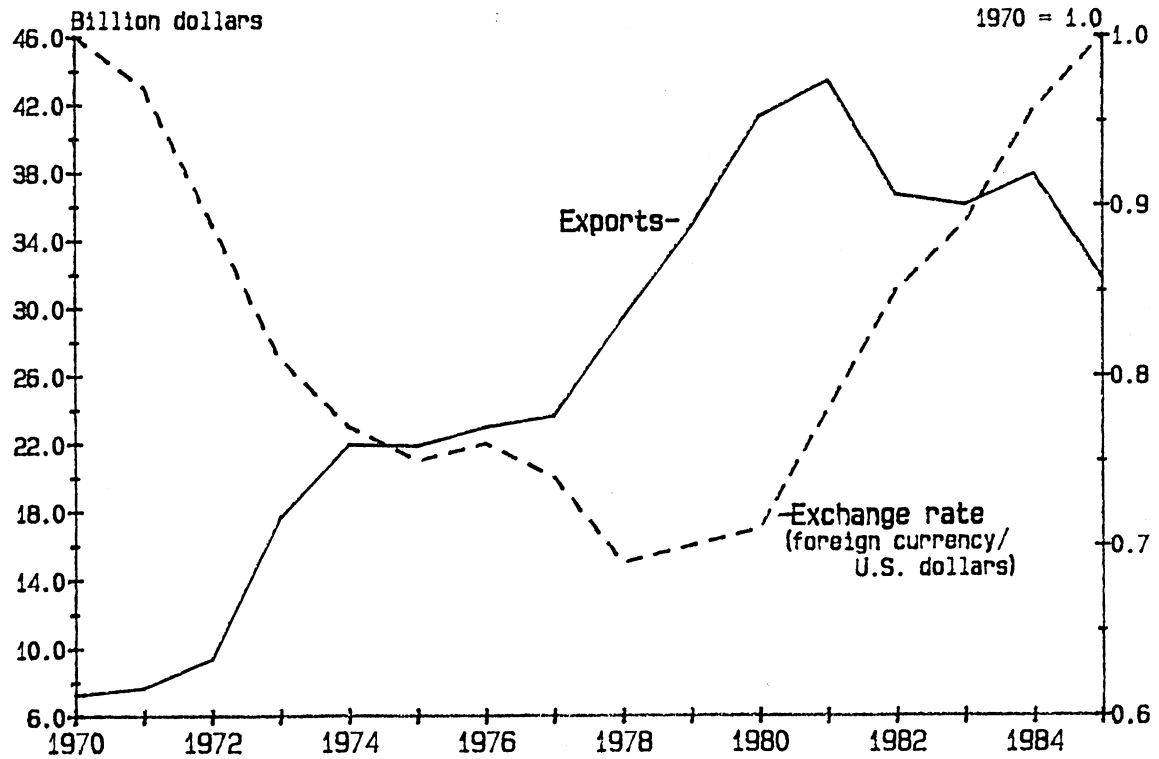
The Exchange Rate Guarantee Program and Subsidies

The preceding suggests that an exchange rate guarantee, as opposed to an export credit guarantee, can operate as a price subsidy when exchange rates

---

6/ See the appendix for a more detailed look at this subject using a two-country model.

Figure 1. Dollar movements and total U.S. agricultural exports
(Nominal exports, USDA real exchange rate index)



are expected to, or actually, appreciate. This can be better understood by looking at the specifics of the exchange guarantee program.

The Food Security Act of 1985 specified several key elements of the exchange rate guarantee program.

- The maximum exchange value of the dollar, used in figuring the U.S. dollar value of loan repayments, must be tied to the value of the "trade-weighted [exchange rate] index published by the Department of Commerce." The value of the trade-weighted index is set on the same date a purchaser receives credit, which effectively puts a ceiling on the dollar exchange rate faced by an importer.

- If the dollar depreciates while the loan is in effect, the importer can calculate dollar loan payments based on the lower value of the dollar.

With these conditions, the exchange rate guarantee program insures that the exchange rate faced by an importer will be below an expected, or actually appreciated, value of the dollar, effectively buying down the local currency price facing the importer. The program essentially places a maximum on the foreign currency costs of loan repayment faced by the importer, eliminating the exchange risk arising from a dollar appreciation. The subsidy very roughly equals the percentage difference between the expected or actual appreciated value of the exchange index and the value of the exchange rate index at the time credit is extended.

EXCHANGE RATE RISK AND THE CHOICE OF EXCHANGE RATES

The exchange rate guarantee program outlined above could (at least theoretically) expand U.S. exports, though other issues need to be addressed before drawing any definite conclusions about its success or failure. In particular, a better understanding of exchange rate risk and how it relates to commodity credit programs is needed. A more prosaic consideration is the type of index best suited to an exchange guarantee program. Possible costs and benefits under an exchange guarantee program are also a central issue, needing consideration along with administrative and institutional questions.

Exchange Rate Risk

There are elements of risk in all commercial transactions because of the possibility that receipts will not fully cover costs. As this risk increases (that is, as profits become more uncertain), the likelihood that any particular transaction will be undertaken diminishes. An extra, important dimension of uncertainty arises when receipts and costs are denominated in different currencies. The decision to undertake a commercial transaction under these conditions depends on not only the normal business considerations, but on the predictability of exchange rate movements as well.

It is the unpredictable element of exchange rate movements that foster exchange rate risk. And such risk is thought to restrain the volume of trade because it imposes an implicit cost, or risk premium, on trade. Without certainty about a currency's exchange value at the time of payment, an international transaction that looked profitable or affordable at the time of contract could easily cost the exporter or importer more than was anticipated. For example, a U.S. wheat exporter agrees to ship 10,000 metric tons at $150.00 per ton. The cost to the importer is $1.5 million to be paid at the time of delivery. If the dollar were to appreciate 10 percent between the time of contract and the time of delivery, the importer's local currency costs would be 10 percent higher than anticipated. It should also be noted that these risks and implicit costs increase as the period of time between contracting and payment lengthens.

Some exchange risk and costs remain even when a hedging transaction is undertaken in forward exchange rate markets because forward exchange rates are not efficient predictors of future spot rates. Some costs will also remain because sellers charge what is essentially a risk premium for entering the forward exchange market (12,23). In addition, forward markets for currencies (if they exist at all) seldom extend for more than 12 months, while contracts for internationally traded goods frequently cover several years.

Further, the currency in which a contract is denominated determines whether the risk falls on the exporter or importer. The importer (exporter) bears all the risk when the contract is denominated in the exporter's (importer's) currency. The evidence indicates that U.S. trading partners bear most of the exchange rate risk, as a majority of this trade is denominated in U.S. dollars (32). The exchange risk problem facing U.S. trading partners, then, is the possibility of a dollar appreciation and how that appreciation affects their ability to pay.

Under the GSM-102 program, exchange rate considerations become important because scheduled payments are denominated in dollars. Any exchange rate movement could unpredictably shift the importer's local currency cost of

payments. This shift in costs could well offset the benefits of the credit program to the foreign buyer, making participation much less attractive.

The Choice of Exchange Rates

Implicit in the above discussion is some conceptual measure of changes in the dollar's value, with the dollar's value very much dependent on the particular measure one chooses to adopt (11,17,5). Not surprisingly, estimates of the costs and effectiveness of an exchange rate risk program are also tied to the exchange rate measure one selects.

The choice of this exchange rate measure is, first, between a nominal or real exchange rate and, second, between a bilateral or multilateral measure. Exchange rates quoted in the newspaper are nominal, or money rates, that measure the purchasing power (in money terms) of one country's currency in another country. Real exchange rates are nominal rates adjusted for the differential movements of prices between countries; they attempt to represent the amount of actual goods that a country's currency can purchase in another country. 7/

A bilateral rate, of course, measures the relative exchange value between any two currencies. A multilateral rate measures the relative exchange value between a single currency and a basket of several other currencies, with its value dependent on the countries included, the weighting scheme, and the period used in determining the weights.

Table 3 shows the differences in magnitude and direction that can occur between exchange rate measures. 8/ The rates of appreciation of the various indices differ, with the largest differences appearing between nominal and real rates. 9/ In the GSM-102 and Mexican exchange rate cases, there are instances where real rates move in different directions from nominal rates. In short, the individual exchange rate measures indicate different dollar values in any given year.

7/ Mathematically:

$$\dot{RER} = \dot{NER} - \dot{Pf} + \dot{Pus}$$

Where all terms are rates of change, and exchange rates are in foreign currency per U.S. dollars, RER is the real exchange rate, NER is the nominal exchange rate, Pf is the foreign price, and Pus is the U.S. price.

8/ The Federal Reserve Board index is trade-weighted and based on the Group of Ten countries, plus Switzerland. The weights are determined by each country's share of summed trade of all the countries. The Total Agriculture index is based on the 38 largest markets for U.S. agricultural exports, and is weighted by the particular country's share of commercial exports. The GSM-102 index includes all countries participating in GSM-102, and is weighted by the size of the country's participation in the program. The Mexican exchange rate is bilateral. Adjusting nominal exchange rates for differential movements between the U.S. and appropriate country Consumer Price Indices (CPI's) yielded all real rates. All indices are in foreign currency to U.S. dollar terms, so a rising index represents an appreciating dollar.

9/ The percentage appreciation of any particular year from the 1980 base year can be quickly calculated by subtracting 1 and then multiplying by 100.

Table 3--Exchange rates compared

Item	Calendar year					
	1980	1981	1982	1983	1984	1985
	Foreign currency/U.S. dollar, 1980 = 1.0					
Federal Reserve Board:						
Nominal	1.0	1.182	1.335	1.434	1.583	1.639
Real	1.0	1.188	1.317	1.383	1.515	1.557
Total agriculture:						
Nominal	1.0	1.230	1.672	3.126	6.974	19.527
Real	1.0	1.113	1.139	1.189	1.274	1.327
USDA GSM-102:						
Nominal	1.0	1.190	1.718	3.301	6.948	18.488
Real	1.0	0.998	1.110	1.243	1.292	1.379
Mexico:						
Nominal	1.0	1.068	2.457	5.233	7.312	11.192
Real	1.0	0.922	1.394	1.549	1.363	1.352

As mentioned above, the Food Security Act of 1985 mandates using "the trade-weighted index published by the Department of Commerce" in the proposed exchange rate guarantee program. This report takes this to mean one of the more commonly used indices, the nominal Federal Reserve Board (FRB) index published in the Survey of Current Business. However, this report will argue that a real bilateral rate is a more appropriate index for use in the exchange guarantee program.

