The Trade Adjustment Assistance (TAA) Program for Farmers in the U.S.: Role of Incentives in Program Participation

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THE TRADE ADJUSTMENT ASSISTANCE (TAA) PROGRAM FOR FARMERS IN THE U.S.: ROLE OF INCENTIVES IN PROGRAM PARTICIPATION

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The Trade Adjustment Assistance (TAA) program for farmers was established in 2002 to assist farmers adversely affected by import surges. Since its introduction, the program has been mostly underused by farmers, and the American Recovery and Reinvestment Act (ARRA) in 2009 eased the program rules to encourage more farmers to participate. Why has farmers' participation in the program been so low? Have the relaxed criteria of the ARRA been effective in encouraging farmers' participation? Based on a simple decision-making model and a uniquely constructed panel data set, we find that farmers' incentive to make up for losses in other types of direct government payments as well as eligibility criteria explain farmers' participation in the TAA program. Less time and efforts needed for participation, proxied by previously approved cases of the same or similar commodities, also seems to drive farmers' participation. Results also confirm that the ARRA of 2009 was effective in increasing farmers' participation.

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1. Introduction

The value of agricultural imports to the U.S. doubled during the last decade. As a measure to assist farmers adversely affected by import competition via cash benefits and technical assistance, the Trade Adjustment Assistance (TAA) program for farmers was first established by the TAA Reform Act of 2002. TAA programs have been supported by two reasons: First, benefits of international trade are widely distributed whereas the costs are highly concentrated to the groups of farmers, workers, and firms that bear the high cost of competition (Rosen, 2008). Therefore, a targeted assistance is needed for groups affected by international trade. Second, TAA could serve as a policy to support freer trade without using measures that might restrict imports and potentially create tensions among trade partners (Hornbeck and Rover, 2011). Moreover, evidences show that TAA program for farmers have been effective: Technical assistance has been helpful in assisting farmers and fishermen in improving productivity and diversifying their crops (Rosen, 2008); Cash benefits made to farmers in the program have shown the impacts that extend 'well beyond the farm.' (Kemper and Rainey, 2013). However, since its introduction in 2002, the TAA has been underused by farmers, as only about 10% of authorized funding was used during fiscal years (FY) 2003-08 (Jurenas, 2011). The American Recovery and Reinvestment Act (ARRA) of 2009 eased the eligibility criteria for TAA, but the program was still not actively used, spending about 64.5% of authorized funding during FY2009-11 (Jurenas, 2011). This paper focuses on the question of why farmers' participation has been so low, even though the program provides cash benefits and technical assistance to eligible producers. We examine this issue of low participation in light of farmers' incentives to participate in the TAA program – even though the TAA program could potentially provide farmers with cash benefits and technical assistance, farmers may lack incentive to actually go through the document preparation and administrative processes.

There have been only a few studies on the TAA program for farmers, most of which have focused on the issue of the eligibility criteria. Bacho and Goodwin (2008) reviews 69 complete petitions filed from 2002 to July 2007 among which 41 (59.4%) turned out to be ineligible for program benefits by the U.S. Department of Agriculture (USDA), and suggests relaxing the eligibility requirements. Another study conducted by the U.S. Government Accountability Office (GAO) (2006) also notes strict eligibility criteria as well as low cash

payments as potential factors that discourage farmers from participating in the program. Jurenas (2011) and the GAO (2012) provide an update of the program—what commodities were certified and what proportion of applicants received payments after the reauthorization of the TAA for Farmers by the ARRA of 2009. According to the report, the USDA certified relatively few commodities after the reauthorization—5 out of 18 commodities – but once the commodities were certified, about 90 percent of the applicants who produced certified commodities were approved for TAA payments.

Unlike the existing studies on the TAA program for farmers that focus on program activities and eligibility criteria, this paper takes an integrative approach to explain farmers' participation in the program by modeling farmers' incentives for participation. More specifically, we focus on the role of exogenous factors – change in prices and imports that affect eligibility, revision of the TAA program, and time and efforts for participation – in affecting the farmers' incentives to participate in the program. For empirical analysis, we use a panel data set encompassing the first and the second round of the TAA program. The results suggest that farmers have higher incentives to participate in the program and thus file more petitions: (i) if commodities satisfy eligibility criteria; (ii) if farmers have experienced a recent decrease in the receipt of direct government payments from other sources; and (iii) if there are previous cases of approval for TAA benefits for the same or similar commodities.

Another important issue related to the TAA program for farmers is the modification of the program rules under the ARRA of 2009, the major stimulus package enacted as a response to the financial crisis in 2007-08 and the economic downturn. Following suggestions of previous studies on the TAA program for farmers (Bacho and Goodwin, 2008; U.S. Government Accountability Office (GAO), 2006), the program was modified so that more farmers in need can participate in the program. Using the model of farmers' incentives, we set up a hypothesis to test the effectiveness of this revision. Based on the empirical results, changes made in the TAA program in the ARRA of 2009 indeed were successful in increasing the cases of TAA petition. Additional empirical analysis on farmers' participation *before* and *after* the ARRA suggests that there might have been a change in farmers' motivation for participating in the TAA program for farmers: Before the ARRA, the TAA program mainly served as a means to mitigate the negative price risk and also as a way to make up for losses in other government farm support programs. After the ARRA, the TAA program has served its role as a training program for farmers to develop business plans to cope with import surges.

Several features differentiate this paper from previous studies. First, this study examines the role of farmers' incentives to participate in the program, which has been ignored in the previous literature on the TAA program for farmers. Unlike previous studies on the TAA that focused mainly on eligibility criteria, we model farmers' incentives to participate in the TAA program and address the issue of eligibility criteria as *one of the factors* that incentivizes farmers. By taking this comprehensive approach, we expect to contribute to better understanding and more effective use of the TAA policy as well as other related farm policies. Second, this study could serve as a partial evaluation of the effectiveness of the ARRA, adding to the recent body of studies on the impact of the ARRA (Feyrer and Sacerdote, 2011; Wilson, 2010; Cogan and Taylor, 2010), but with a particular focus on agriculture and trade.

Section 2 provides background on the TAA program for farmers before and after the ARRA. Thereafter, we set up a simple model of farmer's incentive to participate in the TAA program and derive hypotheses to explain farmers' participation in Section 3. Sections 4 and 5 explain the data, definitions of variables, and the empirical strategy. Analysis of the results and discussions of the policy implications will follow in Sections 6 and 7, respectively.

2. Background

2.1 TAA Program Before the ARRA

The Trade Expansion Act of 1962 first established Trade Adjustment Assistance (TAA) programs for workers and firms dislocated by international trade liberalization, and the TAA program for farmers was established by the TAA Reform Act of 2002[1]. The TAA for Farmers assists farmers adversely affected by import competition through cash benefits up to $10,000 per year and through technical assistance provided by the U.S. Department of Agriculture (USDA). In order for a group of farmers who has filed a TAA petition to be eligible for the cash benefits, the commodity should meet the following criteria: (i) the price of the commodity in a given marketing year should be less than 80% of the national average price in the 5 preceding marketing years; (ii) there needs to be an increase in imports of like or

[1] P.L. 107-210, Sections 141-142, approved August 6, 2002, 116 Stat.946 (19 U.S.C. 2401 et seq.).

directly competitive products[2] during the most recent 12 month period; and (iii) the increase in imports has demonstrably contributed to the price decline[3]. Once judged eligible by the Foreign Agricultural Service (FAS) at the USDA, cash payments will be made to producers who produced the commodity in the most recent year if: (iv) farmers' net farm income[4] for the most recent year is less than that of the year before; and (v) the farmers have met with Extension officers and received technical assistance. Hereafter, I call the criteria (i) and (ii) as the "price criteria" and the "import criteria," respectively.[5] The cash payments are given to the eligible farmers according to the formula, up to a maximum of $10,000:

$$Payment = 0.5 \times (0.8\bar{p} - \tilde{p}) \times q \qquad (1)$$

Where $\tilde{p}$, $\bar{p}$, and q are national average price of the agricultural commodity covered by the TAA for most recent marketing year, national average price for five years preceding the most recent marketing year, and the amount of the commodity sold in the most recent marketing year, respectively. For example, $\tilde{p}$ and $\bar{p}$ could be denoted in $ per pound, and q could be denoted in pounds, so that the payment can be calculated in $'s. The amount of cash adjustment assistance given to the producers is thus half the difference between the current price and the 80% of the average price for the preceding five years, multiplied by the amount of commodity produced. Denote the price that the producer receives per unit of commodity sold by $\tilde{p}_{TAA}$. The TAA program could alleviate the risk of unfavorable price decline by

[2] According to Sec. 1580.102 of the 7 C.F.R. (Code of Federal Regulations), "*like or directly competitive* generally means products falling under the same HTS number used to identify the agricultural commodity in the petition. A *like* product means substantially identical in inherent or intrinsic characteristics, and the term *directly competitive* means those articles which are substantially equivalent for commercial purposes, that is, are adapted to the same uses and are essentially interchangeable therefore."

