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ADDITIONALITY OF CREDIT GUARANTEES FOR U.S. WHEAT EXPORTS

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Credit guarantees are important marketing tools in the world wheat market, both to develop new markets and to compete in existing markets. Governments of exporting countries typically assume the default risk of importing countries when offering export credit guarantees. This has the effect of reducing the importer's cost of financing and may increase trade. Defaults represent an expected cost of the guarantees to the creditor and have led to questions concerning the effectiveness of guarantee programs. Credit is also offered by competing countries which dissipates the effect of additionality and makes credit an essential component of exporter strategy in selected markets.

One justification of guarantee programs is that additional grain is sold when guarantees are provided. "Additionality is measured as the change in imports associated with the value of guarantees to an importer. The effect of the guarantee is through an implicit subsidy in the credit market. Thus, estimating additionality requires that the subsidy value be quantified and included in the analysis.

The effectiveness of credit guarantee programs is an important issue confronting policymakers. Senator Richard Lugar, in discussions on the farm bill, asked, "What

evidence is there that the GSM-102 program [a United States credit guarantee program] has expanded total import demand?" The guarantors' benefits accrue as increased sales, market share, or a higher price received for the product. Programs used by the United States were under scrutiny in 1995, both domestically and abroad. The combined effects of credit guarantee programs and the Export Enhancement Program (EEP) on importer behavior are not well-understood but are clearly affected by similar programs in competitor countries.

Producers, exporters, and importers are also concerned with the effectiveness of guarantee programs, as they are the principal beneficiaries of increased sales. Guarantees either alleviate importers' credit constraints or lower the cost of financing purchases. There are several important questions about credit guarantees besides measuring additionality. One is the effect of credit programs versus direct price subsidies on sales. Another is the effectiveness in terms of additionality of programs offered by the United States versus competitor countries.

The objective of this study was to assess the additionality of export credit guarantees. The focus was on countries that have received guarantees for wheat from the United States and its competitors.

BACKGROUND

Exporter Credit Guarantee Programs

The United States, France, Canada, Australia, and some smaller wheat exporting countries each have some form of an export credit program (Dahl et al. 1995a). A government guarantee relieves exporters' banks of the risk that an importer will default. Guarantees are widely used by many importing countries, due to a high cost of alternative financing. Importers do incur financing fees to cover administration costs of the programs, but guarantees still provide an implicit subsidy to the importing countries. The most popular programs are government-sponsored guarantees of private loans, which are described in this section.¹

U.S. Credit Guarantee Programs

Guarantee programs for the United States are administered by the Commodity Credit Corporation (CCC). GSM-102 and GSM-103 have been the most widely used programs (Dahl et al. 1995a). GSM-102 provides short-term coverage, six months to three years. GSM-103 provides longer term coverage, three to seven years.

The CCC establishes program coverage for individual importing countries on an annual basis. Importers and exporters arrange credit sales using their respective banks. Once the importer obtains a letter of credit, the importer's bank must guarantee payment. The parties file with the CCC who

either approves or denies a guarantee of 98% of port value and a portion of the accrued interest.² The loan is made at cost above the London Interbank Offer Rate (LIBOR), a standard benchmark for international lending.

Other government-sponsored export programs are used to expand markets and compete with subsidies of other exporters. The United States uses the EEP, concessional aid such as Food for Peace Program, and credit guarantee programs. A substantial portion of exports since fiscal year 1985/86 have involved one or more of these programs.

Competitor Country Credit Guarantee Programs

Rivals of the United States also guarantee credit in the same markets. Canada offers a credit program administered by the CWB. The loan terms and interest rates are comparable to CCC guarantees: typically guarantees of up to three years at a cost above LIBOR. Coverage is 95 to 100% of principal and usually requires a 10% down payment by the importer. COFACE, the semi-private Company for International Trade Insurance, handles guarantees for France. It typically offers longer terms, up to seven years, at Paris Interbank Offer Rate (PIBOR) and premiums, depending on the term. Although guaranteeing loans is risky (the expected cost being defaults), governments can spread the risk over many loans, many years, and many importers. This

¹A recent article in the *Economist* examines the political motivations and problems associated with export credit guarantees and other forms of export promotion.