Real Or Nominal?

Exchange rate risk theory suggests that a measure of real risk be used in analysis when price movements are significant (3,18,24,25,9,29). This is because in addition to unanticipated movements in nominal exchange rates, changes in foreign currency sales prices and receipts and changes in the costs of production those receipts must cover add uncertainty and implicit costs to international transactions. It follows that a stable real exchange rate would be more likely to reduce the uncertainty facing traders than a nominal rate. Such a scenario would occur, for example, under modest price movements but where considerable time elapsed between contracting and importing, or where there was severe shortrun inflation. Where GSM-102 destination countries experience such shortrun inflation, then, a real measure of exchange rate risk for use in an exchange rate guarantee program and for analysis is appropriate.

On a more practical level, assuming the sole intent of the exchange rate guarantee program is to insulate CCC programs from the effects of dollar appreciation, using a nominal index might give the importer an unintended subsidy. For example, suppose an importer receives $1 million in credit and the exchange rate at the time equals 0.5 (foreign currency/U.S. dollars). The credit must be repaid in the next period. (For simplicity, interest charges are ignored.) The importer will need 0.5 million in local currency to repay

the credit if the exchange rate remains unchanged. But if the value of the dollar appreciates 20 percent, the importer will need 0.6 million in local currency to repay the credit. With no inflation, both the nominal and real rates of exchange will have risen by 20 percent and the importer faces 20 percent higher real costs.

But what if prices in the importer's currency rise 20 percent (with U.S. prices unchanged)? The importer still needs 0.6 million in local currency to repay the credit, but neither the real costs nor the real exchange rate change. The 0.6 million buys as much as the previous period's 0.5 million bought, and could still be exchanged for $1 million.

If, however, the exchange rate guarantee program fixes the maximum rate of exchange faced by the importer equal to the nominal value of the dollar at the time the credit is extended (0.5 foreign currency/U.S. dollar), the importer would need only 0.5 million in local currency to repay the credit. The subsidy would equal 0.1 million of the importer's currency, effectively lowering the importer's home currency price by 20 percent. Again, this suggests that a real exchange rate measure should be used in analysis and in an exchange rate guarantee program. 10/

Bilateral Or Multilateral?

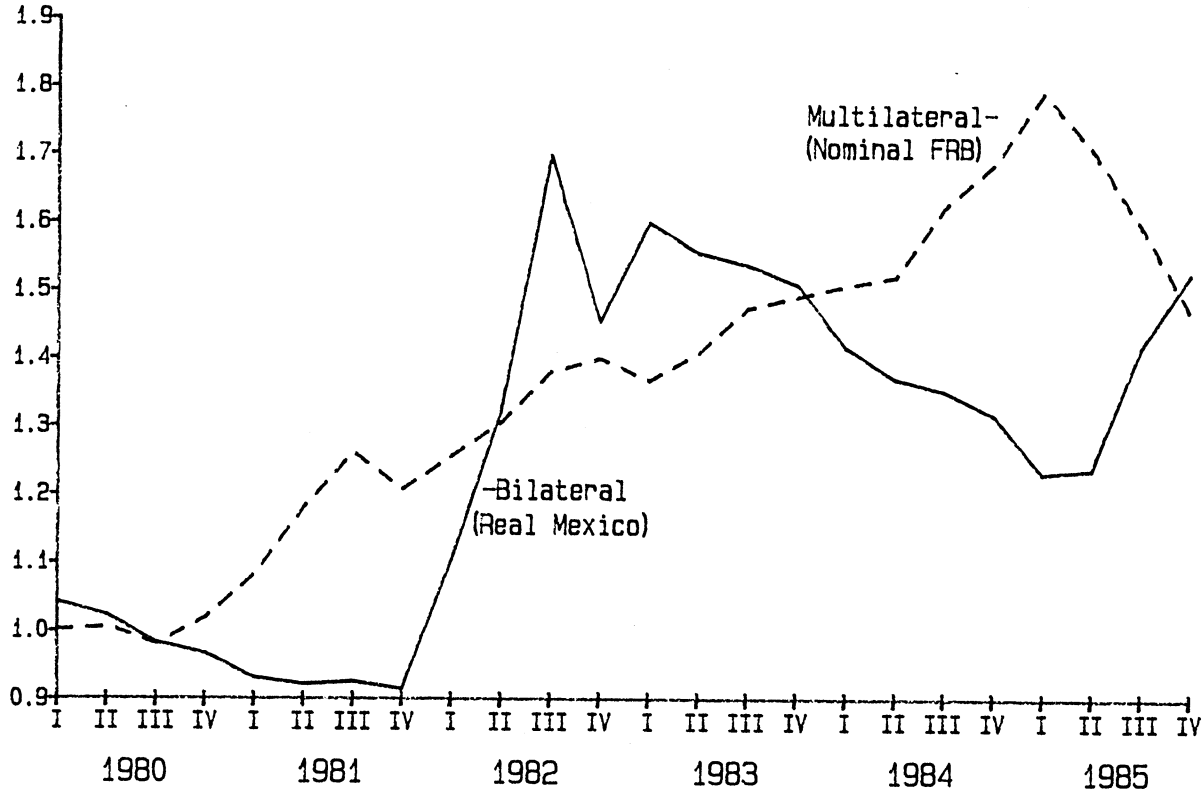
A multilateral exchange rate cannot be expected to move in parallel with a bilateral rate unless the bilateral rate figures heavily in its calculations. As a result, an exchange rate guarantee program based on a multilateral rate risks overcompensating participating importers, making the program more expensive than necessary, or undercompensating importers, making the program ineffective. Such possibilities are shown in Figure 2, where the multilateral FRB index is graphed against the bilateral Mexican rate.

The FRB index indicates a dollar appreciation from late 1980 to 1981, while the Mexican/U.S. index shows a dollar depreciation. In this instance, a Mexican importer would receive compensation where none is needed or intended. In early 1982, the FRB and Mexican/U.S. indices both move upwards (indicating dollar appreciation), but the guarantee program would not provide the intended relief to Mexican importers because the Mexican/U.S. exchange rate index indicates a much stronger dollar appreciation. In 1984 and 1985, the two measures of the dollar's value move in opposite directions, with the guarantee program again failing to meet its intended goals. Given these considerations, a bilateral exchange rate index seems the appropriate measure for any exchange rate guarantee program.

There is a tangential issue regarding the selection of an appropriate exchange rate measure. Governments often are the importing agents for GSM-102 countries. These governments tend to peg their currency to the value of the dollar, and are free to decide on when and how to adjust the peg. Governments that are heavy GSM-102 users might have an incentive to manipulate their exchange rate under a guarantee program based on a bilateral exchange rate. But this scenario seems unlikely since adjustments in the exchange rate would affect all segments of the economy, imposing costs that should far outweigh any benefits gained through the GSM-102 program.

10/ Another consideration is the choice of the inflation measure used in adjusting nominal exchange rates for differential price movements. This report uses CPI's.

Figure 2. Multilateral and bilateral exchange rates
(Foreign currency/U.S. dollar, 1980 = 1.0)



COST EFFECTIVENESS OF THE EXCHANGE RATE GUARANTEE PROGRAM

A worthwhile exchange rate guarantee program should at least result in:

- Significant new GSM-102 exports, but most of those new GSM-102 exports must not displace (directly or indirectly) any other U.S. commercial agricultural exports. If this condition holds, the program is said to have additionality, that is, there is a net addition to total overseas U.S. sales that can be directly attributed to the program. The program would have 100 percent additionality if all new GSM-102 exports were net additions and zero additionality if all new GSM-102 exports were simply displacing commercial U.S. exports.

- A cost-effective program in the sense that the value of the new exports exceed the cost of operating the program.

These are necessary, though not necessarily sufficient, conditions for the success of an exchange rate guarantee program. Failure to meet at least these criteria would suggest against pursuing the program.

The analysis presented below indicates that there is some potential for increased GSM-102 exports under an exchange rate guarantee program. However, cost effectiveness as defined above is unlikely, because the countries most likely to purchase additional U.S. commodities under an exchange rate guarantee program are the countries that would probably displace their commercial purchases of U.S. commodities.

Price Subsidies and Rising GSM-102 Exports

Theoretically, the exchange rate guarantee program outlined earlier increases GSM-102 exports through a price-subsidy effect, which is induced in one or both of two ways. First, guaranteeing a maximum exchange rate for repaying credits eliminates the implicit cost, or risk premium (faced by importers of U.S. goods), that arises strictly from uncertainty about the future value of the dollar. Call this the risk portion of the price-subsidy effect, or risk subsidy. Other things being equal, removing uncertainty, and thus the risk premium, allows importers to face lower implicit import prices (costs), so the volume and value of U.S. exports should increase. Second, given an expected or actual dollar appreciation, the exchange guarantee program induces what might be called the direct portion of the price-subsidy effect, or direct subsidy. The difference in this case is that the importer could face an actually lower local currency-denominated import price, instead of the removal of some implicit price. The extent of this part of the price subsidy depends on how much the dollar is expected or actually appreciates above the guaranteed maximum rate. The size of the effect on trade will depend on the expected size of the direct portion of the subsidy and on the responsiveness of trade to price changes. Again, other things being equal, this should induce more exports under the GSM-102 program. The evidence presented below indicates that the risk-subsidy effect, if it exists at all, is much less likely to be significant than the direct-subsidy effect.

Risk Subsidies and Rising Exports

There have been many studies on whether uncertainty about dollar movements (i.e., exchange rate risk) lowers the volume of trade. One expects that it does, but most studies fail to find a statistically significant direct relationship between the volume of trade and exchange rate risk. Where a relationship is found, the effects are indirect--through prices--or small. These results appear to hold regardless of the measure of exchange risk used. 11/ Research by the International Monetary Fund (IMF) (25), and Hooper and Kohlhagen (24) are representative of those studies that fail to find any measurable direct effect, while work by Maskus (29) finds some connection between exchange risk and trade.