[3] According to Section 291 of the Trade Act of 2002 - 107 P.L. 210, "*contributed importantly* means a cause which is important, but not necessarily more important than any other cause," and is determined by the Secretary of Agriculture.

[4] According to the USDA's website, net farm income is "a value of production measure, indicating the farm operators' share of the net value added to the national economy within a calendar year, independent of whether it is received in cash or a noncash form such as increases/decreases in inventories and imputed rental for the farm operator's dwelling." It is also a "portion of the net value added by agriculture to the national economy earned by farm operators (i.e., the entrepreneurial earnings of those individuals who share in the risks of production and materially participate in the operation of the business)."

[5] Since it is not easy both for the potential participants (producers of commodities) to address the causality between the surge in imports and decline in prices in the petition-filing stage and for me to come up with a measure for such causality, we do not include the criteria (iii) in the analysis.

compensating for the difference between $0.8\bar{p}$ and $\tilde{p}$[6]. FIGURE 1 graphically shows this effect. The dashed line is a price of a commodity without the TAA program, which is just identical to the price of the most recent year. The solid line is the price with TAA program, which is a weighted-average of $0.8\bar{p}$ and $\tilde{p}$. In this way, the TAA program creates an effective lower bound for the producer price.

[FIGURE 1 about here.]

2.2 TAA Program After the ARRA

The ARRA made a substantial change in the eligibility criteria for TAA. The act reauthorized the Trade Act for 2002, and provided an expanded definition of terms and more lenient group eligibility requirements for TAA petition. The major changes in ARRA of 2009 included the following: First, the eligibility requirements for groups of farmers to be certified and the criteria for individual farmers to be eligible for benefits became more lenient. The new Act required that the price of the most recent marketing year be less than 85% of the previous 3 year prices instead of 80% of the previous 5 year prices. Moreover, not only the national average price, but also quantity of production, the value of production, or the cash receipts for the commodity may be used for eligibility assessment. Also, the ARRA clarified the import criteria by specifying that the *volume* of imports is used to show that the imports have increased. Also, unlike the prior TAA program for farmers, there was no such requirement for the farmers' net farm income to have decreased in order to be qualified for the cash payment. Another notable change was the way that the financial assistance was given to farmers. Under the Reform Act of 2002, the cash payments to eligible farmers were calculated based on the formula involving the amount of production. Therefore, the TAA cash payment was "coupled" to the amount of production. However, the ARRA of 2009 abandoned this cash payment formula and stated that the cash benefits would be given to farmers to develop and implement business plans, with a maximum cap of $12,000. In order to receive cash benefits, farmers

[6] There are two possible cases for the amount of the cash adjustment:
(i) If $\tilde{p} < 0.8\bar{p}$, $Payment = 0.5 \times (0.8\bar{p} - \tilde{p}) \times q$. Then the unit price that the farmer receives is: $\tilde{p}_{TAA} = \frac{\tilde{p} \times q + Payment}{q} = \tilde{p} + 0.5 \times (0.8\bar{p} - \tilde{p}) = 0.5\tilde{p} + 0.5 \times 0.8\bar{p}$. Therefore, the farmer receives the weighted-average of $0.8\bar{p}$ and $\tilde{p}$. (ii) If $\tilde{p} \geq 0.8\bar{p}$, $Payment = 0$, and $\tilde{p}_{TAA} = \tilde{p}$.

first need to complete intensive training courses aiming to improve the competitiveness of production and to develop their initial business plan. If the initial business plan is approved, a farmer can receive a maximum of $4,000 to implement the plan. The farmers whose initial plans are approved can develop a long-term business plan to adjust to import competition from which a farmer can receive a maximum of $8,000. Thus, the TAA cash payment after the ARRA is in the form of "decoupled" payment.

The ARRA of 2009 included a sunset clause that the Act expires on December 31, 2010. Hence, the Act authorized the funding only through the year-end of 2010. However, eligible producers were able to access technical and financial assistance during the calendar year of 2011 if the USDA had already approved their crops for TAA benefits. Program benefits were also available if producers filed petitions before January 1, 2011 and if the eligibility was established. Hence, the USDA received petitions for the FY 2011 from May 21, 2010 to July 16, 2010. The Trade Adjustment Assistance Extension Act of 2011 (TAAEA, P.L. 112-40) effective on October 21, 2011, extended the provisions of the TAA program for Farmers. The TAAEA authorized, but did not appropriate, $90 million for both the FY 2012 and the FY 2013, and $22.5 million for the first quarter of the FY 2014. No major change was made in the eligibility criteria. For the exact program rules before and after the ARRA, refer to *APPENDIX I.*

3. Modelling Farmer's Decision Making

This section derives testable hypotheses on farmers' petition filing behavior from a simple decision making model. There is a two-step process regarding the TAA program for farmers. First, farmers decide whether to file a petition, taking into account the eligibility criteria and incentives for filing petitions given available information. Once a petition is filed, the USDA Foreign Agricultural Service (FAS) decides whether to approve or deny the petition based on the eligibility criteria. We focus on the first part of the process and model only the petition-filing decision of farmers.

Assume that a representative farmer[7] producing only one output has a von Neumann-Morgenstern utility function $U: R_+ \rightarrow R_+$ which is defined as the following:

$$U(\pi, t, e) = u(\pi) - v(t, e) \qquad (2)$$

where $u(\pi)$ is utility from net revenues and $v(t, e)$ is disutility from, or cost of, participation, which comes from time and efforts associated with the TAA program. The utility from net revenues and the disutility from participating in the TAA are additively separable. Further, assume that:

$$u'_\pi > 0, \quad u''_\pi < 0, \quad v'_t > 0, \quad v'_e > 0 \qquad (3)$$

where u'_π and u''_π stand for the first and the second derivative of the utility function with respect to net revenues, and v'_t and v'_e stand for the first derivative of utility function with respect to time and effort, respectively. We assume that the farmer is risk-averse with respect to net revenues, following a number of previous studies (Moscardi and de Janvry, 1977; Binswanger, 1980; and Dillon and Scandizzo, 1978). Assume also that the farmer's net revenues take three forms:

$$\pi = \pi_{TAA} + \pi_{OTHER} + \pi_{PROD} \qquad (4)$$

[7] The rationale for assuming a representative farmer is the following: TAA petitions can be filed by an individual farmer or a group of farmers. Once a petition is filed, the USDA makes a decision on the 'state-commodity' for which the petition is filed, and if approved, the benefit is applied to all farmers in the state that produced the commodity in the year of petition. For example, a decision is be made for 'blueberry farmers in Maine.' Therefore, an individual farmer or a group of farmers filing a TAA petition effectively represents a state *and* a commodity.

π_{TAA}, π_{OTHER}, and π_{PROD} are net revenues from the TAA program (TAA cash benefits), other direct government payments to farmers, and production, respectively. Since the farmer never pays out money because of the TAA program, $\pi_{TAA} \geq 0$. Also, π_{OTHER} includes payments to the farmer from other government programs such as commodity program, loan deficiency program, counter-cyclical payments, disaster assistance, and conservation. According to the setup, the net revenue from the TAA program, other government payments, and production are perfect substitutes.

[FIGURE 2 about here.]

According to the farmer's participation (*P*) or non-participation (*NP*), and whether a petition is approved (*A*) or not approved (*NA*), there are three possibilities for the farmer's utility, as shown in the decision-making tree in FIGURE 2. Since $v(t,e)$ is the disutility from time used and efforts made in participating in the TAA program, $v(t,e) > 0$ if a TAA petition is filed and $v(t,e) = 0$ if not. According to the TAA rules, $\pi_{TAA} \geq 0$ if a petition is approved and $\pi_{TAA} = 0$ if petition is not filed or if a petition is filed but is not approved. Therefore,

$$\mathrm{U}(\pi,t,e \mid P,A) = u(\pi \mid P,A) - v(t,e \mid P,A) = u(\pi_{TAA} + \pi_{OTHER} + \pi_{PROD}) - v(t,e) \quad (5)$$

$$\mathrm{U}(\pi,t,e \mid P,NA) = u(\pi \mid P,NA) - v(t,e \mid P,NA) = u(\pi_{OTHER} + \pi_{PROD}) - v(t,e) \quad (6)$$

$$\mathrm{U}(\pi,t,e \mid NP) = u(\pi \mid NP) - v(t,e \mid NP) = u(\pi_{OTHER} + \pi_{PROD}) \quad (7)$$

