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The Export Enhancement Program's Influence on Firm-Level Competition in International Markets

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The U.S. government awarded export subsidies to agribusiness firms through the Export Enhancement Program (EEP). This study analyzes (*a*) whether the subsidies promoted new firm market entry and (*b*) whether firm characteristics influenced program participation. Trade in three commodities, poultry, wheat, and wheat flour, was analyzed using firm-level data. It was found that new firm market entry was not significantly higher among subsidy recipients and that past program participation strongly influenced current program participation. Although the EEP is believed to have been administered fairly, perceived or real barriers prevented some firms from using it.

Key words: Export Enhancement Program, market entry, trade

Introduction

The value of United States agricultural and food product exports declined by over 30% from 1980 to 1985. This drop in exports coincided with high domestic farm-support prices, a worldwide recession, a strong U.S. dollar, and U.S. competitors subsidizing their exports. As a result, U.S. grain stocks grew. Hoping to expand agricultural exports, the United States established aggressive export promotion programs in the 1985 farm legislation. The most prominent of these programs was an export subsidy program called the Export Enhancement Program (EEP).

The EEP's primary objectives were to counter the subsidies of U.S. competitors and to maintain and expand U.S. agricultural exports [U.S. General Accounting Office (USGAO) 1994]. Subsidies under the EEP were targeted towards export markets that received subsidized shipments from U.S. competitors. In the early years, the EEP was used primarily in northern Africa in response to subsidized European Union wheat shipments to those markets. Since then, the program has been broadened to include more products and countries.

Numerous studies have found that the EEP has only been marginally effective in expanding U.S. agricultural exports (Seitzinger and Paarlberg; Haley; Bailey; Haley et al.; and others). The reduction in domestic farm-support prices, the decline in the value of the dollar, and renewed world economic growth all had a stronger impact on U.S. agricultural exports since the mid-1980s.

All the studies conducted thus far on U.S. export promotion programs, including the EEP, have aggregated across firms, focusing on the relationship between program costs and perceived or measured benefits. No study has attempted to determine how these programs affect U.S. exporting firms. However, a better understanding of this link is important to

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policymakers who design programs aimed at expanding U.S. agricultural exports. Understanding EEP's effect on firm-level competition is particularly important given that the program has been administered at the firm level (EEP regulations are reviewed below).

Recently, the administration of the EEP has come under renewed public debate. The agreement reached under the Uruguay Round of the General Agreement on Tariffs and Trade has forced policymakers to evaluate how to best administer this program in line with the statutes of that agreement (USGAO 1994). Others have recently raised concerns over the impacts of the EEP on firm objectives (USGAO 1993; Lugar). Still others in the agribusiness sector have suggested that the program is disruptive to normal business transactions (Paarlberg; U.S. Congress).

The purpose of this article is to determine whether the EEP affected firm export-market-entry decisions and to determine what firm characteristics influenced participation in the program. These issues are framed within the context of Baldwin's export-market-entry model. Market entry is defined here as a firm exporting for the first time to a country. New market entry is an important issue, as program subsidies may affect a firm's expected profits from entering a market. However, the program regulations and subsidy award mechanisms may have limited the EEP's ability to promote new firm entry. Also, program participation may have been strongly influenced by firm characteristics, such as firm size and firm experience in foreign markets.

Policymakers have stated that new firm entry is an important way of expanding U.S. exports (U.S. Department of Commerce). However, market entry is thought to be influenced by certain fixed costs associated with export trading. These fixed costs may act as a barrier to entry, thereby, limiting export trading to a small number of large firms. Thus, the impact that a subsidy may have on encouraging new firm entry is a relevant empirical issue.

The studies by Auquier, Baldwin, and Caves argue that fixed costs associated with international transactions arise from activities such as acquiring market information, establishing and maintaining foreign trading systems, and making product modifications. Shifts in exogenous factors, like exchange rates or government policies, can affect these costs and influence firm market-entry and -exit decisions. Baldwin demonstrated that changes in the exchange rate can encourage new firms to enter export markets. In an extension of Baldwin's work, Feinberg showed that U.S. exporting firms increase the number of markets they serve when the dollar depreciates. However, industries with high market-entry costs do not expand their country coverage as much. Unfortunately, past studies (Baldwin; Caves and Pugel; Feinberg) which evaluated the impact of these fixed market-entry costs on firm market-entry decisions were confronted by many data problems. Measures of the market-entry costs are not available nor are other important firm level data, such as price and marginal costs of production.