The IMF study is a wide-ranging survey of the exchange risk literature. (See (13) for another useful review of the literature that covers domestic, as well as trade-related, effects.) In addition to examining trade flow effects, the IMF survey covers the various appropriate measures of exchange rate risk; the effects of risk on the structure, output, and investment decisions of the international sector of a country's economy; and the effects that exchange risk may have on inflation, macroeconomic policy, and protectionism. The IMF study also includes some empirical work. Given all the evidence, the IMF study finds relatively few "directly measurable adverse effects of exchange rate variability on trade." But failure to capture a statistically significant relationship does not mean no relationship exists. According to the IMF study, exchange rate variability is ultimately a symptom of shifts in underlying macroeconomic factors that govern the supply and demand for foreign exchange (e.g., relative interest rates), with these factors "regarded as the basic cause of uncertainty."

11/ Exchange rate volatility is the most common proxy of the risk level, but the difference between the appropriate forward and spot rates has also been used.

Hooper and Kohlhagen developed a theoretical model of exchange rate risk and its effects on trade prices and volumes. Guided strictly by that model, they concluded that, given risk-averse traders, exchange risk will unambiguously reduce the quantity of traded goods. The effect on the price of traded goods was found to depend on who bears the risk. Prices fall when importers bear the risk because of decreased demand; prices rise when exporters bear the risk, reflecting some sort of risk premium. Hooper and Kohlhagen's empirical work on tradeable-good prices generally confirms the theoretical model. However, this effect is quite small, with each 1-percent change in risk yielding less than a 0.01-percent change in price. Like the IMF, Hooper and Kohlhagen found little empirical evidence of a risk and trade volume connection, but the empirical work covered only 2 years in which exchange rates were floating.

Maskus explored the effects of exchange risk on the volume of exports and imports between the United States and Japan, the United Kingdom, Germany, and Canada, with each bilateral trade category divided into industrial categories (total trade, agriculture, crude materials, manufactured goods classified chiefly by material, chemicals, machinery, transportation equipment, and miscellaneous manufactured goods). Maskus concluded that "exchange rate risk restricted the volume of U.S. trade during the floating rate period" because 58 of 64 estimated equations showed a negative coefficient on the risk variable (indicating reduced export and import volume). However, only 26 of the coefficients with the correct sign were statistically significant.

Maskus then calculated the impact of exchange risk on trade. For example, during the 1974-84 period, exchange rate risk was estimated to have reduced total U.S. trade (exports plus imports) by 3.2 percent, and total U.S. agricultural trade by 6 percent. To reach these conclusions, Maskus estimated the level of exports and imports that would have occurred had exchange rate risk been lowered to a minimum, and then subtracted those results from the historical trade figures. 12/ This was done for each of the industrial categories and each of the bilateral export and import flows between the United States and the four countries. Maskus then summed only the results based on statistically significant coefficients to calculate the final level of affected trade. The 3.2-percent result for total trade was based on one country on the import side (Japan) and one country on the export side (Germany). The findings for agricultural goods were based on two countries on the import side (Japan and Germany) and one country on the export side (Germany).

Other studies that found some direct connection between trade and exchange risk are Cushman (9) and Akhtar and Hilton (3), while Gotur's more recent study (18) failed to find a connection. Cushman built upon Hooper and Kohlhagen's work and partly rebutted their findings. Cushman's results were ambiguous, however; none of the significant relationships showed above a 0.1-percent response to a 1-percent change in risk. Cushman's price effects were even smaller. Gotur's study used the basic theoretical framework developed by Akhtar and Hilton, but expanded the number of countries considered. Gotur also tested the robustness of the Akhtar and Hilton conclusions by varying the sample period, the exchange risk measure, and the estimation techniques. In the end, Gotur provided a persuasive direct

12/ Maskus assumed that the minimum feasible level of risk equaled the lowest average measure of risk recorded in four consecutive quarters during the study period.

rebuttal of Akhtar and Hilton's findings of statistically significant relationships between exchange risk and trade.

The Maskus Results Extended to Agricultural Exports Alone

There are admittedly problems with the way Maskus extended his results (which are based on a severely limited number of countries) to cover all the trade taking place under each individual sector. Such problems would be evident even if all of Maskus' estimated relationships were statistically significant. A fairly heroic assumption is required to essentially say that the behavior of all U.S. imports is accurately represented by the case of imports from Japan alone. The same argument holds for the case of all U.S. exports, as well as all the other individual categories. However, Maskus' results are the only estimates available of the effects of exchange risk on U.S. agriculture trade. As a result, this report will be equally heroic and extend Maskus' work to cover agricultural exports alone.

To arrive at what is a very approximate figure of the effects of exchange risk on total U.S. agricultural exports, a weighted average of the export results of the four individual countries was constructed. The weights were based on each country's average share of U.S. agricultural exports during 1974-84. The four countries collectively accounted for just under 30 percent of all U.S. agricultural exports during this period. Had exchange rate risk been reduced to Maskus' minimum, the calculations suggest that total U.S. agricultural exports would have been 2.4 percent higher during 1974-84. Assuming that GSM-102 exports behave in a like manner, reducing exchange risk to some minimum would increase exports by only $300 million over the $12.5 billion in GSM-102 commodities exported during FY's 1981-85. This $300 million accounts for 5.6 percent of the $5.4 billion in unused GSM-102 program funds.

It follows that, even if exchange risk effects exist, and even if the 2.4-percent figure is representative, lowering exchange risk probably will not produce a large enough response in GSM-102 exports to make an exchange guarantee program worthwhile. It is far more likely that any foreseeable important gains in exports will come from the direct-subsidy effects of the exchange rate guarantee program.

The remainder of this analysis focuses on the direct price-subsidy effects of an exchange guarantee program and how a guarantee program might affect GSM-102 trade taking place under an expected or actual dollar appreciation. The data limit the analysis to the GSM-102 programs for FY's 1981-83. Given the analytical methods, this period covers the 1981 through early 1985 dollar appreciation. While making assumptions about possible benefits, this study estimates the actual costs of the exchange guarantee program had it been in place during the given years, essentially using the events of the past few years as a model for expectations about the future.

Direct Subsidies and Rising Exports

The most rigorous approach to follow when calculating the possible increase in GSM-102 exports would be to estimate the present discounted value of the exchange rate guarantee program's subsidy. The present discounted value of the subsidy, in combination with the appropriate price elasticity would show the expected increase in exports. 13/ But this is difficult because

13/ Price elasticity is simply the percentage change in the quantity of exports caused by a 1-percent change in price. For example, if a price

assumptions need to be made about expected movements in interest rates, prices, and exchange rates. Further, there exists virtually no agreement on the size of price elasticities facing exported U.S. commodities (15,33). To circumvent these problems, two alternative assumptions about the response of GSM-102 exports were adopted and then used to examine whether an exchange guarantee program is likely to be cost effective.

The first assumption is that the guarantee program results in 100 percent of the unused authorization being used. Such an assumption puts the analysis on the most favorable footing possible. Applied to the 1981-83 programs, this assumption translates into GSM-102 exports that are $2.3 billion higher. The assumption seems reasonable on first review. During the years that an exchange guarantee would have affected the FY 1981 GSM-102 program, the dollar appreciated by just under 30 percent; for the FY 1982 and 1983 programs, it appreciated by just under 40 percent and slightly over 20 percent, respectively. 14/ The figures imply a significant direct-subsidy effect under a program that fixes the maximum allowable dollar exchange rate at the time the credit is extended. If other things remain equal, even the assumption of a price elasticity less than 1 (say 0.7) would raise the value of GSM-102 trade to near or beyond authorized levels.

If other things are not equal, exchange rate movements might not fully explain why the GSM-102 program was not fully utilized by importers. In this case, adopting the 100-percent assumption would be unreasonable, biasing the analysis toward finding the exchange guarantee program cost effective. Given a second review, the debt and oil price problems of many GSM-102 destination countries in the 1980's suggest that an assumption of only 75 percent of the unused GSM-102 authorization being used is more reasonable. This assumption translates into GSM-102 exports that are $1.7 billion higher.

Additionality and the Costs of an Exchange Rate Guarantee Program

Given a $2.2 billion, or more likely $1.7 billion, rise in GSM-102 exports, we now need to estimate the expected costs of the program, as well as the level of additionality at which the program is cost effective. This report finds that the average yearly cost of operating the program may well be under 20 percent of the value of credit extended in any particular year, but that the level of additionality needed to break even would be quite high. 15/ At a minimum, more than 60 percent of new GSM-102 exports would have to be additional for the guarantee program to be cost-effective. But the program would more likely need more than 80 percent of the new GSM-102 exports to be additional for the program's success. The research indicates that such high levels of additionality are unlikely.

---

elasticity equals 1.2 and export prices fall by 5 percent, then the quantity of exports can be expected to rise by 6 percent. One point to note is whether the elasticity is greater or less than 1. If it is greater (less), then a 1-percent price movement will lead to a greater (less) than 1-percent quantity movement, and the value of trade will rise (fall).

14/ Based on a real trade-weighted exchange rate index composed of all the GSM-102 destination countries.

15/ The 20-percent figure is the cost that would be expected on average, and is based on dollar movements in FY's 1981-86. Any year's cost could be higher but, given the substantial dollar appreciation during this period, 20 percent probably represents an upper bound.

Several simplifying assumptions were made in calculating these figures. Allocations and use of credit guarantees were assumed to be evenly distributed throughout the fiscal year, allowing the use of annual averages in the calculations. Annual principal and interest payments on 3-year credit terms were assumed, with the first payment due a year after the credit was first extended. Finally, it was assumed that the 6-month London Interbank Offer Rate on U.S. dollar deposits (LIBOR) represented the interest rate faced under the GSM-102 program.

Principal and interest payments were calculated using LIBOR to generate the cost estimates of an exchange rate guarantee program that would have covered the 1981 through 1983 GSM-102 credit programs. The resulting payments were then converted from U.S. dollars to local currency using the exchange rate in effect for each of the 3 years in which payments were due. A similar calculation was also made where the maximum dollar exchange rate was the rate in effect during the year credit was extended. The difference between the two local currency payments, converted back to U.S. dollars, represents the dollar shortfall in payments that would have resulted had an exchange guarantee program been operational.