The farmer's expected utility from filing a TAA petition (EU_P) and from not filing a TAA petition (EU_{NP}) are therefore written as the following:

$$\begin{aligned} EU_P &= Pr(A)\mathrm{U}(\pi,t,e \mid P,A) + \{1 - Pr(A)\}\mathrm{U}(\pi,t,e \mid P,NA) \\ &= Pr(A)\{u(\pi_{TAA} + \pi_{OTHER} + \pi_{PROD}) - v(t,e)\} + \{1 - Pr(A)\}\{u(\pi_{OTHER} + \pi_{PROD}) - v(t,e)\} \\ &= Pr(A)u(\pi_{TAA} + \pi_{OTHER} + \pi_{PROD}) + \{1 - Pr(A)\}u(\pi_{OTHER} + \pi_{PROD}) - v(t,e) \end{aligned} \quad (8)$$

$$EU_{NP} = \mathrm{U}(\pi,t,e \mid NP) = u(\pi_{OTHER} + \pi_{PROD}) \quad (9)$$

where $Pr(\ \cdot\ )$ stands for probability. If $EU_P \geq EU_{NP}$, the farmer will file a petition. Otherwise, the farmer will not file a petition. Denote the difference in expected utility from participating and not participating in the TAA program ($EU_P - EU_{NP}$) as Δ:

$$\Delta \equiv EU_P - EU_{NP} \qquad (10)$$

As Δ gets bigger, participating in the TAA program by filing a TAA petition becomes relatively more attractive than not participating. This will, in turn, increase the likelihood of petition filing. This model does not predict the *absolute* threshold at which participating in the program becomes a better or a worse option (where Δ changes from negative to positive, or vice versa). The model focuses only on the *relative* attractiveness of participation compared to non-participation. Given this setup, observations on farmer's incentive to participate in the TAA program follow from simple comparative statics:

Observation I: Δ gets larger as *Pr(A)* increases.

$$\frac{\partial \Delta}{\partial \mathrm{Pr(A)}} = u(\pi_{TAA} + \pi_{OTHER} + \pi_{PROD}) - u(\pi_{OTHER} + \pi_{PROD}) \geq 0,$$

since $\pi_{TAA} \geq 0$ and $u'_\pi > 0$.

Observation II: Δ gets larger as π_{OTHER} decreases.

$$\frac{\partial \Delta}{\partial \pi_{OTHER}} = Pr(A)u'(\pi_{TAA} + \pi_{OTHER} + \pi_{PROD}) - Pr(A)u'(\pi_{OTHER} + \pi_{PROD})$$

$$= Pr(A)\{u'(\pi_{TAA} + \pi_{OTHER} + \pi_{PROD}) - u'(\pi_{OTHER} + \pi_{PROD})\} \leq 0,$$

since $Pr(A) \geq 0, \pi_{TAA} \geq 0$ and $u''_\pi < 0$.

Observation III: Δ gets larger as *t* or *e* decreases.

$$\frac{\partial \Delta}{\partial t} = \frac{\partial \Delta}{\partial v(t,e)} \cdot \frac{\partial v(t,e)}{\partial t} = -1 \cdot \mathrm{v}'_\mathrm{t} < 0,$$

since $\mathrm{v}'_\mathrm{t} > 0$.

$$\frac{\partial \Delta}{\partial e} = \frac{\partial \Delta}{\partial v(t,e)} \cdot \frac{\partial v(t,e)}{\partial e} = -1 \cdot \mathrm{v}'_\mathrm{e} < 0,$$

since $\mathrm{v}'_\mathrm{e} > 0$.

Parallel to these observations, we state testable hypotheses on farmer's participation in the TAA program as follows:

A. Eligibility Criteria

Hypothesis I-a: Likelihood of participation increases if the commodity satisfies the TAA eligibility criteria.

There are two kinds of motivation that work in the same direction. Firstly, probability of approval (*Pr(A*)) increases if the commodity satisfies the eligibility criteria. If so, by *Observation I*, participating in the program becomes more attractive relative to not participating, which will increase the likelihood of participation, holding other things constant. Intuitively, if the commodity in consideration satisfies either price, import, or both eligibility criteria, the likelihood of getting TAA cash benefits in the future increases, which motivates the farmer to participate in the program. Secondly, satisfaction of eligibility criteria indicates that the price of the commodity has decreased significantly and that there was an increase in imports of the same or like commodities, i.e., the need of the farmer to mitigate negative price risk and to cope with surges in imports is higher.

B. Impact of the ARRA

Hypothesis I-b: Likelihood of participation increases after the ARRA.

The ARRA of 2009 includes revision of the TAA rules which relaxed the eligibility criteria. Hence, probability of approval (*Pr(A*)) will increase after the ARRA, which will increase the likelihood of participation, again by *Observation I*. The intuition is similar – the farmer will react to higher expected returns from participation.

C. Direct Government Payments

Hypothesis II: Likelihood of participation increases if net revenues from other government payments decrease, or vice versa.

This hypothesis follows directly from *Observation II*. Given the direct substitutability of net revenues from the TAA program or other government farm programs, and also the concave utility function of the farmer, marginal utility from TAA cash benefits is higher if the farmer receives less government payments from other sources, which will incentivize the farmer to participate in the TAA program by filing a petition, other things held constant. Likewise, if

the farmer received higher government payments from other sources, the farmer will be less motivated to participate in the TAA program.

D. Cost of Participation

Hypothesis III: Likelihood of participation increases if a TAA petition was approved for benefits for the same or similar commodity in the past.

If a TAA petition was filed and approved for the same or a similar commodity in the past, those previous cases may serve as a useful benchmark and reduce time (*t*) or efforts (*e*), or both, for obtaining necessary information and prepare documents. By *Observation III*, likelihood of participation will increase.[8]

In *Hypothesis III* above, previous approval is used as a proxy for lower disutility of participation. One might wonder if previous approval could also be a proxy for increased likelihood of approval (*Pr(A*)). This is most likely not the case, since a previously approved commodity has a higher burden of meeting the price eligibility criterion. If a petition was approved in the past for a commodity, its price must have decreased by more than 20% as of the 'most recent' year at that time (After the ARRA, the price must be lower by more than 15% of the previous three-year average. But the logic is the same). To be qualified again, price in the most recent year must *again* be lower by at least 20% compared to the previous five-year average which already includes the past year in which the price was low. This high burden of eligibility may actually *lower* the likelihood of approval. In the following sections, we test these hypotheses using data.

4. Data and Descriptive Statistics

We constructed a panel data set which encompasses the first (2003-07) and the second (2010) rounds of the TAA program for farmers. Each observation is a 'state-commodity in year t' – commodity *j* produced in state *i* in year *t*. Dependent variable is 'petition,' which is 1 if a petition is filed for commodity *j* produced in state *i* in year *t*, and 0 otherwise. Independent

[8] Foster and Rosenzweig (1995) found that farmers' own experience and neighbors' experience with new technologies improved adoption and profitability of high-yielding seed varieties. Likewise, as individuals can learn from themselves, their neighbors, and their peers, the concepts "learning by doing" and "learning from others" discussed in investment behavior could also apply to TAA petition behaviors.

variables include: indicator variables on price eligibility and import eligibility; percent change in direct government payments in state *i* from year *t-2* to year *t-1*, and its one-year lag (percent change in direct government payments in state *i* from year *t-3* to year *t-2*); indicator variable indicating whether a petition was approved for the same or similar commodities in previous years; state-level real net farm income in each year; state farm characteristics including the percentage of full owners, average age of farm operators, average farm size, etc. *APPENDIX II* contains exact definitions of all variables.

The validity of using state-level data to explain decision-making of farmers rests on the following reasons: First, the Reform Act of 2002 specifies that 'an individual or a group of' farmers can file a petition. However, filing a petition is rarely a decision made by a sole individual and the impact of such action applies to all the farmers in the state who produced the commodity in the respective year. Therefore, when a petition is filed, it is in effect filed *on behalf of* all the farmers who produce the commodity in the state. Second, actually in many cases petitions are filed by groups of farmers which represent producers of a certain commodity in a certain state, a region, or the entire United States. Petition filing done by groups of states is more common in aquaculture and fisheries, which accounts for more than half of the TAA petitions. Lastly, data used by farmers when deciding whether to file a petition and when preparing for a petition, and the data used by the USDA FAS to evaluate group eligibility in investigation process are also aggregate-level (state-level or national level) data rather than individual farm-level data.

4.1 Data

State-level price data from 1997 to 2010 were collected for 202 field crops and two fishery commodities[9]. The data were obtained from the Quick Stats[10] database at the USDA NASS (National Agricultural Statistics Service) website. Based on the price data, price eligibility variables were calculated.

Import data of agricultural commodities from 1997 to 2010 were collected from the GATS (Global Agricultural Trade System) database[11] in the USDA FAS (Foreign Agricultural

[9] Catfish and shrimp.

[10] http://www.nass.usda.gov/Data_and_Statistics/Quick_Stats/index.asp

[11] http://www.fas.usda.gov/gats/default.aspx

Service). Data on both import quantity and import value were collected. BICO (HS-10) product grouping was used because the level of aggregation was most comparable with the price data. Once all the import data were collected, HS-10 product code was then matched with the commodity categories in the price data. To do that, we collapsed import data by summing up the imports of related commodity categories. Then, import eligibility variables were calculated.