²Up to 1992, this was 4.5% interest. In 1993, this was lowered to 2.8%. In 1995, an adjustable rate was introduced. Interest covered is set annually at less than 55% of the most recent 12-month treasury bill auction (Dahl et al.).

may give an advantage to larger guarantors since they can compete with more favorable terms and absorb more default risk.

Motives for Offering Credit Guarantees

Alleged motives for offering credit guarantees include increasing sales by relaxing an importer's foreign exchange constraints (Smith and Ballenger), supporting specific sectors of an economy and correcting market failures (Raynauld), and competing with other guarantors (Baron). Additionality may be positive when market failures are corrected or when guarantees expand exporter-specific import demand. The importer's valuation of credit determines the response to a guarantee offering, the importer's valuation of any subsidy, and, ultimately, additionality. If either the demand for wheat or credit is inelastic, no additionality occurs, and credit sales simply displace cash sales. Additionality is also nil if the subsidy value of the guarantee is not transmitted to the importer (e.g., because it is captured by the importer's bank).

Cash flow problems, foreign exchange or income constraints, and financial constraints are some reasons importers demand guarantees (Grigsby and Jabara). Alleviating these constraints is achieved through the added dollar purchasing power from guaranteed loans, which can expand demand. Two impacts on lending activity occur with guarantees. "First, a U.S. government guarantee enables banks to provide financing in excess of country lending limits and to offer longer credit terms than they normally would provide for agricultural commodities. Second, banks usually charge a lower rate of interest

because of the guarantee," (Grigsby and Jabara, p. 195).

Additionality and Export Programs

Government credit guarantees can relax importers' credit constraints and/or make credit less expensive. Export credit frees foreign exchange in the short run, relaxes payment difficulties, and delays payment for consumption. If credit simply relieves exchange shortfalls or reduces short-run debt servicing difficulties, additionality might be limited. As Eaton describes, "For the special facilities [export credits and guarantees] to provide relief from balance-of-payments difficulties requires that some net reduction in the country's demand for foreign exchange be achieved, which works against the additionality criterion [of a net increase in sales]" (Eaton, p. 137).³

Baron defines additionality as sales that either would not have taken place without credit or sales where a competitor offered similar comparative financing. Baron critiqued earlier studies by the U.S. Treasury and ExIm Bank. In both cases, a subjective probability of additionality was assigned to sales by ExIm Bank. These probabilities were based on the riskiness of the credit recipient and level of competition. These methods are inadequate, and "a measure of

³Simply considering the repayment prospects ignores other facets of the effects of these programs. Additionality has been treated as a general topic by the ExIm Bank staff and others. ExIm Bank programs were first studied by Feinberg, who provides an overview of subsidy activity, creditworthiness, and risk. Protecting market shares is also a facet of additionality. This was the main point of Baron in an ExIm Bank study of additionality of export credit and guarantees.

the effect of an ExIm Bank credit on exports thus should be a function of the interest rate, the amount of the credit relative to the export value, the export value, the repayment schedule, and the competition faced by the product” (Baron, p. 214).

The U.S. GAO (1992) analyzed CCC guarantee programs and found that if the loans were liquidated, the loss would approach \$6.5 billion. The study also points to the \$4.51 billion in delinquent loans, mostly to Iraq and the Former Soviet Union (FSU) and recently Poland. Iraq defaulted for political reasons, and states of the FSU received guarantees for political reasons. The CCC responded, stating that losses would be less if the program were evaluated only on the loans made for sound reasons (U.S. GAO 1992).

Importers receive an implicit subsidy from credit guarantee. The only direct transfer, or explicit subsidy, would occur if the importer defaults. Typically, the interest rate on the guaranteed loans is less than the interest rate for nonguaranteed loans. Thus, with guarantees, more credit is available to importing countries and at favorable terms. The total savings on interest payments constitute a subsidy to importers (Dahl et al. 1995a). The size of the subsidy depends upon the repayment terms of the loan, the banks involved, the size of the loan guaranteed, and the risk the importer exhibits. The subsidy value is distinguished from the value of the guarantee itself as described in Dahl et al. (1995b), which estimated the actuarially sound premium that importers would have to pay for guarantees. Interest savings from credit guarantees, along with other subsidies, from EEP and PL-480, allow the United States to act as a

price discriminating seller. Skully (1992) treated the interest subsidy as a price discount, or pure price subsidy.