The empirical analysis presented in this article was conducted using firm-level data on U.S. wheat, wheat flour, and frozen poultry exports. These data reveal the export market-entry and -exit patterns of firms. Thus, this study offers new evidence on how the EEP affected firm-level competition. This should be useful to policymakers involved in designing programs like the EEP.

Background: The Export Enhancement Program

The EEP was formally announced by the U.S. Department of Agriculture on 15 May 1985 and was reauthorized by the Food, Agriculture, Conservation, and Trade Act of 1990. Under the EEP, U.S. exporting firms receive a subsidy for shipments of specific agricultural

commodities to targeted countries. When a country has been selected to be part of the EEP for a specific commodity, the USDA issues an invitation for bids from firms for subsidies under the program. U.S. exporting firms are required to negotiate a (contingent) sales contract with agents in the targeted country. These contracts are fixed at concessional or discount prices. Firms then submit bids to the USDA, indicating the subsidy they will require to complete the sales contract. If the subsidy is within bounds established by the USDA, but unknown to the firm, then the bid is approved. The sales contracts negotiated by the firms are contingent upon the USDA's approval of the EEP bid. Firms exporting under the EEP do not receive their subsidy until the product is delivered [U.S. Department of Agriculture (USDA)].

The program may have encouraged firms to enter new export markets if they were successful in obtaining a subsidy through the bidding process. However, the bidding process and other program regulations may have limited program participation to firms with certain characteristics. Firms already established in foreign markets may have been more successful in negotiating the contingent sales contracts and were, thus, more successful in obtaining an EEP subsidy. Indeed, their position may place them at an advantage over potential entrants (Caves). Further, firms with large market shares may be more successful in negotiating a contract, if their position reflects the strength of their trading relations with foreign agents (Okun).

The extent to which the EEP facilitates new firm entry may be limited by some of the program requirements. For instance, a firm must have documented experience trading the commodity targeted under the program (or a similar commodity). Although a trader may have unique country information from trading other commodities in the targeted country, it cannot participate under the EEP unless it has prior experience with the commodity. Thus, market entry would only involve firms actively trading the commodity in other markets.[1] Also, firms participating in the EEP must have an office and agent in the United States and they must post a performance security before submitting bids (USDA).

In the next section, the potential impacts of the EEP on firm market-entry decisions are formalized. The beachhead model proposed by Baldwin is adapted for this purpose.

An Export-Market-Entry Model

Baldwin framed firm foreign-market-entry decisions as a traditional net present value (NPV) investment problem. Accordingly, if the NPV is positive, investment in the fixed market-entry assets is made and exporting occurs.

Two types of firms are considered here—new (or potential) entrants and incumbent firms. A potential entrant will attempt to maximize the net present value of the export activity for a given market:

$$\text{(1a)} \qquad \max_{(\tilde{q}_{ijt})} \Big[\sum_{t=0}^{\infty} R^t \,(\tilde{P}_{ijt} - c_{it} - c^X_{ijt} + s_{ij0})\tilde{q}_{ijt} - \sigma_{ij0}\Big] \text{ (New Entrant)}$$
$$\text{s.t. } \tilde{q}_{ijt} \geq 0,$$

where $R=1/(1+r)$ and r is a constant discount rate. $\tilde{P}_{ijt}$ and $\tilde{q}_{ijt}$ are the export price and quantity of firm i to market j at time t (the tilde denotes that the firm is a new or potential

[1] In May 1995, the USDA abolished the prior experience requirement. The change in regulations occurred after the data period used in this study ended.

entrant); c_{it} and c_{ijt}^{X} are firm i's marginal costs of producing and exporting to market j; s_{ij0} is the subsidy firm i receives during the initial period; σ_{ij0} is a measure of the fixed cost investment required to enter market j in the initial period. In Baldwin's model, revenues and the fixed market-entry costs were valued in the foreign market currency and the marginal costs of production were valued in the exporter's currency. Hence, a change in the exchange rate would cause a change in earnings and could induce new firm entry. Here, all prices and costs are denominated in the exporter's currency (U.S. dollars). Thus, the relevant question is whether the subsidy (s_{ijt}), given the price $\tilde{P}_{ijt}$, is sufficient to make this expression positive, so that under the NPV investment decision rule the firm will attempt to enter the market.