Costs Under 100- and 75-Percent Assumptions

Two alternative exchange rate measures were used to calculate the possible costs of an exchange rate guarantee program. The Food Security Act of 1985 suggests using the nominal FRB 10-country index, but this report showed earlier that individual, real bilateral rates are better suited to the goals of an exchange guarantee program. Alternative cost estimates were therefore calculated using a trade-weighted index, based on the real bilateral rates of all GSM-102 destination countries. Table 4 shows these calculated costs and the previously assumed potential benefits of increased GSM-102 exports.

Table 4--Possible costs and potential benefits under an exchange rate guarantee program

FY 1981 Through FY 1983	Costs		Potential benefits	
	Annual average	3-year total	Annual average	3-year total
	Millions of dollars			
100% of unused allocation used:				
FRB exchange rate	520	1560	770	2310
GSM-102 exchange rate	500	1500		
75% of unused allocation used:				
FRB exchange rate	490	1470	580	1740
GSM-102 exchange rate	475	1425		

There is little variance in the estimated cost of the exchange rate guarantee program. Regardless of the index or level of unused allocation used, total costs to the program for the 3 fiscal years remain near $1.5 billion,

averaging $0.5 billion per year. The total potential benefits figures show a much greater variation. Across the unused allocation categories, costs are roughly 5-percent lower in the 75-percent case than in the 100-percent case, while total potential benefits are, of course, 25 percent lower. The benefit/cost ratios show a $1.50 return per dollar spent in the 100-percent scenario, but only a $1.20 return per dollar spent in the 75-percent scenario. While both benefit/cost ratios indicate that a successful program would be likely, remember that the benefits assumptions underlying the ratios yield the best possible scenario. The potential benefits occur only under an assumption of 100-percent additionality--an unlikely event.

The more important conclusion, however, is that adopting a more reasonable assumption (use of 75 percent of the unused allocation) moves the benefit/cost ratio to a significantly less favorable result, and suggests that reaching a breakeven point will be much more difficult. The next question is necessarily: At what level of additionality would an exchange rate guarantee program be expected to slip below the breakeven point (a benefit/cost ratio of 1)?

Additionality Under 100- and 75-Percent Assumptions

Table 5 presents the levels of additionality (net new commercial sales as a percentage of new GSM-102 exports) required for the exchange rate guarantee program to break even. The figures show at which point the benefit/cost ratio equals 1. For example, if an exchange guarantee program led to 75 percent of the unused GSM-102 allocation being used, something like 80 to 85 percent of the new GSM-102 exports must be totally new agricultural exports for the program to be cost effective. In any event, breakeven additionality is high under any of the scenarios.

Table 5--Breakeven additionality

FY's 1981 through 1983	Exchange rates	
	FRB index	GSM-102 index
	Percent	
100% of unused allocation used	68	65
75% of unused allocation used	85	81

Tables 4 and 5 confirm that there is little difference in the calculations when compared across exchange rate measures, but there is a significant difference when compared across allocation use categories. Both tables suggest that it becomes much more difficult for the program to break even as the level of new GSM-102 exports generated falls. Going from the 100-percent scenario to the 75-percent scenario dramatically raises the level of additionality required for a cost-effective exchange guarantee program. But can these levels of additionality be reasonably expected?

The Likelihood of High Additionality

The extent to which allocated credit guarantees are used, and the extent to which a country's U.S. commercial agricultural imports depend on the GSM-102 program would seem to most affect the level of additionality generated by an exchange guarantee program. There would be little for an exchange rate guarantee program to affect if most of the GSM-102 allocation covering exports to a country is used. Add to this an appreciating dollar, as occurred over the study period, and the suspicion would be that the GSM-102 program was already sufficiently attractive. Such conditions suggest the raising of GSM-102 allocations as an effective method for increasing exports.

If a country imports most of its U.S. agricultural goods under the GSM-102 program, then by definition any increase in GSM-102 trade would increase U.S. sales in that country. Whether this increase in U.S. sales is truly additional depends on whether there are any third country effects. For example, if new GSM-102 exports displace some of a competing country's trade, that country probably will try to sell those goods in other markets. If the competing exporter successfully boosts sales to a third market, at the expense of U.S. goods, net additionality of the program would be something less than 100 percent. However, the important point is that a country already relying heavily on GSM-102 trade has the greatest potential for truly additional exports. When foreign importers do not rely heavily on GSM-102 there is clearly access to, or less need for, other sources of trade financing. In this case an exchange rate guarantee program would probably shift non-GSM sales to the GSM-102 program, generating few additional exports.

Figures 3-8 diagram GSM-102 trade in FY's 1982-84 and show how each country's trading patterns conform to the above considerations. The analysis covers U.S. agricultural exports in aggregate and by major commodity, for each of the destination countries receiving GSM-102 covered goods.

The columns of the matrices in figures 3-8 show how much of the GSM-102 allocation is used for each country. The expectation is that countries appearing in the right column, indicating over 75-percent of their allocation was used, would have little additionality under an exchange rate guarantee program. Those countries appearing in the left column, indicating under 50-percent use of the allocation, would have the greatest potential for additionality.

The rows of the matrices show what proportion of a country's U.S. agricultural imports was conducted under the GSM-102 program. Here the expectation is that countries appearing in the top row would most likely increase GSM-102 use under an exchange guarantee, but at the expense of other commercial U.S. agricultural sales. Countries appearing in the bottom row rely heavily on GSM-102 imports. These countries would have the greatest potential for truly additional export sales if new GSM-102 exports were generated.

Only those countries in the lower left corner of the matrices could be expected to have high additionality under an exchange rate guarantee program. Conclusions are indeterminate for countries appearing in the boxes immediately adjacent to the lower left box, while conclusions for countries appearing in all other sections are that a high level of additionality is unlikely. It cannot be inferred that an exchange rate guarantee program would produce additional U.S. agricultural exports without a majority of the GSM-102 destination countries appearing in the lower left corner of the matrices.

Figure 3. Aggregate GSM-102 exports

Usage of GSM-102 allocation for individual countries

GSM-102 as a proportion of U.S. agricultural exports

	Low (less than 50%)	Medium (between 50% and 75%)	High (greater than 75%)
Low (less than 50%)	Argentina India Indonesia Nigeria Spain Trinidad Uruguay Venezuela Yemen	Honduras Korea Morocco Panama Peru Thailand	Bangladesh Chile Colombia Costa Rica Dominican Republic Egypt Guatemala Haiti Mexico Pakistan Philippines Sierra Leone Turkey Yugoslavia
Medium (between 50% and 75%)			Brazil Ecuador El Salvador Hungary Jamaica Portugal
High (greater than 75%)			Iraq

Figure 4. GSM-102 wheat exports

Usage of GSM-102 allocation for individual countries

GSM-102 as a proportion of U.S. agricultural exports

	Low (less than 50%)	Medium (between 50% and 75%)	High (greater than 75%)
Low (less than 50%)	Egypt	Morocco	Costa Rica Korea Mexico Nigeria Philippines Sierra Leone Turkey
Medium (between 50% and 75%)			Bangladesh Brazil Chile Colombia Dominican Republic Haiti Peru
High (greater than 75%)		Yugoslavia	Ecuador Guatemala Iraq Jamaica Portugal

Figure 5. GSM-102 feed grains exports

Usage of GSM-102 allocation for individual countries

GSM-102 as a proportion of U.S. agricultural exports

	Low (less than 50%)	Medium (between 50% and 75%)	High (greater than 75%)
Low (less than 50%)	Morocco Nigeria Peru	Korea Panama	Chile Ecuador Egypt Turkey
Medium (between 50% and 75%)			Dominican Republic Mexico Portugal
High (greater than 75%)			Costa Rica El Salvador Honduras Iraq Jamaica Philippines