ESTIMATES OF CREDIT GUARANTEE SUBSIDY

Savings to importers from credit guarantees constitute an implicit subsidy, which is referred to as the guarantee subsidy. Two factors affect the guarantee subsidy: the implicit interest subsidy and the loan volume guaranteed. The guarantee subsidy, in turn, affects the demand for wheat purchased under guarantees.

A periodic subsidy estimation similar to the continuous discounting formulation of Skully (1992) and Hyberg et al, was used to value the implicit interest subsidy. This allows for payments over the time frame of the GSM guarantee. For further information on subsidy estimation and results, see Diersen, Wilson, Dahl, and Satyanarayana (1997).

Subsidy Interpretation

The total implicit subsidy value of guarantees is derived as $V_{US} = S_{US} \cdot L_{US}$ where L_{US} and S_{US} are guaranteed loan volume and the subsidy rate respectively. V_{US} is an estimate of the discounted savings for an importer using CCC guarantees relative to a nonguaranteed loan.

In addition to this implicit interest rate subsidy, larger allocations by creditors might also imply a default subsidy; however, the credit limit for guarantees is determined under the assumption that a sovereign power could enforce a higher proportion of loans paid back. Other than transaction fees,

guaranteed loans have an interest rate comparable to the cost of capital in less risky countries. Thus, an implicit subsidy is associated with guaranteed loans. This subsidy rate, S_{US} , is the interest savings between the private rate of interest, i_p , and the guarantee interest rate, i_{US} , for each dollar guaranteed.

Additionality of Guarantees

The interest subsidy and the volume of guaranteed loans combine to measure the value of guarantees to the importer, $V_{US} = S_{US} * L_{US}(I_{US}, E_{US})$. Changes in V_{US} are measured as the combined effects of changes in loan volumes guaranteed and the interest subsidy. Additionality of guarantees is defined as the partial derivative of the demand for wheat (D_{Credit}) with respect to the guarantee subsidy times the guarantee subsidy. Defining additionality this way gives a direct measure of additionality, as opposed to the measure reported in the U.S. GAO (1995). This measure also isolates the subsidy effect net of other programs and price effects.

EMPIRICAL MODEL AND PROCEDURES

Import Demand Specification

Additionality is difficult to measure due to the multiplicity of factors that govern import behavior. We estimated import demand for wheat which is comprised of two components: the demand for cash sales and the demand for credit sales. Pooled cross-sectional time-series models of imports from each of the United States, Canada, and France for selected countries were used to evaluate the additionality of credit guarantees.

Six countries receiving CCC guarantees were chosen for analysis: Algeria, Brazil, Egypt, Mexico, Morocco, and Tunisia. Taken together, these countries provide enough observations for an econometric analysis. Each country also has at least one competing guarantor (i.e., Canada or COFACE). The last year for which observations for all variables are available is 1992. Time series data for 20 years are used, which should give robust estimation with the pooled sample. However, credit has only been used extensively for about 12 years and is sporadic across countries and time. Thus, the analysis spans a period before and after credit guarantee programs were instituted.

STATISTICAL RESULTS AND HYPOTHESIS TESTS

The relative effectiveness of own and competitor guarantee subsidies were evaluated, and various hypothesis tests were conducted. EEP and GSM subsidies and cross-country pairs of credit subsidies were tested to determine their relative effectiveness.

United States

In the U.S. model, the effect of the Export Enhancement program is significant. Export credit guarantees for the U.S. have a positive, significant effect, and guarantees for Canada are significant with a negative sign, indicating that CWB credit subsidies adversely affect demand for U.S. wheat. The parameter for French guarantees was insignificant, suggesting the effect of French COFACE subsidies on U.S. exports cannot be assessed definitively.

Additionality Estimates of U.S. Credit Guarantee Programs and EEP

These results indicate that additionality for credit guarantees is significant in these importing countries. Specifically, the coefficient V_{US} indicates that a \$1000 change in the subsidy value (a subsidy unit) resulted in an estimated 57 *mt* in additional imports on average, during the sample period.