Petition-related data were collected from the Federal Register Notices on the TAA program for farmers posted on the USDA FAS website.[12] The variables include: whether a petition was filed for a certain state-commodity produced during the year; whether the filed petition was approved; whether a commodity had been approved for TAA benefits ever before; whether the petition is a new petition or a re-evaluation for the one approved in the previous year; and whether the petition was filed by a single state or jointly by multiple states.

Data on farm demographics and management of each state come from the Census of Agriculture of 2002 and 2007. The data were collected from the State Fact Sheets database[13] available on the USDA ERS (Economic Research Service) website. Data on net farm income (2000-10), index of farm total factor productivity (2000-04), and state-level farm receipts of direct government payments (2000-10) were also collected from the USDA ERS.

4.2 Descriptive Statistics

[TABLE 1 about here.]

TABLE 1 presents descriptive statistics for petition and eligibility variables. Throughout the whole period, petitions were filed for only 227 of the 15,294 state-commodities (1.5%). Between 2003 and 2007 when the first round of the TAA was active, the rate of petition filing was particularly low (1.12%). No petition was accepted in years 2008 and 2009 due to the closing of the first round of the TAA program. During the second round of the TAA after the ARRA (year 2010 in the data), there was a significant increase in the number of petitions,

[12] http://www.fas.usda.gov/info/fr/notices.asp

[13] http://www.ers.usda.gov/StateFacts/

tripling the rate of petition to 3.5%.[14] This sharp increase was mainly due to the relaxation of eligibility criteria. Modification of the TAA program in the ARRA also increased the rate of approval by the USDA, from 35% to 79% of all petitions filed. 'New petitions' are the cases of TAA petitions that exclude petitions that were filed for re-approval of existing TAA benefits.

Eligibility variables were calculated based on the price and import data. For all years, 2,976 out of 15,294 state commodities (19.4%) satisfy the price criterion. Due to the revision of the price criterion in the ARRA of 2009, the ratio of state-commodities that satisfy the price criterion increased from about 19% before the ARRA to about 27% after the ARRA.

There is an ambiguity in the import criterion – 'increases in imports of the commodity or like product'— stated in the TAA Reform Act of 2002. 'Imports' could mean either import *quantity* or import *value*. Also, 'increases' could mean increases in imports compared to the previous year, or to the previous five-year average, etc. Therefore, we define 'import eligibility' in year t as an increase of import quantity (which is measured in different metric for different commodities) from year $t–2$ to year $t–1$. The same variable was calculated based on the dollar value of imports. According to the import quantity and value, about 54-56% of the commodities satisfy the import eligibility throughout the whole period. The number of commodities eligible for import criteria is stable, except for a noticeable decrease in 2010. This means that, in each year between 2002 and 2006, for more than a half of the commodities in the data, there was a steady increase in import quantity and value. The pace slowed in 2009.

[TABLE 2 about here.]

TABLE 2 compares the state characteristics—demographics and state farm management characteristics—of all states and the states that filed TAA petitions, averaged over the years 2003-07, and 2010. Although not all these variables were used in the empirical analysis, this

[14] Based on my data set, the petition rate tripled mainly due to the fact that there were more petitions prepared and filed by multiple states in 2010 compared to other years. For example, when constructing the data set, I count a petition prepared by 10 states as 10 separate petitions filed by each state. The actual number of petitions submitted did not increase much in 2010 compared to previous years. For such comparison, please see *APPENDIX III and IV* that presents the record of petitions filed, approved and denied in each year.

table shows a quick snapshot of farm characteristics in all states and the states that filed petitions. States that filed petitions have higher net farm income, higher average age of farm operators, higher proportion of rural population with some college or upper degree, higher percentage of farms owned by full owners (as opposed to farms operated by tenant farmers), higher percentage of non-family corporations, and higher index of total factor productivity compared to all states. On the other hand, petitioned states received lower amounts of direct payment from the government, showed lower percentage increase in direct government payment, had smaller average farm size, and smaller proportion of farms owned by individuals, family, or sole proprietorship.

5. Empirical Strategy

5.1 Linear Probability Model (LPM)

We focus primarily on the incidence of TAA petitions by farmers in state *i* for commodity *j* in year *t*, but we also present the results on approval once petitions are filed. Given the binary outcome variable (petition = 1 if petition is filed; 0 otherwise) and the panel structure of data, we first estimate a linear probability model (LPM) with state-commodity fixed effects to test the hypotheses. In addition to simplicity of estimation, each coefficient estimate obtained in a LPM is a measure of the marginal effect of a unit change in the associated independent variable on the probability of petition. The equation to be estimated is the following:

$$Y_{ijt} = \beta_0 + \beta_1 E_{ijt} + \beta_2 I_{ijt} + \beta_3 F_{ijt} + \sum_{i,j} SC_{ij} + \gamma_{04} T_{04} + \cdots + \gamma_{07} T_{07} + \gamma_{10} T_{10} + u_{ijt} \qquad -(11)$$

Y_{ijt} is whether a petition was filed by state *i* for commodity *j* in year *t*. For commodity *j* produced in state *i* in year *t*, E_{ijt}, I_{ijt}, and F_{it} are vectors of variables related to eligibility criteria, farmers' incentives, and farm characteristics, respectively. SC_{ij} stands for a fixed effect of a 'state-commodity *ij*' – commodity *j* produced in state *i* – and T_t is a year dummy for year *t*. Lastly, u_{ijt} is a random error term.

Robustness checks is done by (i) using an alternative estimator; (ii) using only the observations that satisfy the eligibility criteria; (iii) using alternative definitions of income eligibility; and (iv) using real instead of nominal values of government payments.

5.2 Rare Events Logistic Regression (ReLogit)

We also use the Rare Events Logistic Regression (ReLogit) in order to address issues stemming from the dependent variable and also to check robustness of the results from the LPM. Also, we use ReLogit to examine more closely how the results differ according to different types of commodities.

Logit regression is often used when dependent variable is binary. However, only 227 petitions were filed in our data, which accounts for only about 1.5% of the total of 15,294 observations. Because of this large disparity between the numbers of 0's 1's in the dependent variable, application of the standard logistic regression method may result in biased coefficients and underestimation of rare events (King and Zeng, 2001a, 2001b). Hence, we apply the method of ReLogit regression, an unbiased estimator developed by King and Zeng (2001a, 2001b) for rare events and small samples. ReLogit estimates the same model as a traditional logit regression but corrects for possible coefficient biases by producing lower mean square error in case of rare events (King and Zeng, 2001b).

The dependent variable Y_{ijt} which takes a value 1 if state *i* filed a petition for commodity *j* in year *t*, and 0 otherwise, has a value of 1 with probability ϕ and 0 with probability 1- ϕ.

$$\phi = \frac{e^{Z_{ijt}}}{e^{Z_{ijt}} + 1} = \frac{1}{1 + e^{-Z_{ijt}}} \qquad -(12)$$

And, $Z_{ijt} = \beta_0 + \beta_1 E_{ijt} + \beta_2 I_{ijt} + \beta_3 F_{ijt} + \gamma_{04} T_{04} + \cdots + \gamma_{07} T_{07} + \gamma_{10} T_{10} + u_{ijt}$.

Z_{ijt} is whether a petition was filed by state *i* for commodity *j* in year *t*. E_{ijt}, I_{ijt}, and F_{it} are defined the same way as in the LPM.

6. Results

TABLE 3 presents the empirical results using the LPM. Regressions (1) through (3) consider both state and commodity fixed effects. Regression (3) is the main result and Regressions (1) and (2) explore more parsimonious specifications. Regressions (4) and (5) consider only state fixed effects and commodity fixed effects, respectively, mostly preserving the variables in the main result. Regressions (6) and (7) examine the results before and after the ARRA separately.

[TABLE 3 about here.]

Results based on Regressions (1) through (5) that use all years are the following:

A. Eligibility Criteria

Likelihood of participation seems to increase if the commodity satisfies the TAA eligibility criteria based on the signs, but the results on import eligibility are insignificant in all specifications. Therefore, the results support *Hypothesis I-a* only for the price criterion. The predicted dependent variable based on the mean values of the explanatory variables suggests that there is on average 1.48% probability that a TAA petition is filed. Satisfying the price eligibility increases the likelihood of petition by 0.7% point. This makes sense, because eligibility increases the likelihood of approval once a petition is filed, and thus increases the likelihood of getting funding. Also, the results suggest that farmers' motivation to mitigate the negative price risk drives farmers' participation in the TAA program. Insignificant results for import eligibility may come from the lack of clear definitions of 'increases in imports' before the ARRA.

B. Impact of the ARRA

Impact of the ARRA which relaxed the price eligibility criteria and clarified the import criteria is captured by the dummy for year 2010. In all specifications, the impact is positive and statistically significant. Relaxation of eligibility criteria by the ARRA increased the likelihood of farmers' participation by 1.1– 2.3% points. This result confirms the effectiveness of the ARRA on farmers' participation, supporting the *Hypothesis I-b*.