Figure 6. GSM-102 cotton exports

Usage of GSM-102 allocation for individual countries

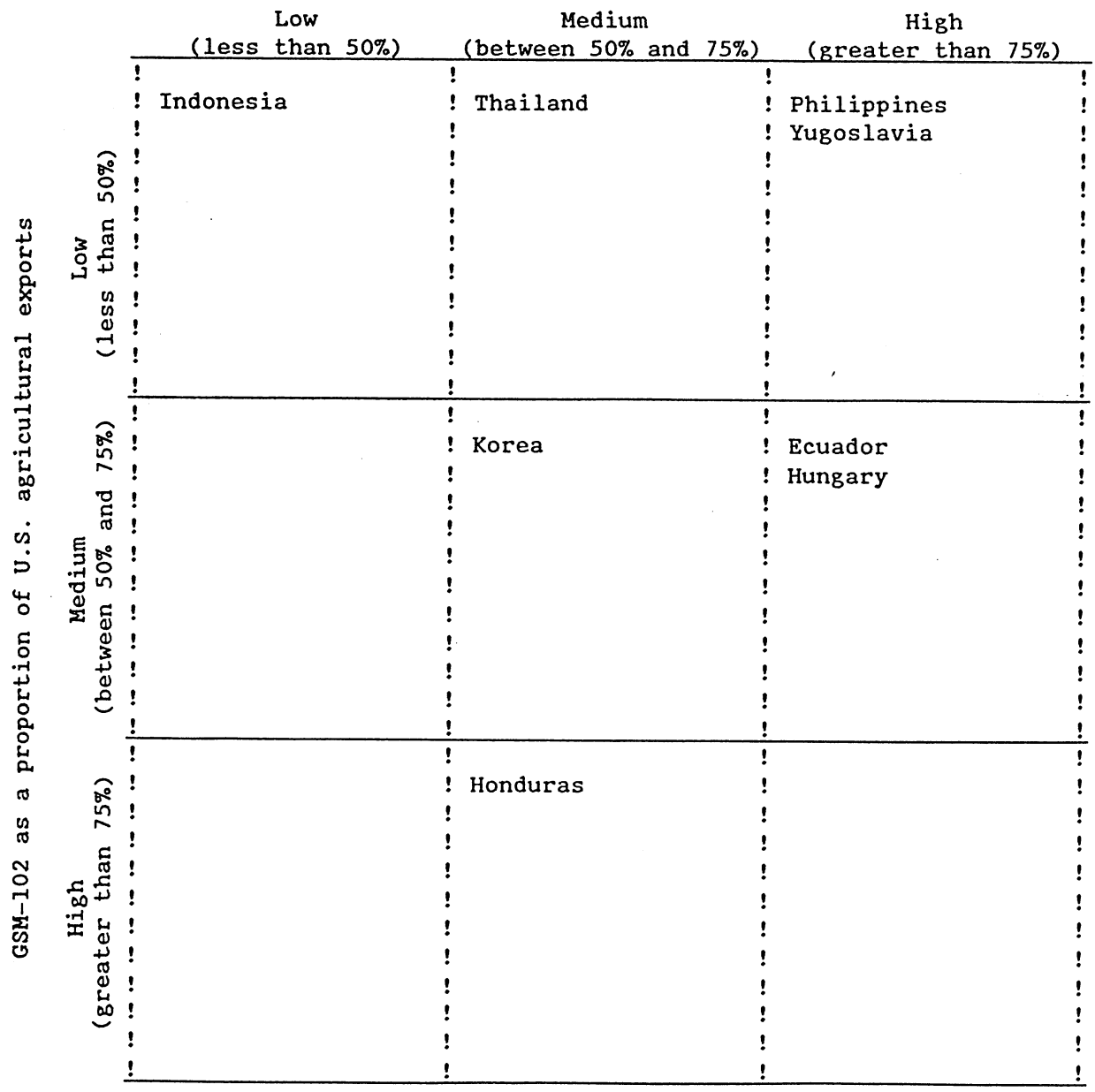


Figure 7. GSM-102 oilseeds exports

Usage of GSM-102 allocation for individual countries

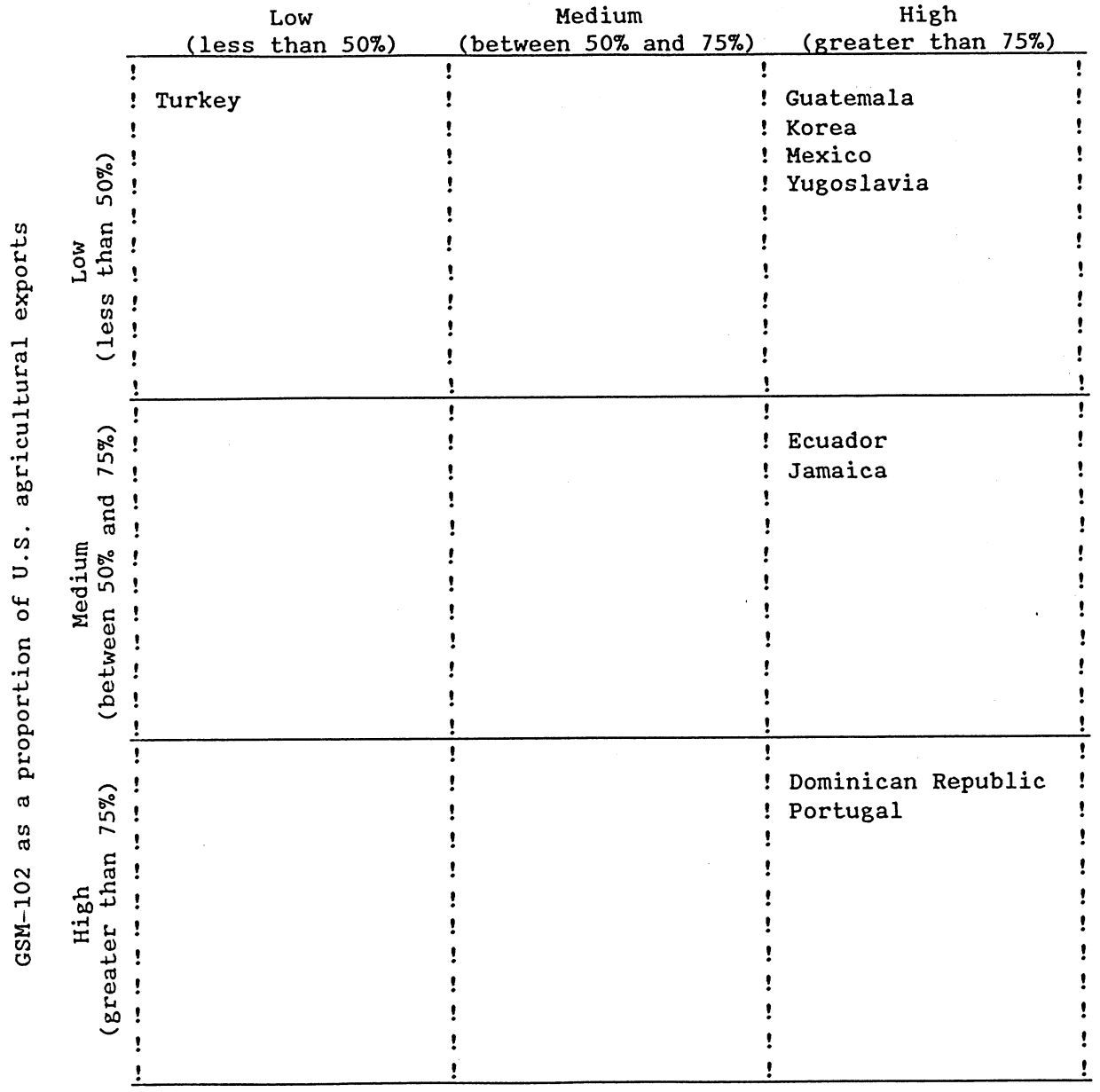


Figure 8. GSM-102 rice exports

Usage of GSM-102 allocation for individual countries

GSM-102 as a proportion of U.S. agricultural exports

	Low (less than 50%)	Medium (between 50% and 75%)	High (greater than 75%)
Low (less than 50%)	Bangladesh Brazil Dominican Republic El Salvador Nigeria Peru Spain Trinidad Yemen		
Medium (between 50% and 75%)			
High (greater than 75%)		Portugal	Iraq Jamaica

Examining the matrices leads to the conclusion that the prospects for high additionality under an exchange guarantee program are extremely low for both aggregate GSM-102 trade and the individual major commodities (wheat, feed grains, cotton, oilseeds, and rice). No country appears in the lower left box of any of the figures. In only three cases--Yugoslavia in the wheat matrix, Honduras in the cotton matrix, and Portugal in the rice matrix--does a country appear in an indeterminate box. All other GSM-102 destination countries appear where a low potential for additionality is indicated.

INSTITUTIONAL FACTORS AFFECTING THE EXCHANGE RATE GUARANTEE PROGRAM

Cost effectiveness (as defined earlier) is the important consideration in deciding whether to adopt an exchange rate guarantee program. But cost effectiveness alone is not a sufficient condition for recommending the adoption of the exchange rate guarantee program. And while the necessary cost-effective conditions are unlikely to be met, it is probably useful to review some of the institutional factors that may affect the decision. Such factors as the ability of the CCC to administer the program, the reactions of countries whose exports compete with those of United States in international markets, and the willingness of both private banks and U.S. exporters to participate, come to mind.

CCC Administration

The availability of human resources in the CCC to implement an exchange rate program must be considered. Such a program would require more staff than currently available to monitor exchange rates, a complex task that would be greatly complicated if real bilateral exchange rates were used. The CCC would also face calculating the proper dollar payments due from a myriad of importers during any dollar appreciation. The office's workload would vary, depending on changes in the exchange rate, so personnel planning would also be difficult. Resources might be underutilized under a depreciating dollar, but unable to provide timely CCC payments to participating U.S. creditors during an appreciation.

The exchange rate guarantee program would also complicate administering a relatively simple GSM-102 program because the criteria for allocating credit guarantees would grow more complex. Allocation would not only depend on market development objectives and the availability of foreign exchange for debt repayment, but on hard-to-anticipate changes in exchange rates and inflation. A significant runup in the value of the U.S. dollar would leave the CCC open to substantial payments. Combine this with the unpredictability of dollar movements, and meaningful budgeting for the program becomes extremely difficult.

Competing Country Reaction

Competitors undoubtedly would both criticize and attempt to counter the program. They might criticize the program as being prohibited under the IMF's Articles of Agreement, which prohibit a member from establishing separate official exchange rates for specified transactions. Competitors may not be able to directly counter the program by offering a similar exchange rate guarantee program since they face the risk of adverse exchange rate movement between their currency and the dollar. However, they could retaliate on other grounds; competitors marketing their commodities through a marketing board may

further lower their export price. Such efforts would no doubt limit the increase in exports under the program in GSM-102 markets or perhaps in other markets.

Private Bank Participation

Although the program offers them no new incentive to participate, U.S. bank participation is critical to the exchange rate guarantee program's success. The foreign exchange program attempts to minimize the risk to foreign purchasers, but at some cost to U.S. creditors. Under the current GSM-102 program, U.S. banks collect repayments from the CCC only if the importer's bank fails to pay as scheduled. But under an exchange rate guarantee program, in periods of dollar appreciation, perhaps every repayment would involve some compensation from the CCC. Receiving full payment from two parties could burden U.S. banks. But, banks might participate if payments are made on a timely basis.

Exporter Participation

The program would complicate the existing GSM-102 program for U.S. exporters. GSM-102 coverage now begins when credit is extended. Under the exchange guarantee program, the purchaser would desire coverage from when the sale is made, not from when the credit is actually extended. Time could be substantial between when the sale is made and when credit is extended, so the guarantee program would need CCC and U.S. exporter agreement on the exchange rate at the time of the sale. But U.S. exporters may be willing to accept this complication if the program significantly enhances sales.

CONCLUSIONS

The main conclusion to be drawn from this report is that the operating costs of an exchange rate guarantee program are likely to exceed the generated benefits. Failure to meet the minimal criteria of cost effectiveness suggests that the program would not be economically successful and on these grounds should not be pursued.

This conclusion is drawn from several considerations. First, it was assumed that an exchange rate guarantee would increase exports under the GSM-102 program, but that in all probability not all of the unused GSM-102 program authorization would be used. Seventy-five percent was selected as a reasonable representation of the increase that might actually occur. The actual figure could just as easily be lower. If the level of unused GSM-102 authorization used were below 75 percent, it would be that much more difficult for the guarantee program to break even.