The effect of the subsidy was quantified over time. For the 50 observed guaranteed loans to the six importing countries, the average CCC subsidy was \$5.1 million. Loan guarantees averaged \$105 million with an average subsidy rate of just over 5% of loan volume. Thus, on average, the subsidy accounted for 292,000 *mt* of additionality. This is about 23% of the average (1,261,000 *mt*) of total wheat exports to the sample of importing countries, and 33% of the average (877,000 *mt*) of guaranteed quantity.

The subsidy reflects interest savings with CCC guarantees (i.e., the interest rate differential) and changes in the loan volume under guarantees and the terms of the guarantees--all of which are under some control of the CCC. The credit guarantee accounts for a significant portion of the fluctuation in U.S. exports. Significance of this parameter is evidence of the extent of additionality of credit guarantees.

The estimated parameter for the CCC subsidy can be used to measure additionality across importing countries. This was derived for each importing country on an annual basis (Table 1). For example, in 1986, Algeria had 87,000 *mt* of additional imports

attributable to the CCC subsidy, which is 0.057 (the subsidy coefficient) times the \$1,529,000 subsidy. Additionality is greatest for Egypt, with 4.8 *mmt* of additionality over eight years. The lowest total is for Tunisia, which was the smallest importer in this study. A total of 14.6 *mmt* of additionality is accounted for across these importing countries.

Additionality of export sales attributable to EEP was analyzed in a similar manner. The EEP subsidy parameter estimate is significant and similar in value regardless of the error structure. The V_{EEP} coefficient indicates that every \$1000 change in total EEP subsidies (bonus times quantity) results in an estimated 15 *mt* change in imports. The subsidy accounts for some fluctuation in U.S. exports. The average value of the V_{EEP} for these countries was \$32.2 per *mt* on EEP sales of 905,000 *mt*. The average impact of EEP subsidies is the V_{EEP} coefficient estimate times the average total subsidy ($0.015 * 32,188$) or 492,000 *mt*, which is roughly 54% of EEP sales.

EEP and GSM programs accounted for substantial additionality in the years offered. The annual U.S. additionality totals for both programs are shown in Table 2 and were computed as the total program's subsidy by year times the subsidy's estimated coefficient. The totals reflect the different coefficients for V_{US} and V_{EEP} , as the CCC subsidy coefficient is higher, but is outweighed by the higher average EEP subsidy. The decline in the additionality for CCC guarantees in later years is mainly due to reduced allocations in more recent years to these importers. This conforms with the results reported by Wilson and Yang (1996).

Table 1. Estimate of CCC Guarantee Program Additionality by Year and Importer

Year	Additionality by Importing Country (1000 <i>mt</i>)					
	Algeria	Brazil	Egypt	Mexico	Morocco	Tunisia
80					12	
81					46	
82		142	411		228	21
83		505	108		351	54
84		985	2		199	6
85		165	351		404	10
86	87	170	368	7	587	149
87	246	26	992	462	544	106
88	583	72	1,414	315	529	
89	246	22	1,137	168		
90	374			91		42
91	460			101	26	23
92	513			159	550	46
Total	2,509	2,087	4,783	1,303	3,476	457

Table 2. United States Additionality by Year and Program

Year	Program Additionality (in 1000 <i>mt</i>)		Total
	EEP	GSM-102, 103, 105	
80		12	12
81		46	46
82		802	802
83		1,018	1,018
84		1,192	1,192
85	1,093	930	2,023
86	2,528	1,368	3,896
87	4,244	2,376	6,620
88	1,556	2,913	4,469
89	531	1,573	2,104
90	2,066	507	2,573
91	3,915	610	4,525
92	3,111	1,268	4,379
Total	19,044	14,615	33,659

Hypothesis Tests

The estimation results presented above show that both credit guarantees and EEP have added substantially to the wheat exports from the United States. The results also suggest that Canada's guarantee program has adversely affected U.S. exports. To evaluate further the relative effectiveness of the programs, several hypotheses were formulated using the parameter estimates, and statistical tests were conducted. In particular, hypotheses tests on the equivalence of parameter estimates on U.S. and Canadian guarantee programs, parameter estimates on U.S. EEP and credit guarantee program, and additionality across importing countries are tested. Also, the significance of interaction between credit guarantee and EEP is tested.