Incumbent firms may have been at an advantage in obtaining EEP subsidies. These firms would have incurred the market-entry costs, prior to the inception of the EEP. Thus, they may have been able to offer a lower price to the importer, since the market-entry costs (σ_{ijt}) have already been incurred:

$$\text{(1b)} \qquad \max_{(q_{ijt})} \left[\sum_{t=0}^{\infty} R^t (P_{ijt} - c_{it} - c_{ijt}^{X} + s_{ij0}) q_{ijt}\right] \quad \text{(Incumbent Firm)}$$

$$\text{s.t.} \quad q_{ijt} \geq 0,$$

where P_{ijt} and q_{ijt} are the price and quantity of incumbent firm i in market j. Further, they have established the trade ties which would facilitate negotiations for the contingent sales contract.

To summarize, differences in firm experience in export markets and corresponding cost structures could affect decisions on market entry and program participation. Unfortunately, measures of some of the variables described in the market-entry model are unavailable. Specifically, measures of firm export prices, marginal costs of production and exporting, and fixed market-entry costs are not available. However, some detailed firm-level data are available which allow for the testing of the hypotheses following from the market-entry model. These data are described in the next section.

EEP and Firm Export Data

Two firm-level data sets were used. One data set, obtained from the USDA's Foreign Agricultural Service contains data on the subsidized quantity, subsidy value, product, firm, destination country, and fiscal year.[2]

In table 1, the EEP data were aggregated over fiscal years 1985 through 1993 to show the total subsidy receipts participating firms received under the program for wheat, wheat flour, and frozen poultry. The majority of the subsidies were received by a relatively small number of firms. For wheat, about 60% of the subsidies were received by the four largest participating firms. However, this concentration in subsidy receipts is commensurate with the four-firm export seller concentration ratio for the U.S. wheat sector, which is also about 60% (Conklin). For wheat flour and frozen poultry, the concentration of subsidy receipts among the largest four participating firms was measured at 82 and 77%, respectively. These levels far exceed the four-firm export seller concentration in these sectors, measured at about 62% for wheat flour and 40% for broiler meat (Patterson). Thus, in comparison to export

[2]These data were from the Foreign Agricultural Service's records and were supplied to the authors by Jim Warden and Ralph Bean.

Table 1. Leading EEP Subsidy Recipient Firms

Product/Years/Firm	Subsidized Quantity (1,000 MT)	Subsidy Receipts ($1,000)	Share of Product Subsidies (%)
Wheat, FY 1985–93:			
Cargill Corporation	26,571	889,459	20.28
Continental Grain	25,969	818,293	18.66
Louis Dreyfus Corporation	20,851	673,867	15.37
Ferruzi	6,939	245,028	5.59
Bunge Corporation	6,516	190,575	4.35
Peavey International	5,056	169,447	3.86
Farmland Industries	4,569	162,885	3.71
CAM USA, Inc.	4,432	160,732	3.67
Artfer	3,928	140,737	3.21
Garnac Grain	3,879	118,408	2.70
Other	26,861	816,092	18.61
Wheat flour, FY 1985–93:			
Pillsbury	1,391	126,304	34.26
Archer Daniels Midland	843	84,256	22.85
Cargill Corporation	770	62,642	16.99
Peavey Company	410	32,308	8.76
Continental Grain Company	197	16,293	4.42
International Multifoods	174	14,942	4.05
Bartlett and Company	167	12,233	3.32
Commodity Specialists Company	100	11,078	3.00
Tradigrain	47	3,255	0.88
ConAgra	30	3,386	0.92
Other	25	1,984	0.54
Frozen poultry, FY 1986–93:			
Gold Kist	67	44,081	30.83
ConAgra	60	40,469	28.30
FastFood Merchandisers	24	13,674	9.56
North American Trading	21	11,916	8.33
Louis Dreyfus	16	10,421	7.29
Gress Foods	10	3,923	2.74
Porky Products	7	4,409	3.08
Cargill Corporation	6	3,547	2.48
Pillsbury	5	3,135	2.19
American Poultry International	4	2,059	1.44
Other	10	5,344	3.74

Source: USDA, Foreign Agricultural Service.

sales, it appears that participation in the EEP was limited to a small number of firms in the wheat flour and poultry sectors.