C. *Direct Government Payments*

Hypothesis II states that the likelihood of participation increases if net revenues from other direct government payments to farms decreases, or vice versa. The hypothesis is supported by empirical results. A 1% decrease in government direct payments in the previous year increases the likelihood of TAA petition by 0.3–0.6% points, and the impact is statistically significant in most models. The results are consistent with decreases in direct government payments in the year before. Hence, farmers' incentive to make up for losses in direct government payments in the recent past years seems to drive farmers to participate in the TAA program. Likewise, an increase in the receipt of direct government payments in the past seems to lower farmers' incentive to participate in the TAA program.

D. *Cost of Participation*

Previous cases of approval for TAA benefits for the same or similar commodities has a positive yet insignificant impact in regressions (2) and (3), but the impact becomes significant in regressions (4) and (5). Therefore, *Hypothesis III* is weakly supported. Previous cases of approval for the same or similar commodities could serve as a useful benchmark when preparing for the procedure and thus save time and efforts to search for information. For example, shrimp farmers in Florida who are considering filing a TAA petition in 2010 could contact shrimp farmers in Louisiana who received TAA benefits in 2005 to ask questions regarding the preparation of materials and learn some knowledge on the TAA program. On the other hand, wool producers in Montana have no such cases of past approval, which would increase time and efforts to prepare for the procedure.

One might suspect endogeneity of the variable 'previously approved.' First, reverse causality is not an issue because filing a TAA petition in this year cannot cause approval of TAA petition on the same or similar commodity in last year. Omitted variable could be a potential issue, if there is some omitted characteristics of state-commodities that affects both 'previously approved' and 'petition.' For example, certain producer groups might be more concretely organized or have better bargaining or lobbying power. This may increase both the likelihood of petition and approval in the previous years. This possibility cannot be completely ruled out, but state and commodity fixed effects capture state-specific and commodity-specific characteristics, which may alleviate some of the concern. Also, 'previously approved' is a proxy for reduced costs of petition rather than a proxy for

increased likelihood of approval for current a petition. If the latter case is true, by *Observation I*, impact of the variable 'previously approved' might be overestimated. However, a previously approved commodity has a higher burden of satisfying the price eligibility criterion since the price has to decrease further from the already decreased price. This high burden of establishing eligibility may actually lower the likelihood of approval, which may also lower the likelihood of petition. This point also partially addresses the endogeneity concern, by weakening the impact of the omitted variable, if any, that may affect both 'petition' and 'previously approved' in the same direction.

'Fishery commodities' also have a notable impact on TAA petition, increasing the likelihood of TAA petition filing by 8.6% points. This large impact may come from: (i) the fact that fishery commodities are heavily traded internationally, which exposes domestic seafood products to price competition from imported commodities (Tveterås *et al.*, 2012); and (ii) higher degree of organization of producers compared to field crops, which is pronounced in the case of TAA policy. In most of the petitions filed by fisheries producers, petitions were filed by associations of producers throughout several states, regions, or even the entire United States. In the data, among the 131 cases of petitions prepared by multiple states, 86 cases were associated with fishery commodities.

Average net farm income of the year (measured in real USD with base year 2009) included as a control variable seems to have a positive and significant impact. According to the coefficient estimate, a $1,000 increase in average net farm income increases the likelihood of petition by 0.6% points. Other state characteristics such as average education and age of rural population and farm size are not included in the main results since the variables do not vary much over time due to the fact that the data come from the Census of Agriculture of 2002 and 2007, and are mostly captured by state-specific fixed effects.

Regressions (6) and (7) examine the results before and after the ARRA separately. Since the data after the ARRA is only for a single year (2010), the results after the ARRA may not be as reliable as the results before the ARRA. However, since the revision of the Act in 2009 has made significant changes to the rules, it would be worthwhile to examine how the relationships change before and after the ARRA. Three things are noticeable – First, price eligibility becomes not significant after the ARRA. Note that different group eligibility

criteria were applied before and after the ARRA, and thus 'price eligibility' after the ARRA may not fully capture the actual group eligibility criteria considered by farmers.[15] Especially, 'price eligibility' was calculated based on the price data only and not on the quantity or the value of, or cash receipts from production. Therefore, this result does not necessarily mean that the price eligibility criterion is not an important factor for farmers' participation decision. The result (that the price criterion becomes insignificant after the ARRA) also suggests that the change in the program rules – from using a cash payment formula based on the production level to a decoupled cash payment related to development of business plans – changed farmer's motivation for participation. Before the ARRA, the TAA program was a way to mitigate a negative price risk. After the ARRA, the TAA program is used to better cope with the surges in imports. Second, the import eligibility criterion becomes positively significant, possibly due to the clarification of the import eligibility criterion in the ARRA 2009. Third, the result on the direct government payment does not hold anymore, and the effect actually becomes the opposite and significant. After the ARRA, a 1% increase in direct government payment from year t-2 to t-1 *increases* the likelihood of program participation by 3.1%, suggesting a complementary, not substitutable, relationship between the TAA program and other government farm programs. However, this result *cannot* be simply interpreted that *Hypothesis II* is rejected. There are confounding factors that need to be considered. The first factor is the Farm bill in 2008, which increased the overall level of government spending and changed the levels of support for some specific farm programs. The second is the change in the focus of the TAA program for farmers from the cash benefits calculated according to the level of production to decoupled payments associated with development of business plans.

[TABLE 4 about here.]

TABLE 4 presents robustness checks. Regressions (1) through (3) use the same dependent and explanatory variables as Regression (3) in the main results (TABLE 3), but use only the

[15] **(1) Group eligibility criteria before the ARRA**: (i) The national average price for the most recent marketing year is less than 80% of the average price for the 5 preceding marketing years, and (ii) increases in imports like or directly competitive commodity, produced by the group contributed importantly to the decline in price. **(2) Group eligibility criteria after the ARRA:** (i) The national average price, or the quantity, or the value of production of, or the cash receipts for the agricultural commodity for the most recent marketing year is less than 85% of the average of the 3 preceding marketing years, and (ii) the volume of imports of like or directly competitive products in the marketing year increased when compared to those of the 3 preceding marketing years; and (iii) the increase in imports contributed importantly to the decrease in those quantities

observations that satisfy price eligibility, import eligibility, and both. All signs are preserved, and significance levels of coefficient estimates are similar. Regression (4) uses import quantity instead of import value when calculating the import eligibility variable. Regression (5) uses real instead of nominal values of direct government payments. In every specification, results are robust.

[TABLE 5 about here.]

TABLE 5 presents results from the ReLogit model. Regression (1) is a robustness check of the main results. All signs are preserved and the results become more significant, further confirming the validity of the *Hypotheses I through III*. In the ReLogit results, import eligibility also becomes positive and significant in some specifications. Regression (2) contains state-specific control variables that were omitted in the results using the LPM. Among the variables, 'full owner' is positive and statistically significant – higher percentage of farms operated by full owners rather than part owners or tenant farmers significantly increases the likelihood of petition. This seems to make sense, because full owners, as opposed to part owners or tenant farmers are likely to have higher motivations to obtain the TAA cash payments and improve productivity from technical training sessions offered by the TAA program. Regarding the participation in the TAA program as a type of investment for the farm with returns in the form of cash benefits and technical training, previous studies that showed a positive relationship between land title or secure land tenure and incentives for investments (Smith, 2004; Graham and Darroch, 2001; Gebremedhin and Swinton, 2003; and Place and Otsuka, 2002) can be a rationale for this idea. Regressions (3) and (4) again compares the results before and after the ARRA, and the results are consistent with the results using the LPM. Regressions (5) and (6) compare the ReLogit results for field crops and fishery commodities, considering the distinctiveness of the two commodity groups. All the results from the main model are preserved in both regressions except for the results on the import criterion. The coefficient on the import criterion is positive and significant in case of field crops, whereas the impact is negative and significant for fisheries commodities. This is most likely due to the limitations of the data: Shrimp and catfish are the only fishery products included in the data, and import data for all commodities –both field crops and fisheries commodities—are in national-level rather than state-level.

[TABLE 6 about here.]

We further examine the results on approval once a petition is filed. The results are presented in TABLE 6. Specifications (1) through (4) differ according to fixed effects considered and explanatory variables included. Price eligibility is insignificant, suggesting that the price data actually used in the investigation process might not be the same as the price data publicly available at the USDA website. Import eligibility is positive and significant, as expected. It is also interesting to examine that the percent increase in government payment in other farm programs has negative and significant impacts on likelihood of approval. Previously approved cases have a negative and significant impact on approval, confirming that the burden of proving the eligibility is higher in the cases of re-approval.

7. Conclusion

This paper examines farmers' incentives to participate in the TAA program for farmers. Higher expected likelihood of approval proxied by meeting the eligibility criteria increases farmers' participation in the program. Therefore, strict eligibility criteria before the ARRA could be an answer to low participation in the program, confirming previous studies. Also, incentives to make up for losses in direct government payments from other farm programs in the past seem to play a significant role in farmers' participation in the TAA program, more so before the ARRA. This result suggests that government farm policy or payment programs should not be considered separately, given the substitutability of the different farm programs as sources of farmers' net revenues. Lastly, incentives associated with reduced time and efforts proxied by previous cases of approval also seem to motivate farmers' participation.