U.S. and Canadian Equivalence

One function of the CCC guarantee programs is to compete with other guarantors' programs. Additionality of CCC and CWB credit subsidies was tested for equivalence. Results indicated that the effects of the CWB subsidy and the CCC guarantee were not statistically different and thus had equal, but opposite effects on demand for U.S. wheat.

CCC Guarantees and EEP Subsidies

Credit guarantees have been assumed to be equivalent to price subsidies or discounts in earlier studies by Skully (1992) and Haley (1989). This is a strong and frequently used assumption that is tested in this study.

The results indicate that the effect of the credit guarantee subsidy is not equivalent to

the effect of a direct price subsidy on U.S. exports. The guarantee subsidy accrues as interest savings across the loan volume guaranteed and is indirect. EEP subsidies, on the other hand, are bonuses given to exporters on a per bushel basis; this is transferred to importers via a lower selling price and is therefore a direct subsidy. Importers, based on the test result, do not respond to these subsidies in the same manner. A dollar of CCC guarantee subsidy has a greater impact in terms of additional exports, than does a dollar in EEP subsidy.

GSM and EEP Interaction

Use of credit guarantees and EEP are correlated across importers and through time, as importing countries are often targeted with both programs. In our sample, V_{US} and V_{EEP} are correlated. To test for the significance of this relation, an interaction term between the subsidies is added to the basic model. Adding this variable did not improve the explanatory power. Using the interaction term, which was significant with a negative sign, did not affect the estimate of additionality.

Test of Constant Additionality Across Importers

A test of the equivalence of the CCC subsidy effects across importers was conducted. Since not all countries are credit constrained or face the same cost of financing, there is *a-priori* justification to expect different responses to credit by different importers. Results suggest additionality may be higher for Tunisia, Brazil, Egypt, and Morocco, than indicated by the earlier estimate.

Empirical Results From Competitor Countries' Programs

Canada

An interesting aspect of the Canadian results is the nonsignificance of a number of parameter estimates. The only variables that are significant are GNPPC, PROD, and V_{CA} . This means that somehow Canada has been successful in mitigating the effects of competing guarantors. In addition, the effects of CWB subsidies were less than in the U.S. model indicating that CWB subsidies do more to offset U.S. programs than increase Canadian exports.

Using the V_{CA} parameter estimate, additionality is measured for CWB credit subsidies. The higher V_{CA} parameter estimate and lower loan volume, on average,

relative to the United States, give about the same level of additionality for Canada and the United States (Table 3). Algeria and Brazil accounted for most of Canada's additionality.

France

Results for France differ from those of the United States and Canada. In the U.S. model, neither P_{FR} nor V_{FR} was significant. The effect of U.S. EEP programs was smaller than in the U.S. model suggesting that EEP expands U.S. exports more than it reduces French exports. Parameters for all export credit guarantee programs were insignificant. One possible explanation for this is that the extension of credit by U.S. and Canada may have freed foreign exchange for other import purchases (French wheat for blending).

Table 3. Estimates of Canadian Additionality by Year and Importer

Year	Additionality by Importing Country (1000 mt)			
	Algeria	Brazil	Egypt	Mexico
82		93		4
83		260	161	72
84		363	5	
85		455	183	
86	12	422	126	90
87	125	237		92
88	146			
89	171	117		
90	223	125		
91	147	340		
92	273	151		
Total	1,097	2,563	475	258

SUMMARY AND IMPLICATIONS

One of the important problems confronting U.S. export programs is estimating the volume of trade that can be attributed to expenditures on the program. This is particularly apparent in the case of export credit guarantees which has a number of important characteristics. First, any subsidy element associated with the program is implicit as opposed to direct. Second, most major competitors use similar programs, thereby dissipating the potential effects of U.S. credit programs. Finally, these indirect subsidy programs ultimately have to compete as a strategic variable with the direct price subsidies. The purpose of this study was to analyze the effectiveness of export credit programs relative to other programs and to provide estimates of additionality.