There is high cross-product participation in the program. For instance, companies like Cargill, Continental Grain, ConAgra, Louis Dreyfus, Peavey, and Pillsbury shipped at least two or all three of these products under the program. Some of these diversified agribusiness firms became quite involved with the program. Cargill exported eggs, feed grains, frozen

poultry, rice, vegetable oil, wheat, and wheat flour under the EEP and accounted for about 19% of all the subsidies awarded between 1985 and 1993.

The other firm-level data set used in this study was the Port Import/Export Reporting Service (PIERS) data. This data set, available from the *Journal of Commerce*, provides information on firm-level export shipments, specifying the product, quantity, exporting firm, date, and destination country. It does not, however, provide information on firm export prices, as the *Journal of Commerce* is forbidden from releasing this information (Patterson and Abbott 1991).

The EEP data were matched by product, country, year, and firm name with the PIERS data. Unfortunately, not all firm names are revealed in the PIERS data set. However, the location of the firm's headquarters or some other facility is identified. Some of the undisclosed firms were identified using this information. The remaining unidentified firms were dropped from the sample.[3] Since some observations were dropped from the PIERS sample, not all the observations in the EEP transactions data could be matched with the PIERS data. Thus, some of the observations from the EEP transactions data were also dropped. Still, the samples used in this analysis contained 329, 78, and 62 matches between the EEP and PIERS data for wheat, wheat flour, and frozen poultry, respectively. This compares to a total of 461, 98, and 91 subsidy awards made during the sample periods. Thus, the samples accounted for more than two-thirds of the subsidies awarded. The wheat sample included fiscal years 1985 through 1991; wheat flour included 1985 through 1993; and, frozen poultry included 1986 through 1993.[4]

In one statistical test, the EEP data were used to estimate average annual export subsidies for each destination. These averages were then used with official U.S. Bureau of the Census export data (U.S. Department of Commerce, Bureau of the Census).[5] Note, the data on EEP subsidies were recorded during the fiscal year when the export sale was made, not when the product was shipped. Data on when the subsidized shipments were made are not available. Therefore, the fiscal year (October–September) EEP data were used in combination with U.S. census calendar year data, assuming a three-month lag between export sales and export shipments.[6]

Market Entry and the EEP

As a preliminary step in analyzing whether the EEP promoted new firm entry, the short-term gross per unit annual return for EEP and non-EEP destinations were compared. If the gross return for EEP destinations (the export price plus the subsidy) was higher, then the program may have induced new firm entry. This would require the firm's price concession (or

[3]U.S. exporting firms can prevent the disclosure of their firm name in this data set. In other analyses using the PIERS data, the undisclosed firms were named by their city location. This reasonably identified the firms (Patterson and Abbott 1994). When this procedure was used in this study, it produced results similar to those obtained when the undisclosed firms were dropped from the sample.

[4]The PIERS data were only available for the fiscal years 1985 through 1991 for wheat. The first frozen poultry EEP award was not made until FY 1986.

[5]Wheat is defined by the following harmonized (Schedule B) export codes: 1001.10.0000, 1001.90.2000, and 1008.90.0040; wheat flour: 1101.00.0000; and frozen poultry (whole broilers): 0207.21.0020. For frozen poultry, the EEP was limited to frozen whole broilers. Hence, the census data used in the study was for this product. However, measures obtained from the PIERS data were for broiler meat exporting firms. This includes exporters of chicken parts and whole broilers. However, the same firms participate in these alternative product markets with roughly equal market shares in each.

[6]As an example, EEP data for fiscal year 1986 (October 1985 through September 1986) were matched with U.S. census data for calendar year 1986. Previous studies have shown at least a three-month lag between export sales and most export shipments (Ruppel).

discount) offered under the sales contract to be proportionally less than the subsidy. Since information on firm-level export prices are not available, industry-level data were used in this analysis. Export unit values, calculated using the Census Bureau data, were used as measures for export prices. Subsidies for EEP destinations were calculated as an average of firm subsidies. The export price for EEP destinations had the per unit subsidy added to the export price. Since some U.S. shipments to some EEP destinations were not made under the program, the per unit subsidy was weighted by the share of shipments occurring under the EEP.[7]

Table 2 presents the average per unit gross returns for EEP and non-EEP destinations during select years of the program for wheat, wheat flour, and frozen poultry. The average gross returns for frozen poultry shipments to EEP destinations are higher than to non-EEP destinations. However, using a one-tailed *t*-test for differences in means, these returns were not found to be significantly higher at conventional significance levels. Also, the null hypothesis of equal returns could not be rejected under a two-tailed test. In the case of wheat flour, in one year (1988) the returns for EEP shipments were higher. However, the difference in the mean returns for EEP and non-EEP destinations were not found to be significantly different under either a one-tailed or two-tailed test. For wheat, the returns for EEP destinations were lower, though not significantly different from non-EEP destination returns.