This paper also examines the implications of the revision in the program rules in the ARRA of 2009. Easing the eligibility criteria was successful in encouraging more farmers to participate in the program. Also, due to the change in the method of cash payment from coupled to decoupled form, the TAA program after the ARRA serves more as a means to better prepare for import surges by obtaining technical training and developing business plans rather than a way to mitigate negative price risk.

Limitations mostly come from the data. First, the USDA accepted TAA petitions only in 2010 after the ARRA, meaning that there is only one year of observations available after the ARRA. Second, only two fishery commodities – catfish and shrimp – were included in the data due to the limited availability of price and import data. Lastly, the paper focused on farmers' motivation to obtain cash payments and did not closely examine the motivations for technical training or development of business plans, which is a focus of the program after the ARRA.

The findings in this paper allow us to better understand the reasons behind the low program activities before the ARRA and subsequent policy changes. If incentives are what drive farmers to participate, policy makers could take into account the factors that incentivize farmers in order to design a future TAA program in a more effective way. These issues are particularly relevant and timely given the uncertainty of the future TAA program under the current Administration. The findings in this paper could also shed light on program participation studies in other areas of agricultural policy.

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9. Tables and Figures

FIGURE 1. TAA Program Creates an Effective Lower Bound of the Producer Price

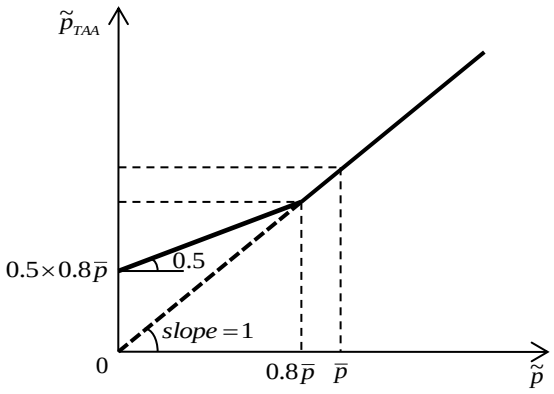

FIGURE 2. Decision-Making Tree of the TAA Program

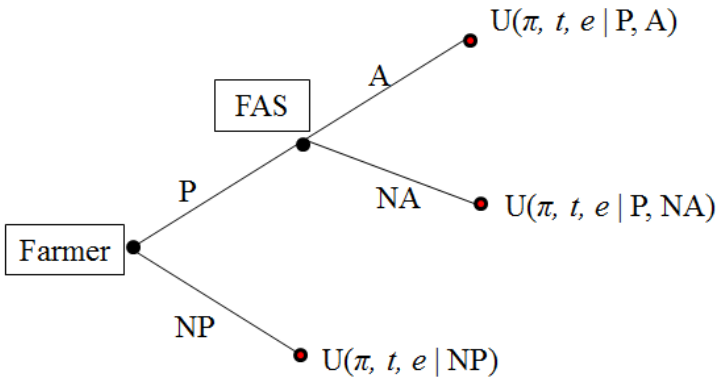

TABLE 1. Descriptive Statistics: Petition and Eligibility Variables

		2003	2004	2005	2006	2007	2010	Sum
Petitions		26	64	24	17	15	81	227
New Petitions		26	40	9	3	10	28	116
Approvals		25	7	17	2	0	64	115
Eligible	Price	699	544	547	428	360	608 [a]	2,976
	Import I [b]	1,600	1,209	1,426	1,576	1,543	842	8,196
	Import II [c]	1,522	1,448	1,673	1,585	1,701	751	8,680
Observations		2,549	2,549	2,548	2,547	2,548	2,553	15,294

[a] The price eligibility criteria became more lenient after the ARRA, making more commodities eligible.
[b] Import eligibility based on quantity; [c] Import eligibility based on value

TABLE 2. . Descriptive Statistics: State Characteristics

	All States (Obs: 15,294)		Petitioned States (Obs: 227)	
	Mean	Std. Dev.	Mean	Std. Dev.
Net Farm Income [a]	2,357,990	2,844,190	3,458,021	3,953,976
Government Direct Payment [a]	383,013	407,651	359,738	339,717
Percent Change in Gov. Direct Payment	9.7	64.3	-0.05	47.9
Percent Change in Gov. Direct Payment, 1-year lag	9.95	66.3	4.49	36.2
Average Operator Age (Years)	55.9	1.5	56.4	1.3
Average Farm Size (Acres)	564.3	760.4	452.8	595.8
Completed Some College or Upper Degree [b]	44.9	8.6	45.9	9.4
Farms Owned by Individuals/Family/Sole Proprietorship [c]	86.8	4.2	86.3	4.5
Farms Owned by Non-Family Corporations [c]	0.55	0.37	0.59	0.36
Farms Owned by Full Owner [c]	70.12	8.12	71.88	6.38
Index of Total Factor Productivity	1.20	0.29	1.26	0.33

[a]: 1,000 real USD, base year 2009
[b]: Percentage of rural population
[c]: Percentage of total farms

TABLE 3. Main Results (LPM)

Dependent Variable: Petition (1 = Petition, 0 = No Petition)

EXPLANATORY VARIABLE	(1) All Years	(2) All Years	(3) All Years	(4) All Years	(5) All Years	(6) Before ARRA	(7) After ARRA
Price Eligibility	0.005		0.007**	0.006***	0.008	0.012***	-0.007
	(0.004)		(0.004)	(0.002)	(0.008)	(0.005)	(0.006)
Import Eligibility (Value)	0.004		0.005	0.005	0.004	-0.0001	0.017***
	(0.003)		(0.003)	(0.003)	(0.005)	(0.002)	(0.005)
% Increase in Gov. Pmt.		-0.003	-0.005*	-0.006**	-0.004*	-0.008***	0.031***
		(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.008)
% Increase in Gov. Pmt,		-0.005*	-0.006**	-0.006**	-0.004*	-0.007***	0.014*
1-year Lag		(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.008)
Previously Approved		0.143	0.146	0.413***	0.322***	-0.188*	0.568***
		(0.104)	(0.103)	(0.032)	(0.080)	(0.106)	(0.020)
Fishery Commodities				0.086***			0.254***
				(0.017)			(0.018)
Average Real Net Farm			6.08e-06***	6.43e-12***	5.21e-13	4.90e-06***	-5.88e-07
Income			(2.09e-06)	(1.00e-12)	(4.46e-13)	(2.09e-06)	(9.57e-07)
Year 2004	0.015***	0.014***	0.010**	0.006	0.012*	0.013***	
	(0.004)	(0.005)	(0.005)	(0.005)	(0.007)	(0.005)	
Year 2005	-0.001	-0.000	-0.001	-0.004	-0.002	0.005	
	(0.004)	(0.005)	(0.005)	(0.004)	(0.010)	(0.004)	
Year 2006	-0.003	-0.002	0.000	-0.004	-0.005	0.006	
	(0.004)	(0.006)	(0.006)	(0.005)	(0.011)	(0.005)	
Year 2007	-0.004	-0.009***	-0.01***	-0.02***	-0.012	-0.005**	
	(0.003)	(0.003)	(0.003)	(0.003)	(0.011)	(0.002)	
Year 2010	0.023***	0.018***	0.019***	0.011***	0.014**		
	(0.004)	(0.004)	(0.004)	(0.003)	(0.007)		
Constant	0.006*	0.010***	-0.007	-0.010**	0.005	-0.002	0.004
	(0.004)	(0.002)	(0.007)	(0.005)	(0.004)	(0.006)	(0.004)
Observations	15,294	15,294	15,294	15,294	15,294	12,741	2,553
Number of Groups	2,128	2,128	2,128	50	204	2,128	-
State Fixed Effects	Yes	Yes	Yes	Yes	No	Yes	No
Commodity Fixed Effects	Yes	Yes	Yes	No	Yes	Yes	No
R^2	0.011	0.021	0.1214	0.2270	0.2167	0.032	0.523

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.10

TABLE 4. Robustness Checks (LPM)

Dependent Variable: Petition (1 = Petition, 0 = No Petition)