Summary of Empirical Findings

Empirical models of demand were developed and estimated using a pooled data set of importing countries. Models were estimated for each of the principal exporting countries providing export credit guarantees: the United States, Canada, and France. Important conclusions from these results are:

Additionality to U.S. Credit: Positive additionality was found for CCC guarantees, indicating that the GSM programs have resulted in additional exports that would not have occurred without the programs. Additionality of CCC guarantees totaled approximately 12.6 *mmt* to the six importing countries over 13 years.

Constancy Across Importers:
Additionality is not constant across

importing countries, suggesting varying benefits across importers.

Comparing Additionality of Credit Guarantees to EEP: CCC guarantees have been viewed as providing a default subsidy and a pure price subsidy. While there is a price subsidy equivalent, this is not the same as the direct price subsidy as provided by EEP. The equivalence of the CCC subsidy and EEP subsidy was tested. The U.S. results indicate that the CCC subsidy (from guarantees), on a per dollar of subsidy basis, provides about 4 times more additionality than EEP. These results cast doubt on the price subsidy equivalence of guarantees. This disparity may be due to overlap of the programs. Regardless, the assumption that these subsidies are equivalent is questionable and these results suggest credit guarantees provide more than the imputed value of interest savings.

Intercountry Rivalry and Additionality of Competitor Country Guarantees: The CWB subsidy has a significant and negative effect on U.S. wheat exports. The magnitude of the coefficient is larger than the magnitude of the CCC guarantee subsidy. A test of their equivalence indicated they are not significantly different in absolute value. This is evidence that the CCC and CWB credit subsidies have equal but opposite effects on U.S. demand.

In the Canadian demand model, the effect of the CCC subsidy is insignificant. The coefficient of the CWB credit subsidy is less than either the CCC subsidy or the CWB credit subsidy in the U.S. model. Thus, Canada's guarantee program does more to displace U.S. sales than it does to help Canadian sales.

Policy Issues and Implications

The significance of additionality for CCC guarantees is evidence of the benefits of the program. These results show that CCC guarantees are cost effective when compared with EEP. Likewise, CCC guarantees offset CWB credit guarantees and outperform COFACE guarantees.

Guarantee programs have been criticized for their high cost (U.S. GAO 1992). Program performance evaluation must consider program costs, an issue not considered in this study. When countries do not pay back loans, these costs are absorbed by taxpayers. Any additionality from guarantee programs must be weighed against costs of default to assess net benefits to the United States.

Estimates from this study suggested that among these countries in the case of wheat, the additional sales attributable to export credit amounted to about 12.6 *mmt*. The unit

price for guaranteed sales translates to \$1.5 billion in sales revenue. Profits of these sales, or perhaps the savings on other programs (U.S. GAO 1995), could be counted as offsetting the paid claims of CCC guarantees for all commodities, which totaled \$1.7 billion. Since the analysis in this study only measures additionality for six guarantee recipients, and for wheat only, understates the total additionality of CCC guarantees. While five of these countries have rescheduled loans, they have yet to present a cost to the CCC, and all have additionality.

Additional sales resulting from the total EEP subsidy are not as favorable as from CCC guarantee subsidies when comparing the costs of the programs. Approximately 19 *mmt* of additional sales to these countries is attributable to EEP. The additional revenue needs to be balanced against the \$1.3 billion in EEP bonuses paid out on EEP sales to these six recipients alone.

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This report is a summary of a larger report titled "*Additionality of Credit Guarantees for U.S. Wheat Exports*" Agricultural Economics Report No. 377, July 1997, by Matthew A. Diersen, William W. Wilson, Bruce L. Dahl, and Vidyashankara Satyanarayana, Department of Agricultural Economics, North Dakota State University, Fargo, ND 58105 (701)231-7441.

This study was funded by USDA/CSRS NRI research grant, "Export Credit in International Wheat Trade," No. 93-37400-9464. A copy of the report is available upon request from the Department of Agricultural Economics, P.O. Box 5636, NDSU, Fargo, ND, 58105-5636. This report can also be found at <http://agecon.lib.umn.edu/ndsu.html>.