This analysis suggests that there were not significant additional short-term earnings to be obtained by shipping under the EEP. Thus, this program should not be expected to have induced new firm entry. Comparing average price data for EEP and non-EEP destinations has its limitations. Intrinsic quality factors influencing demand (and supply), monopsonistic buying power, and government policies are all likely to vary from country to country. Should these factors tend to bias the data in favor of the null hypothesis, the probability of a type II error increases. Therefore, the question of new firm entry was also addressed more directly by analyzing firm market-entry patterns for EEP destinations.

The market share histories of firms supplying EEP destinations were evaluated using the PIERS data. Using these data, the proportion of new firms entering a market under the EEP was calculated: $P_{EEP} = x_{EEP} / n_{EEP}$; x_{EEP} is the number of new firms entering the market with an EEP subsidy; n_{EEP} is the total number of firms in the market receiving an EEP subsidy. This proportion provides a measure of the rate of new firm entry under the EEP. Firms were classified as new entrants if they did not supply the destination in previous years.[8]

Table 3 reports the rate of new firm entry under the EEP expressed as a percentage under the heading "EEP Firms." For example, of the 329 wheat EEP awards in the sample, 77 or 23.4% were given to firms classified as new entrants. Under the EEP for wheat flour and frozen poultry, 20.5 and 30.6% of the awards were given to firms classified as new entrants. These percentages would suggest that the EEP did promote some new firm entry. However, these rates of entry should be compared with the rate of new firm entry of firms employing

[7]Export unit values were used as a proxy for the export price. The EEP destinations had the per unit subsidy added to the export unit value weighted by the volume of shipments occurring under the EEP:

$$\tilde{UV}_{jt} = UV_{jt} + \frac{Q^s_{jt}}{Q_{jt}} s_{jt}.$$

UV_{jt} is the unit value calculated using the census data. Q_{jt} is the total quantity shipped to market j; Q^s_{jt} is the quantity of subsidized sales to market j; s_{jt} is the average subsidy for market j.

[8]The new entrant classification was dependent on the span of the available PIERS data, which begins in 1978. Thus, firms not serving a market between 1978 and their first entrance in the market after the inception of the EEP (1985 and later) were classified as new entrants. It is not unreasonable to classify a firm which has been absent from a market for at least eight years

Table 2. Mean Gross Returns for Shipments to EEP and Non-EEP Destinations for Wheat, Wheat Flour, and Frozen Poultry, Select Years

Product/Year	EEP Destinations ($/ton)	Non-EEP Destinations ($/ton)	Difference in Means (*t*-value)	Degrees of Freedom (EEP+Non-EEP)
Wheat				
1986	110.89	122.79	1.33	(11+82)
1988	167.30	187.53	0.64	(11+61)
1990	119.08	209.08	0.88	(15+64)
Wheat flour				
1986	227.40	276.99	0.87	(4+56)
1988	228.79	220.14	0.17	(3+63)
1990	242.34	256.45	0.22	(3+55)
Frozen poultry				
1986	1,702.83	1,358.22		(0+32)
1988	1,821.07	1,487.57	1.12	(4+30)
1990	1,757.00	1,484.59	0.75	(4+39)

Note: The gross returns were calculated using unit values calculated from official U.S. Census Bureau export data and average subsidy levels estimated from information provided by the USDA's Foreign Agricultural Service. The value of U.S. exports are recorded on a free along side (FAS) basis.