Second, the levels of additionality required for the exchange rate guarantee program to be cost effective were calculated using the assumptions about increased GSM-102 trade. Regardless of the scenario imagined, the best figure (i.e., the lowest additionality that could be experienced and still break even) was in the neighborhood of 65-68 percent, with the more likely figure being between 81 and 85 percent. In addition, the figures were quite sensitive to assumptions made about the level of unused authorization used.

Finally, by examining the trade histories of individual GSM-102 destination countries, it was found that the required levels of breakeven additionality

would probably be unattainable. Most of the countries used a high level of their GSM-102 allocations, during a period of strong dollar appreciation. Apparently the GSM-102 export credit program was already sufficiently attractive.

This report admittedly adopted a narrow definition of cost effectiveness. On the cost side, for example, whatever tax revenue additional exports generated would reduce net program expenditures. But the costs of an exchange rate guarantee program are uncertain and could be substantial, depending on the movements of the dollar. Higher benefits, on the other hand, could occur if the effects extend over a longer period of time than considered here. However, most GSM-102 destination countries used a high percentage of their program allocation during a time of strong dollar appreciation, suggesting that substantially higher longrun benefits are doubtful.

Beyond these primary concerns are several other administrative and institutional factors to consider: the attractiveness of the program to U.S. exporters and U.S. banks, the ability of the CCC to implement the program, and the reaction of competing countries. While none of these concerns appears serious enough to prevent the program, they could increase the costs involved. It appears that it would be particularly difficult for the CCC to implement and monitor the exchange rate guarantee program without a significant increase in staff and budget.

REFERENCES

1. Abbott, P.C. U.S. Agricultural Export Expansion Activities: An Evaluation and Analysis of Options for U.S. Wheat Exports, AEI Occasional Papers. American Enterprise Institute for Public Policy Research, Washington, DC Nov. 1984.

2. _____, and F.D. McCarthy. "Potential Welfare Losses Due to Tied Food Aid," Canadian Journal of Agricultural Economics, 31 (Mar. 1983): 45-58.

3. Akhtar, M.A., and R.S. Hilton. "Effects of Exchange Rate Uncertainty on German and U.S. Trade," The Quarterly Review, Federal Reserve Bank of New York, 9 (Spring 1984): 7-16.

4. Baldridge, M. "Statement of the Secretary of the Department of Commerce on Trade," Hearings before the Committee on Banking, Housing, and Urban Affairs, U.S. Senate. May 14, 1986.

5. Belongia, M.T. "Estimating Exchange Rate Effects on Exports: A Cautionary Note," The Federal Reserve Bank of St. Louis Review, 68 (Jan. 1986): 5-16.

6. Chambers, R.G., and R.E. Just. "Effects of Exchange Rate Changes on U.S. Agriculture," American Journal of Agricultural Economics, 63 (Feb. 1981): 32-46.

7. Clark, P.B. "The Effects of Exchange Rate Changes in the U.S. Trade Balance," The Effects of Exchange Rate Adjustments. P.B. Clark, D. Logue, and R. Sweeney, eds. Proceedings of a conference sponsored by the office of the Assistant Secretary for International Affairs Research, U.S. Dept. Treas. 1976.

8. Coes, D.V. "The Crawling Peg and Exchange Rate Uncertainty," Exchange Rate Rules: The Theory, Performance, and Prospects of the Crawling Peg. J. Williamson, ed. New York: St. Martins Press, 1981.

9. Cushman, D.O. "The Effects of Real Exchange Rate Risk on International Trade," Journal of International Economics, 15 (Aug. 1983): 45-63.

10. Dunmore, J., and J. Longmire. "Sources of Recent Change in U.S. Agricultural Exports," ERS Staff Report No. AGES831219. Econ. Res. Serv., U.S. Dept. Agr., Jan. 1984.

11. Dutton, J., and T. Grennes. Measurement of Effective Exchange Rates Appropriate for Agricultural Trade, Economics Research Report No. 51. Dept. Econ. and Bus., N.C. State Univ., Nov. 1985.

12. Fama, E.F. "Forward and Spot Exchange Rates," Journal of Monetary Economics, 14 (Nov. 1984): 320-38.

13. Farrell V.S., D.A. DeRosa, and T.A. McCown. Effects of Exchange Rate Variability on International Trade and Other Economic Variables: A Review of the Literature, Staff Studies No. 130. Board of Governors of the Federal Reserve System, Dec. 1983.

14. Foreign Agricultural Service, U.S. Department of Agriculture. CCC Export Credit Guarantee Program GSM-102, Informational Pamphlet, Feb. 1981.

15. Gardiner, W.G., P.M. Dixit. Price Elasticity of Export Demand: Concepts and Estimates, FAER-228. Econ. Res. Serv., U.S. Dept. Agr., Feb. 1987.

16. Geweke, J., and E. Feige. "Some Joint Tests of the Efficiency of Markets for Forward Foreign Exchange," Review of Economics and Statistics, 61 (Aug. 1979): 334-41.

17. Goolsby, O.H., and R.R. Roberson. Exchange Rate Developments and Their Impact on U.S. Agricultural Exports: 1970-1984. Staff Report No. 5. Foreign Agr. Serv., U.S. Dept. Agr., May 1985.

18. Gotur, P. "Effects of Exchange Rate Volatility on Trade: Some Further Evidence," International Monetary Fund Staff Papers, 32 (Sept. 1985): 475-512.

19. Grassman, S. "A Fundamental Symmetry in International Payment Patterns," Journal of International Economics, 5 (May 1973): 105-116.

20. Grigsby, S.E., and P. Dixit. "Alternative Export Strategies and U.S. Agricultural Policies for Grains and Oilseeds, 1950-83," ERS Staff Report No. AGES8606215. Econ. Res. Serv., U.S. Dept. Agr., Aug. 1986.

21. Grigsby, S.E., and C.L. Jabara. "Agricultural Export Programs and U.S. Agricultural Policy," Agricultural-Food Policy Review: Commodity Program Perspectives, AER-530. Econ. Res. Serv., U.S. Dept. Agr., July 1985.

22. Haley S.L., and B. Krissoff. "The Value of the Dollar and Competitiveness of U.S. Wheat Exports," ERS Staff Report No. AGES860611. Econ. Res. Serv., U.S. Dept. Agr., July 1986.

23. Hansen, L.P., and R.J. Hodrick. "Forward Exchange Rates as Optimal Predictors of Future Spot Rates: An Econometric Analysis," Journal of Political Economy, 88 (Oct. 1980), 829-53.

24. Hooper, P., and S.W. Kohlhagen. "The Effect of Exchange Rate Uncertainty on the Prices and Volume of International Trade," Journal of International Economics, 8 (Nov. 1978): 483-512.

25. International Monetary Fund, Exchange Rate Volatility and World Trade: A Study by the Research Department of the International Monetary Fund, Occasional Paper No. 28. July 1984.

26. Kawai, M., and I. Zilcha. "International Trade with Forward-Futures Markets Under Exchange Rate and Price Uncertainty," Journal of International Economics, 20 (Feb. 1986): 83-98.

27. Longmire, J., and A. Morey. Strong Dollar Dampens Demand for U.S. Farm Exports, FAER-193. Econ. Res. Serv., U.S. Dept. Agr., Dec. 1983.

28. Magee, S.P. "U.S. Import Prices in the Currency-Contract Period," Brookings Papers on Economic Activity: No. 1. Washington, DC, 1974 117-64.

29. Maskus, K.E. "Exchange Rate Risk and U.S. Trade: A Sectoral Analysis," The Economic Review, Federal Reserve Bank of Kansas City, 71 (Mar. 1986): 16-28.

30. Ott, M., and P.T. Veugelers. "Forward Exchange Rates in Efficient Markets: The Effects of News and Changes in Monetary Policy Regimes," The Federal Reserve Bank of St. Louis Review, 68 (June/July 1986): 5-15.

31. Paarlberg, P.L., A.J. Webb, A. Morey, and J.A. Sharples. "Impacts of Policy on U.S. Agricultural Trade," ERS Staff Report No. AGES840802. Econ. Res. Serv., U.S. Dept. Agr., Dec. 1984.

32. Page, S.A.B. "The Choice of Invoicing Currency in Merchandise Trade," National Institute Economic Review. London: National Institute of Economic and Social Research, 98 (Nov. 1981): 60-70.

33. Roe T., M. Shane, D.H. Vo. Price Responsiveness of World Grain Markets: The Influence of Government Intervention on Import Price Elasticity, TB-1720. Econ. Res. Serv., U.S. Dept. Agr., June 1986.

34. Schuh, G.E. "The Exchange Rate and U.S. Agriculture, "American Journal of Agricultural Economics, 56 (Feb. 1974), 1-13.

APPENDIX--DEMAND ENHANCEMENT, PRICE SUBSIDIES, AND EXCHANGE RATES: A GRAPHIC ANALYSIS

Here, a two-country, one-commodity model is used to examine the effects of exchange rate movements on exports taking place under either a demand-enhancement or price-subsidy program. For ease of analysis, one country is assumed to be the importer, and one country (the United States) is assumed to be the exporter. The commodity, while produced in both countries, is assumed to be homogeneous: meaning there is no qualitative difference between the commodity produced in the importing country or the commodity produced in the exporting country and allowing a single world price to determine the direction of trade.

This appendix looks only at the effects of a dollar appreciation. Ignoring an explicit mention of depreciation will not prevent the analysis from demonstrating a main point, namely that the effects of a dollar movement will be the same whether trade takes place under a demand-enhancing program or under a price-subsidy program. Under a dollar appreciation, both the volume of the commodity traded internationally and its world price decrease. Though not presented below, a dollar depreciation would have the opposite effects.