EXPLANATORY VARIABLE	Eligible Commodities Only			Alternative Definitions	
	(1) Price Eligible	(2) Import Eligible	(3) All Eligible	(4) Import Quantity	(5) Real Gov. Pmt.
Price Eligibility		0.008*		0.007*	0.007**
		(0.004)		(0.004)	(0.004)
Import Eligibility (Value) [a]	0.009			-0.002	0.005
	(0.010)			(0.003)	(0.003)
Percentage Increase in Gov. Pmt. [b]	-0.012*	-0.005	-0.010*	-0.005*	-0.005*
	(0.007)	(0.003)	(0.005)	(0.003)	(0.003)
Percentage Increase in Gov. Pmt, 1-year Lag [b]	-0.011	-0.006*	-0.012*	-0.006**	-0.006**
	(0.008)	(0.003)	(0.007)	(0.003)	(0.003)
Previously Approved	0.127	0.218**	0.694***	0.146	0.146
	(0.153)	(0.111)	(0.132)	(0.104)	(0.103)
Average Real Net Farm Income	0.000012*	0.00002***	0.000022	5.93e-12***	6.07e-12***
	(6.98e-06)	(0.000014)	(0.000014)	(2.07e-12)	(2.09e-12)
Year 2004	0.013	0.016***	0.015	0.009*	0.010**
	(0.012)	(0.006)	(0.015)	(0.005)	(0.005)
Year 2005	0.023*	0.007	0.021**	-0.001	-0.002
	(0.013)	(0.006)	(0.011)	(0.005)	(0.005)
Year 2006	0.013	0.015**	0.036*	0.001	0.000
	(0.021)	(0.007)	(0.020)	(0.006)	(0.006)
Year 2007	-0.006	-0.005*	0.001	-0.010***	-0.010***
	(0.006)	(0.003)	(0.006)	(0.003)	(0.003)
Year 2010	0.028**	0.022***	0.037**	0.017***	0.019***
	(0.013)	(0.008)	(0.018)	(0.004)	(0.004)
Constant	-0.024	-0.023**	-0.070	-0.003	-0.007
	(0.030)	(0.011)	(0.048)	(0.006)	(0.007)
Observations	3,186	8,680	1,851	15,294	15,294
Number of Groups	1,006	2,082	551	2,128	2,128
State Fixed Effects	Yes	Yes	Yes	Yes	Yes
Commodity Fixed Effects	Yes	Yes	Yes	Yes	Yes
R-squared	0.025	0.030	0.182	0.023	0.023

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10

[a]: In column (4), import quantity instead of import value is used.

[b]: In column (5), real value (base year 2009) instead of nominal value is used.

TABLE 5. ReLogit Results

Dependent Variable: Petition (1 = Petition, 0 = No Petition)

EXPLANATORY VARIABLE	(1) ALL	(2) ALL	(3) BEFORE ARRA	(4) AFTER ARRA	(5) FIELD CROPS	(6) FISHERY COMMO-DITIES
Price Eligibility	0.853***	0.804***	1.344***	-1.244**	0.491**	1.497***
	(0.167)	(0.167)	(0.194)	(0.558)	(0.203)	(0.343)
Import Eligibility (Value)	0.351*	0.318	-0.020	1.332***	0.488**	-0.855*
	(0.197)	(0.196)	(0.203)	(0.431)	(0.233)	(0.483)
Percentage Increase in	-0.456**	-0.437*	-1.498***	1.904***	-0.273	-0.644***
Gov. Payment	(0.229)	(0.226)	(0.494)	(0.395)	(0.318)	(0.210)
Percentage Increase in	-0.604**	-0.636***	-0.750**	1.043***	-0.565*	-0.878***
Gov. Payment, 1-year Lag	(0.236)	(0.239)	(0.304)	(0.379)	(0.338)	(0.256)
Full Owner		0.027**				
		(0.010)				
Farm Size		-0.000				
		(0.000)				
Some College or Upper		0.015				
Education		(0.019)				
Age		-0.076				
		(0.083)				
Previously Approved	3.956***	3.864***	3.813***	3.898***	4.483***	3.245***
	(0.285)	(0.286)	(0.368)	(0.380)	(0.330)	(0.338)
Fishery Commodities	2.101***	2.218***	1.811***	4.197***		
	(0.260)	(0.258)	(0.301)	(0.555)		
Average Real	0.00012***	0.00009***	0.00012***	0.000135*	0.00012***	0.000094*
Net Farm Income	(0.000023)	(0.000032)	(0.000023)	(0.000071)	(0.000025)	(0.000051)
Year 04	0.609**	0.654**	0.214		2.099***	
	(0.295)	(0.294)	(0.403)		(0.654)	
Year 05	-0.513	-0.520	0.114		1.324**	
	(0.383)	(0.382)	(0.359)		(0.575)	
Year 06	-0.944**	-0.906*	-1.162**		1.386*	
	(0.481)	(0.475)	(0.575)		(0.753)	
Year 07	-1.770***	-1.701***	-1.951***		0.554	
	(0.440)	(0.475)	(0.486)		(0.616)	
Year 10	0.609**	0.638*			1.901***	
	(0.278)	(0.334)			(0.645)	
Constant	-5.659***	-3.574	-5.452***	-5.620***	-7.150***	-3.375***
	(0.282)	(4.370)	(0.315)	(0.481)	(0.630)	(0.324)
Observations	15,294	15,294	12,741	2,553	14,790	504

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.10

TABLE 6. Results on Approval (LPM)

Dependent Variable: Approval (1 = Approved, 0 = Not Approved)

EXPLANATORY VARIABLE	(1)	(2)	(3)	(4)
Price Eligibility	-0.015	-0.009	0.110	-0.054
	(0.043)	(0.043)	(0.087)	(0.070)
Import Eligibility (Value)	0.309**	0.310**	0.358***	0.386*
	(0.121)	(0.120)	(0.087)	(0.193)
Percentage Increase in Gov.	-0.138	-0.228***	-0.229**	-0.149*
Payment	(0.113)	(0.079)	(0.106)	(0.079)
Percentage Increase in Gov.	0.080	0.048	0.031	-0.025
Payment, 1-year Lag	(0.076)	(0.071)	(0.095)	(0.081)
Full Owner		-0.048		
		(0.033)		
Farm Size		-0.000		
		(0.001)		
Some College or Upper		0.044		
Education		(0.054)		
Age		0.373***		
		(0.114)		
Previously Approved	-0.480***	-0.486***	0.040	-0.167
	(0.178)	(0.172)	(0.141)	(0.204)
Fishery Commodities			0.486**	
			(0.181)	
Average Real	-0.0000375	-0.000045	0.000067	-7.05e-06
Net Farm Income	(0.000038)	(0.000039)	(0.000049)	(5.44e-06)
Year 04	-0.592***	-0.601***	-0.969***	-0.900***
	(0.193)	(0.184)	(0.181)	(0.203)
Year 05	0.118	0.187	-0.026	-0.281
	(0.292)	(0.285)	(0.246)	(0.309)
Year 06	-0.510	-0.512	-0.759**	-1.010**
	(0.464)	(0.474)	(0.321)	(0.469)
Year 07	-0.364	-1.054**	-0.610***	-0.943***
	(0.451)	(0.503)	(0.200)	(0.328)
Year 10	0.451**	-0.284	-0.106	0.086
	(0.192)	(0.418)	(0.157)	(0.210)
Constant	0.796***	-17.719***	0.261	0.878***
	(0.206)	(6.012)	(0.204)	(0.100)
Observations	227	227	227	227
Number of Groups	110	110	43	24
State Fixed Effects	Yes	Yes	Yes	No
Commodity Fixed Effects	Yes	Yes	No	Yes
R^2	0.827	0.844	0.640	0.703

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.10

10. Appendices

APPENDIX I: TAA PROGRAM FOR FARMERS BEFORE AND AFTER THE ARRA

	Before ARRA	**After ARRA**	
	Reform Act of 2002	**ARRA of 2009**	**TAAEA of 2011**
Coverage	Agricultural commodity in its raw or natural state.	Any class of goods within an agricultural commodity and wild-caught aquatic species.	
Group Eligibility Requirements	(i) The national average price for the most recent marketing year is less than 80% of the average price for the 5 preceding marketing years, and (ii) increases in imports like or directly competitive commodity, produced by the group contributed importantly to the decline in price.	(i) The national average price, or the quantity, or the value of production of, or the cash receipts for the agricultural commodity for the most recent marketing year is less than 85% of the average of the 3 preceding marketing years, and (ii) the volume of imports of like or directly competitive products in the marketing year increased when compared to those of the 3 preceding marketing years; and (iii) the increase in imports contributed importantly to the decrease in those quantities	
Requirements for the benefits	(i) The producer produced the commodity in the most recent year; (ii) The producer's net farm income for the most recent year is less than that for the latest year in which no adjustment assistance was received; and (ii) The producer has met with an Extension Service agent for technical assistance.	(i) The producer produced the commodity in the marketing year when the petition is filed and in at least 1 of the 3 preceding marketing years; (ii) The quantity produced by the producer in the marketing year has decreased; or the price received for the commodity has decreased compared to the average price for the 3 preceding marketing years; and (iii) No cash benefit was received under other TAA programs (i.e., the TAA for Workers and TAA for Firms programs), nor were benefits received based on producing another commodity eligible for TAA for Farmers.	
Income limit for benefits	An applicant shall not be eligible to receive any cash benefit if the average adjusted gross non-farm income of the person or legal entity exceeds $500,000, or if the average adjusted gross farm income exceeds $750,000.		
Benefits	(i) Cash adjustment assistance: [{0.5 X (80% of the average price for the 5 preceding marketing years - The price for the most recent marketing year)} X The amount sold by the producer in the most recent marketing year] (ii) To receive the cash, the producer should get the technical training. (iii) The cash payment is up to a maximum of $10,000.	(i) Initial and intensive technical assistance (ii) Up to $4,000 to implement an initial business plan (iii) Up to $4,000 to develop a long-term business adjustment plan (if not received any funding for initial business plan). If USDA approves the plan, up to $8,000 to implement the long-term plan	
Applicable period	FY2003 through FY2007 (Oct. 1, 2002 – Sep. 30, 2007)	FY2009, FY2010, and the first quarter of FY2011	FY2012, FY2013, and the first quarter of FY2014
Annual maximum funding level	(i) $90 million per year available for FY2003 through FY2007 by the Trade Act of 2002. (ii) $9 million available for the first quarter of FY2008 (through Dec. 31, 2007), by Section 1(c) of P.L.110-89. (iii) No funding authorized for the remainder of FY2008.	(i) $90 million per year available for FY 2009 and FY2010. (ii) $22.5 million available for the first quarter of FY2011 (Oct. 1 -- Dec. 31 2010)	(i) Funding not to exceed $90 million per year for FY 2012 and FY2013. (ii) Funding not to exceed $22.5 million for the first quarter of FY2014 (Oct. 1 -- Dec. 31 2014) *The TAAEA approved, but did not appropriate the funds to support this authority.*