Table 3. Rate of New Firm Entry among Firms Receiving and Not Receiving an EEP Subsidy in EEP Destination Markets

Product	New Entrants: Percentage EEP Firms	New Entrants: Percentage Non-EEP Firms	Percentage Difference (EEP – Non-EEP)	Number of Observations (EEP + Non-EEP)
Wheat (FY 1985–91)	23.4	36.7	−13.3* (−3.64)	(329+297)
Wheat flour (FY 1985–93)	20.5	36.4	−15.9* (−2.17)	(78+73)
Frozen poultry (FY 1986–93)	30.6	30.2	0.4 (0.06)	(62+328)

Note: The single values in parentheses are test statistics that are approximately distributed as a unit normal (*z*). An asterisk denotes significance at the 5% level with a two-tailed test. The critical value under a two-tailed test at the 5% level is 1.96.

other market-entry tools or strategies. Thus, table 3 also reports the rate of new firm entry among firms not receiving an EEP subsidy: $\tilde{P}_{NoEEP} = x_{NoEEP} / n_{NoEEP}$. The rates of new firm entry were then compared using a test for the difference in population proportions. Under the null hypothesis that the population proportions are the same, H_0: $p_{EEP}-p_{NoEEP} = 0$, a test statistic which is distributed approximately as a unit normal can be computed (Daniel). Either one-tailed or two-tailed tests can be performed using this test statistic.[9]

The fourth column presents the difference in the rates of new firm entry, along with the calculated test statistic. For wheat and wheat flour, the rates of new firm entry were higher among nonsubsidized firms. Further, these differences were significantly different under both a two-tailed and one-tailed test at the 5% level. Thus, it can be concluded that the rate of new firm entry was significantly higher among nonsubsidized firms. In the case of frozen poultry, the rate of new firm entry is slightly higher among subsidized firms, but the difference in the rates of entry is not significantly different from zero.

These results are consistent with the preliminary analysis which showed that there were not significant additional short-term earnings to be obtained from shipping under the EEP. Given the ineffectiveness of the EEP in promoting new firm entry, the next section addresses the question regarding what firm characteristics influenced participation in the program.

EEP Participation and Market Structure

A logit model was used to determine which firm characteristics influenced the probability of a firm supplying a market under the EEP. The dependent variable in this model, Y_{ijt}^k, was set equal to one if firm i exported product k to target country j under the EEP during period t. If a firm supplied the targeted country with product k, but did not receive an EEP subsidy, Y_{ijt}^k, was set equal to zero.

One market structure variable hypothesized to affect a firm's participation in the EEP is its lagged market share (MS_{ijt-n}^k). Information on a firm's market share in specific export markets in earlier periods indicates whether the firm has incurred the fixed costs required to enter the market. Once these investments are made, the potential to trade exists, even if the firm does not complete transactions during some periods. So, lagged market share over several periods may be important. Two lag periods are tested here. The coefficient on this variable tests whether incumbent firms have an advantage in obtaining EEP subsidies and whether the firm's market share affects its likelihood of successfully obtaining an EEP subsidy. Firms with larger market shares may have stronger trading relations with the agents in the export market, thereby improving their ability to negotiate a contingent sales contract.

It was hypothesized that firms with better information systems may be more effective in securing EEP subsidies. Following Caves and Pugel's approach, firm export volumes were used as a proxy for the information system. TMS_{it-1}^k measures firm i's percentage market share of total U.S. exports of product k in the previous period. Hence, it measures the firm's relative size in the export market. Estimates of this variable and MS_{ijt-n}^k were obtained from the PIERS data.

Past participation in the EEP may affect current participation. Past participation in the program in any commodity may provide the firm with information on how to successfully

[9]With regard to the unidentified firms that were dropped from the sample, it is assumed that they were randomly drawn from the subsets of new entrants and incumbent firms. No information suggests that this is an invalid assumption. Thus, the exclusion of these firms from the sample should not bias the statistical tests which are performed in this study.

[10]The products traded under the EEP included barley malt, canned peaches, dairy cattle, eggs, poultry feed, feed grains, frozen poultry, rice, semolina, vegetable oil, wheat, and wheat flour.

compete for the EEP subsidies. Hence, a measure of a firm's participation in the EEP for all products in previous periods should be introduced.[10] Note, for a firm to receive EEP subsidies for wheat, for example, the firm must have previously exported wheat but not necessarily to the targeted market. EEP_{it-1} measures the share of total EEP awards received by a firm in the previous period. It was calculated using the EEP transactions data obtained from the Foreign Agricultural Service.

These hypotheses suggested the following general model:

$$(2) \qquad Y_{ijt}^{k} = \alpha + \beta_1 MS_{ijt-1}^{k} + \beta_2 MS_{ijt-2}^{k} + \beta_3 TMS_{it-1}^{k} + \beta_4 EEP_{it-1} + \varepsilon_t.$$

This equation was estimated as a logit model for each of the products analyzed in this study using data pooled across country destinations, exporting firms, and fiscal years. The estimated coefficients (β) are all expected to be positive.