Open Market Equilibrium

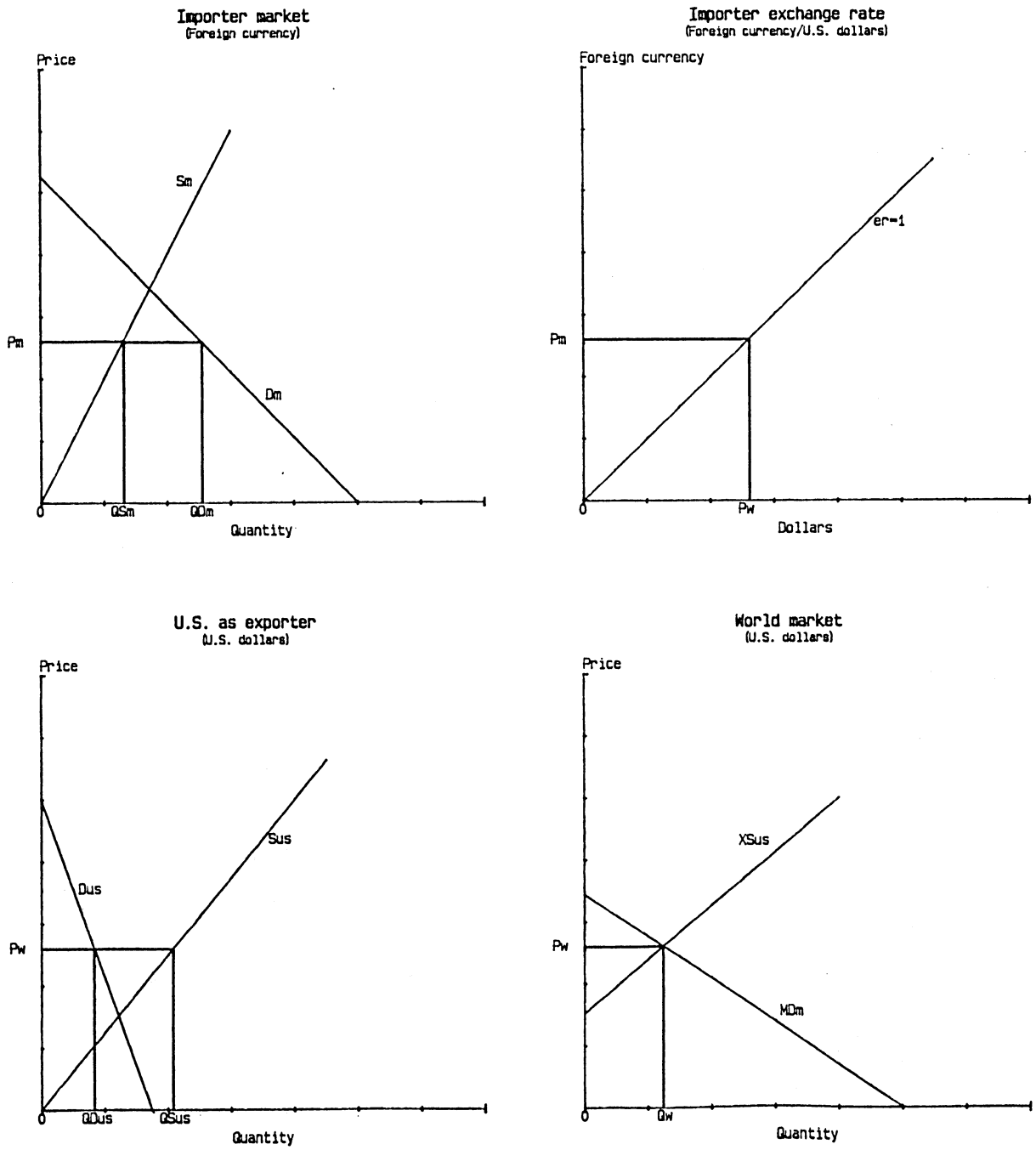
Appendix figure 1 begins the analysis, showing an open world market in a state of equilibrium, that is, the world price is such that imports demanded equal exports supplied. The world market and U.S. as exporter panels are in dollar terms, while the importer market panel is in the importing country's local currency. The exchange rate panel depicts the rate of exchange between the two countries' currencies. For ease of exposition it is assumed that the exchange rate equals 1, resulting in the price of the commodity in the importing country's currency equaling the world price (in dollars).

Domestic Markets, Import Demand, and Export Supply

The upper left panel shows the domestic supply (Sm) and demand (Dm) curves of the importing country, depicting the quantities of the commodity that will be demanded and domestically supplied in the country at any given domestic price. The import demand curve (MDm) in the world market panel is a derivative of the importing country's domestic demand and supply, and is simply the difference between the quantity demanded domestically and the quantity supplied domestically by the importing country at any given price. For example, if the price of the commodity in the importing country was at a level where domestic demand equaled domestic supply (where the importing country's domestic supply and demand curves intersect), there would be no demand for imports. All of the commodity desired in the importing country would be produced domestically, leaving one at the point where the MDm curve intersects the price axis. The other points on the MDm curve are similarly determined by simply varying the price in the importing country's domestic market and calculating the excess of the importing country's domestic demand over domestic supply.

The implication here is that the price-responsiveness of import demand, represented by the slope of the MDm curve, depends on the price-responsiveness of both demand and supply in the importing country. If domestic demand is more (less) price-responsive [Dm is flatter (steeper)], then import demand will be more (less) price-responsive [MDm is flatter (steeper)]. Similarly,

Appendix figure 1. Open market equilibrium



import demand is more (less) responsive to price changes when domestic supply is more (less) responsive to price changes. Also implied is that the MDm curve will shift outward (inward) as Dm shifts outward (inward), or as Sm shifts inward (outward). Overall demand in the importing country could be increased, with a subsequent shift outward in Dm and MDm, by factors such as a rise in income or available foreign exchange, a change in tastes, a rise in the prices of competing goods, or a decline in the prices of complementary goods. Supply conditions in the importing country could be altered, represented by shifting Sm and MDm curves, by changes in technology, favorable or unfavorable weather, or farm policies affecting production.

The domestic market conditions of the exporter, in this case the United States, are depicted in the lower left panel of appendix figure 1. The relationship between the U.S. domestic demand (Dus) and supply (Sus) curves and the export supply curve (XSus) depicted in the world market panel essentially parallels the relationship outlined above for the importing country. However, there is an excess of domestically produced supply over domestic demand, leading to the derivation of an export supply curve. As in the case of the importing country, if the price faced in the U.S. market causes domestic demand and supply to be equal, then there would be no participation in the world market (represented by the intersection of XSus and the price axis). As the price rises, more would be produced in the United States and less consumed, with the surplus of the commodity going to the export market, suggesting the other points along the XSus curve.

Continuing the parallel, the price-responsiveness of export supply depends on the nature of the exporter's domestic market. If either domestic demand or supply in the exporter country is more (less) price responsive, then export supply will be more (less) price responsive. If for some reason U.S. demand shifts downward (upward) or U.S. supply shifts upward (downward), then export supply would shift upward (downward).

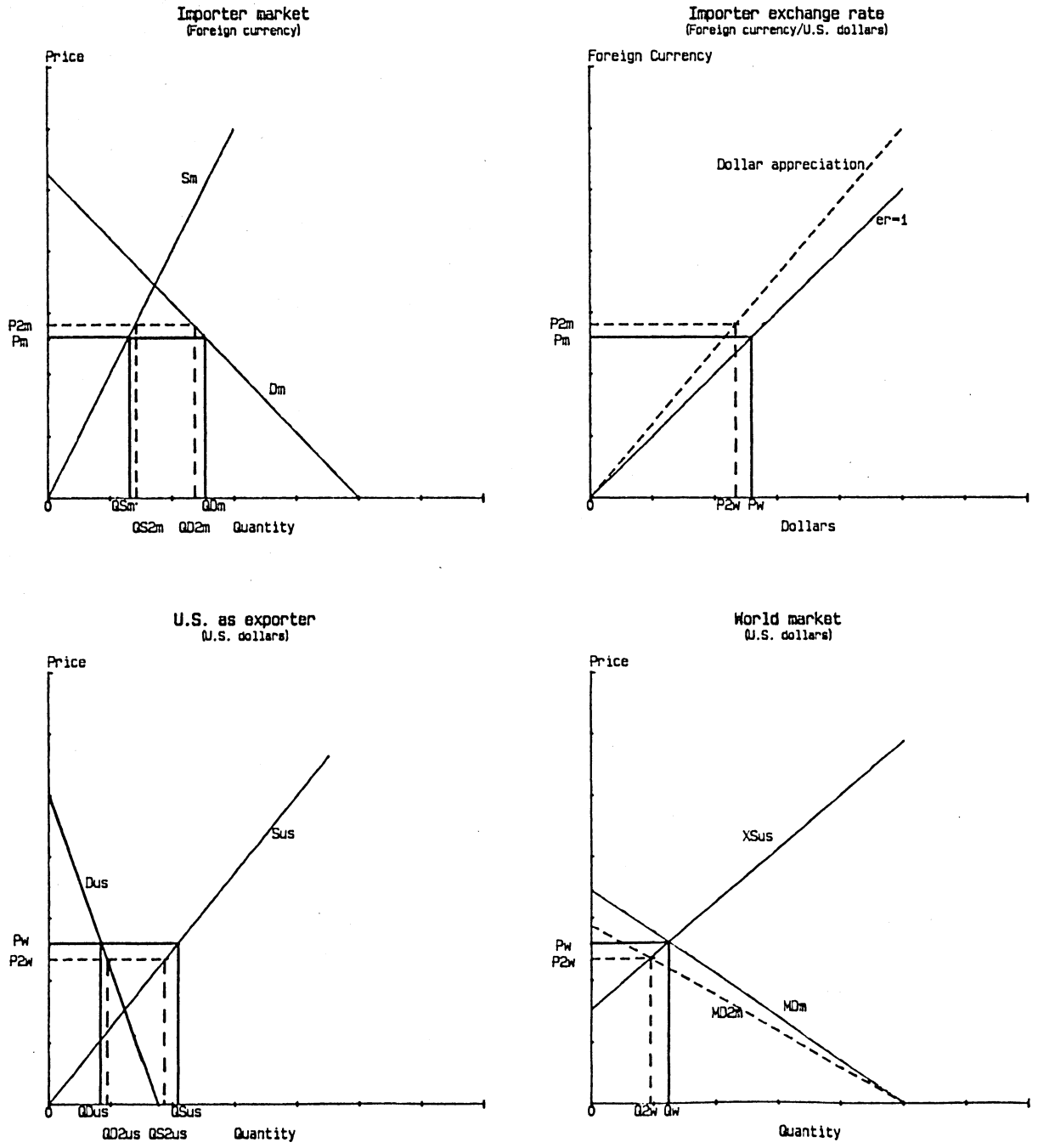
Equilibrium Prices, Exports, and Imports

Given the market conditions depicted in appendix figure 1, the world market will reach equilibrium when the world price equals Pw, where the quantity of exports supplied equals the quantity of imports demanded (Qw). Facing the world market-determined price Pw, the exporter will produce quantity QSus, but only consume quantity QDus. The difference between the quantities produced and consumed equal the quantity of the commodity the United States would export (the distance between QDus and QSus will equal the distance between 0 and Qw). The importer has a similar situation: Faced with price Pm, which equals the dollar-denominated price Pw since the exchange rate is assumed to equal 1, the importer's domestic market conditions dictate that the country will want to consume QDm of the commodity while producing only QSm. To meet its excess domestic demand, the importing country will have to import a quantity of goods equal to the difference between QDm and QSm, an amount which also equals the distance between 0 and Qw in the world market panel.