Table 4 presents the estimation results. None of the lagged market share terms for specific markets (MS_{ijt-n}^{k}) are significantly different from zero. Thus, firms with large market shares in previous periods had no advantage in securing an EEP bid.

For wheat flour, firms with large total operations (TMS_{it-1}^{k}) are more likely to supply foreign markets under the EEP. Using the appropriate transformation on the estimated logit parameters to calculate the marginal effect of an increase in the regressors on the probability of a firm shipping under the EEP (Judge et al.), it was calculated that a 1% increase in a wheat flour exporting firm's lagged share of total U.S. exports increases the likelihood of it supplying a market under the EEP by 3.3%. Thus, extensive information systems may give these firms an advantage. However, the results for frozen poultry make the opposite prediction. Some of the largest U.S. broiler meat exporting firms (Tyson Foods, AJC International, and others; see Patterson) were only moderate participants in the EEP. Thus, being a large exporter of broiler meat did not help secure an EEP subsidy. In the wheat export sector, firms with a large total operation also had no advantage in securing an EEP bid. Recall, however, that firm shares of wheat EEP subsidy awards were proportional to firm shares in the wheat export market.

Finally, past participation in the EEP for any commodity had a significant, positive impact on current participation. For wheat and wheat flour, a 1% increase in a firm's share of last year's EEP subsidies for all products increases its likelihood of shipping these products under the EEP in the current year by 3.3 and 3.7%, respectively. For frozen poultry, a 1% increase in past EEP awards increases the likelihood of a firm shipping under the EEP by 24.4%. This result is consistent with the high cross-commodity participation observed in table 1.

Summary and Conclusions

This study used firm-level data to analyze impacts of the Export Enhancement Program. Two related questions were addressed. One, did the EEP promote new firm entry into foreign markets? Classical statistical methods were used to address this question. Two, did firm characteristics affect firm participation in the EEP? The firm characteristics considered were lagged firm export market shares in targeted EEP destinations, lagged firm market shares for total U.S. exports, and lagged firm shares of total EEP awards. A logit model was used to evaluate the effect of these firm characteristics on EEP participation.

Firms did not receive significant additional per unit profits by supplying markets under the EEP. So, the program should not be expected to promote new firm entry. When the

Table 4. The Effect of Firm Characteristics on a Firm's Probability of Supplying a Market under the Export Enhancement Program-Logit Model Estimates

Independent Variables	Wheat	Wheat Flour	Frozen Poultry
Intercept	−0.529*	−1.460*	−1.960*
	(−4.767)	(−4.911)	(−10.446)
Market share (t–1)	0.011	0.029	0.014
	(1.303)	(1.192)	(1.104)
Market share (t–2)	−7.34E–5	−0.013	0.020
	(−0.007)	(−0.512)	(1.665)
Share of total exports (t–1)	0.037	0.136*	−0.190*
	(0.902)	(3.606)	(−2.064)
Share of EEP awards (t–1)	0.132*	0.156	1.766*
	(5.674)	(2.990)	(3.901)
McFadden R^2	0.12	0.31	0.17
Number of observations	626	151	390

Note: The values in parentheses are asymptotic t-ratios. An asterisk denotes significance at the 5% level, using a two-tailed test.

market share histories of firms supplying EEP destinations were evaluated, the EEP was found not to promote new firm entry. Indeed, in the wheat and wheat flour markets new firm entry was significantly higher among firms not participating in the program.

A firm's past position in a market did not confer it any advantage in bidding for an EEP subsidy. The factor which did consistently affect the likelihood that a firm would ship under the EEP was the firm's past participation in the program. Thus, there appear to be advantages to a few firms associated with the program.

In summary, the EEP did not promote substantial new firm entry and program participation was limited to a small number of firms. Although there is no evidence to suggest that the program was not administered fairly, the cumbersome regulations and administrative procedures associated with the EEP may provide certain advantages to previous participants. The limited access of the EEP to firms may explain why non-EEP market entry is more prevalent than entry under the EEP. Further, this may be an important factor underlying other research that shows the EEP to have had a minimal impact in increasing U.S. exports. Thus, export subsidies, if administered like the EEP, are not likely to expand exports through new firm market entry.

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