The Effects of a Dollar Appreciation in an Open World Market

Appendix figure 2 presents the effects of a dollar appreciation on the open world market. The initial open market equilibrium of appendix figure 1 is depicted by the solid lines, while the appreciation and its effects are represented by the dashed lines. The upper right panel shows the initial shock to the system. A dollar appreciation is represented by the exchange rate line

Appendix figure 2. Dollar appreciation in an open world market

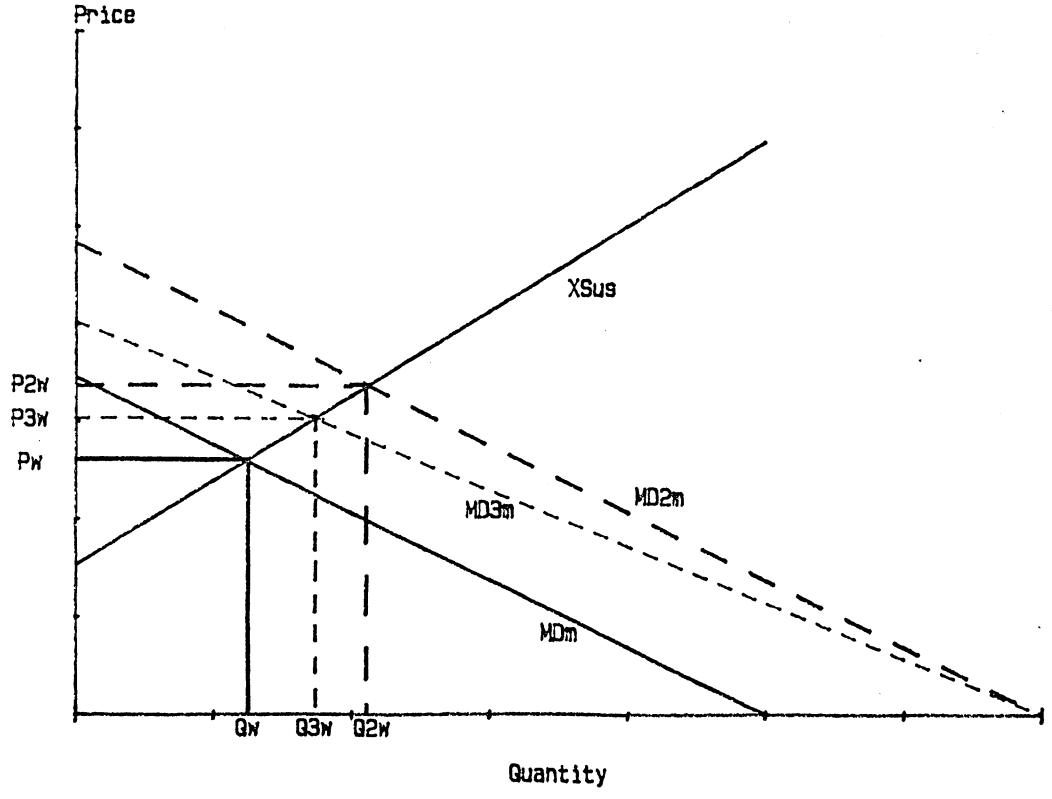


rotating counterclockwise, with each unit of foreign currency purchasing fewer dollars. As a result, at every foreign currency price, the importing country would be able to import fewer goods than in the initial equilibrium. The importer's import demand curve effectively will have rotated counterclockwise to MD2m, representing a decline in world demand, at which point a new world market equilibrium is reached. In the new equilibrium, P2w will be the world price (in dollars) faced by both the exporter and importer. Given this lower dollar world price, the U.S. domestic market would produce less of the commodity (QS2us) while consuming more (QD2us), resulting in fewer exports. Specifically, U.S. exports would be QS2us less QD2us, which equals the distance between 0 and Q2w in the world market panel. For the importer, though dollar-denominated world prices have dropped to P2w, local currency prices of the commodity have risen to P2m because of the exchange rate shift. The importing country produces more and consumes less as a result, leading to a lower level of imports (QD2m less QS2m).

The Effects of Dollar Appreciation on Demand-Enhancing Programs

This report is specifically interested in the effects of an exchange rate guarantee program on CCC export credit programs. Since such programs are sometimes described as demand-enhancing, it is important to understand the effects of exchange rate movements on programs that do lead to structural shifts in demand. Appendix figure 3 presents these effects by focusing on the world market alone, but the domestic exporter and importer markets that underlie the workings of the world market should be kept in mind. Once again, the initial open market equilibrium is depicted by solid lines.

Appendix figure 3. Demand enhancement programs and dollar appreciation

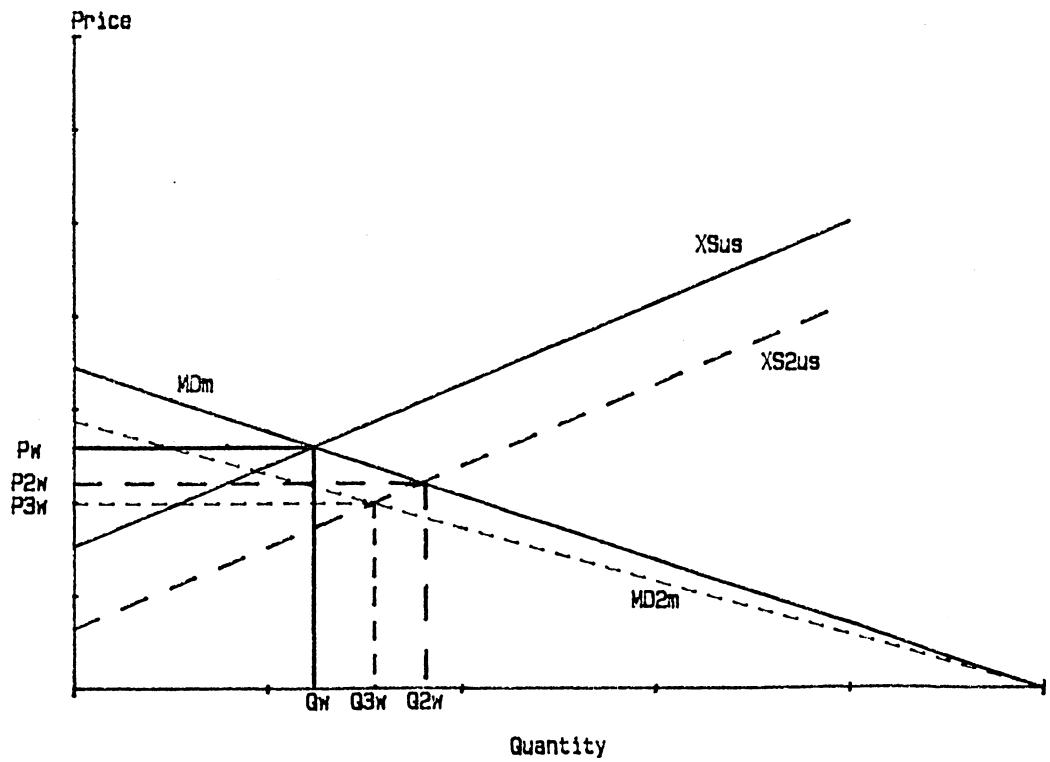


If a program is truly demand-enhancing, it would result in a structural shift in demand, whereby more of the commodity is demanded at any given price. This structural shift is represented by a shift of the importer's import demand curve from MDm to MD2m. With the higher level of import demand, the world equilibrium price would necessarily need to adjust, rising from Pw to P2w. The equilibrium level of exports and imports would also increase, going from Qw to Q2w. With a dollar appreciation, the importer faces higher local currency-denominated import prices, rotating the import demand curve counterclockwise from MD2w to MD3w. Equilibrium prices and quantities again would be forced to adjust to a now lower level of import demand. The equilibrium price would drop from P2w to P3w, and trade volume would decline to Q3w from Q2w.

The Effects of Dollar Appreciation on Price Subsidy Programs

Price-subsidy programs affect world markets differently than demand-enhancement programs in that the importer faces what he perceives as a shift in export supply rather than a shift in import demand. While the effect on the volume of trade under the two types of programs is the same (trade increases) the effect on world prices is quite different. Under export-enhancing programs world prices would be expected to increase, while world prices under a subsidy program would be expected to decline. Appendix figure 4 presents the analysis of the effects of a subsidy program in combination with an appreciating dollar.

Appendix figure 4. Price-subsidy programs and dollar appreciation



Under an export-subsidy program, the importer would be able to purchase more of a commodity at any given price, presenting the importer with a perceived

outward shift in the export supply curve (from XSus to XS2us). With the increase in supply, the world equilibrium price will adjust downward to P2w, which in turn causes the importing country to purchase more of the commodity, Q2w. This adjustment contrasts with enhanced demand program effects in that the importer is moved along the original import demand curve (MDm) rather than shifting on to a new, higher demand curve. A dollar appreciation, since it leads to decreased import demand in the world market, will drop the world equilibrium price still further. These effects are depicted by the rotating of the import demand curve from MDm to MD2m. Under these conditions, the equilibrium price and trade volume would be P3w and Q3w, respectively.

In summary, it can be seen that the effects of a demand-enhancing program and the effects of a price-subsidy program are quite different. Under an enhancement program, world price and trade will tend to rise. While the subsidy program also increases trade volume, it lowers world prices.

In contrast, a dollar appreciation will have the same effects under either an export demand-enhancing program or a subsidy program. Trade volume and world price would be lowered in either instance.

*U.S.GOVERNMENT PRINTING OFFICE:1987-180-916:60138/ERS