APPENDIX II: VARIABLE DESCRIPTIONS

Variable	Description
Dependent Variable	
Petition	1 = A petition is filed for a commodity j produced by state i in year t. 0 = Petition is not filed.
Incentives	
Price Eligibility	1 = A commodity j produced in state i satisfies price eligibility in year t. 0 = Price eligibility is not satisfied.
Import Eligibility (Values)	1 = A commodity j produced in state i satisfies import eligibility in year t. 0 = Import eligibility is not satisfied. Based on import data in 1,000 USD, with 2009 base year.
Import Eligibility (Quantity)	1 = A commodity j produced in state i satisfies import eligibility in year t. 0 = Import eligibility is not satisfied. Based on import quantity data.
Percentage Increase in Gov. Payment	Percentage increase in government payment in state i from year t-2 to year t-1. Based on 2009 real USD.
Percentage Increase in Gov. Payment, one-year lag	Percentage increase in government payment in state i from year t-3 to year t-2. Based on 2009 real USD
Previously Approved	1 = Petition was approved for the same or a similar commodity in the past. 0 = There is no case that a petition was approved for the same or a similar commodity in the past.
Farm Characteristics and Other Control Variables	
Average Real Net Farm Income	Average real net farm income of state i in year t. Based on real USD, with 2009 base year.
Fishery Commodities	1 = Fishery commodity. 0 = Non-fishery commodity.
Full Owner	Tenure of farmers. Percentage of full owner farms (rather than part owner and tenant farms) in state i. Data for years 2002 and 2007.
Farm Size	Average farms size of state i (acres). Data for years 2002 and 2007.
Age	Average age of farm operators in state i (years). Data for years 2002 and 2007.
Some College or Upper Education	Percentage of rural population in state i with some college or upper education. Data for years 2002 and 2007.

APPENDIX III: CERTIFIED/RE-CERTIFIED TAA PETITIONS

Year	Commodity	State*	Certified/ Re-certified	Petition Date (MM/DD/YY)	Decision Date (MM/DD/YY)
2003 (7)	Wild Blueberries	ME	Certified	09/15/03	11/06/03
	Salmon	AK	Certified	09/15/03	11/06/03
	Salmon	WA	Certified	09/15/03	11/06/03
	Shrimp	SC	Certified	09/30/03	11/19/03
	Shrimp	GA	Certified	10/21/03	11/19/03
	Shrimp	TX	Certified	10/21/03	11/19/03
	Catfish	Multistate (AL, AR, FL, GA, ID, IL, KA, KY, LA, MS, MO, NV, NC, OH, OK, SC, TX, UT)	Certified	10/08/03	11/25/03
2004 (11)	Shrimp	AL	Certified	12/04/03	01/12/04
	Lychees	FL	Certified	02/23/04	04/04/04
	Shrimp	NC	Certified	02/23/04	04/04/04
	Shrimp	FL	Certified	02/23/04	04/05/04
	Shrimp	AZ	Certified	02/13/04	04/05/04
	Salmon	WA	Re-certified	09/15/03	11/01/04
	Salmon	AK	Re-certified	09/15/03	11/10/04
	Shrimp	SC	Re-certified	09/30/03	11/18/04
	Shrimp	GA	Re-certified	10/21/03	11/24/04
	Shrimp	NC	Re-certified	02/23/04	11/30/04
	Shrimp	TX	Re-certified	10/21/03	11/30/04
2005 (9)	Shrimp	AL	Re-certified	12/04/03	01/10/05
	Shrimp	LA	Certified	11/18/04	01/10/05
	Olives	CA	Certified	01/21/05	03/14/05
	Shrimp	MS	Certified	02/01/05	03/14/05
	Fresh Potatoes	ID	Certified	02/11/05	03/28/05
	Concord Grape Juice	PA, NY, OH	Certified	02/25/05	03/28/05
	Shrimp	AZ	Re-certified	02/13/04	04/04/05
	Lychees	FL	Re-certified	02/23/04	04/04/05
	Avocados	FL	Certified	11/16/05	12/29/05
2006 (3)	Snapdragons	ID	Certified	12/28/05	02/10/06
	Concord Grape Juice	MI	Certified	02/21/06	03/15/06
	Concord Grape Juice	WA	Certified	02/21/06	03/15/06
2010 (10)	Asparagus	CA, MI, WA	Certified	04/27/10	06/25/10
	Catfish	Nationwide	Certified	04/27/10	06/25/10
	Shrimp	AL, FL, GA, LA, MS, NC, SC, TX	Certified	04/28/10	06/25/10
	Shrimp	AL, AK, FL, GA, LA, MS, NC, SC, and TX	Certified	07/14/10	09/24/10
	Lobster	CT	Certified	07/14/10	09/24/10
	Lobster	ME	Certified	07/14/10	09/24/10
	Lobster	MA	Certified	07/14/10	09/24/10
	Lobster	NH	Certified	07/14/10	09/24/10
	Lobster	Rhode Island	Certified	08/03/10	09/24/10
	Blueberries	ME	Certified	08/03/10	10/05/10

*: AL: Alabama; AK: Alaska; AR: Arkansas; AZ: Arizona; CA: California; CO: Colorado; CT: Connecticut; FL: Florida; GA: Georgia; ID: Idaho; IL: Illinois; IN: Indiana; KA: Kansas; KY: Kentucky; LA: Louisiana; ME: Maine; MD: Maryland; MA: Massachusetts; MI: Michigan; MS: Mississippi; MT: Montana; NV: Nevada; NH: New Hampshire; NJ: New Jersey; NY: New York; NC: North Carolina; OH: Ohio; OK: Oklahoma; PA: Pennsylvania; PR: Puerto Rico; RI: Rhode Island; SC: South Carolina; TN: Tennessee; TX: Texas; UT: Utah; VA: Virginia; WA: Washington; WV: West Virginia; WY: Wyoming

APPENDIX IV: DENIED/TERMINATED TAA PETITIONS

Year	Commodity	State*	Denied/ Terminated	Petition Date (MM/DD/YY)	Decision Date (MM/DD/YY)
2003 (2)	Salmon	OR	Denied	09/15/03	10/28/03
	Fresh Garlic	CA	Denied	10/28/03	12/08/03
2004 (13)	Olives	CA	Denied	12/03/03	01/08/04
	Shrimp	FL	Denied	11/18/03	01/12/04
	Rice	National	Denied	12/04/03	01/13/04
	Crawfish	LA	Denied	12/04/03	01/15/04
	Shrimp	MS	Denied	12/04/03	01/15/04
	Navel Oranges	CA	Denied	02/02/04	03/15/04
	Catfish	MI	Denied	02/13/04	03/19/04
	Fresh Longan	FL	Denied	02/23/04	04/04/04
	Alfafa seed	Multistate (CA, CO, ID, MT, NV, OR, WA, WY)	Denied	02/23/04	04/05/04
	York apples	VA	Denied	02/23/04	04/05/04
	Shrimps	KY	Denied	02/23/04	04/20/04
	Wild Blueberries	ME	Terminated	09/15/03	10/08/04
	Catfish	Multistate (AL, AR, FL, GA, ID, IL, KS, KY, LA, MS, MO, NV, NC, OH, OK, SC, TX, UT)	Terminated	10/08/03	11/24/04
2005 (14)	Seed Potatoes	WA	Denied	01/13/05	03/04/05
	Cabbages	NY	Denied	02/11/05	03/21/05
	Shrimp	FL	Terminated	02/23/04	04/18/05
	Avocados	FL	Denied	03/08/05	04/28/05
	Salmon	AK	Terminated	09/15/03	10/18/05
	Salmon	WA	Terminated	09/15/03	10/18/05
	Shrimp	MS	Terminated	02/01/05	11/05/05
	Shrimp	SC	Terminated	09/30/03	11/08/05
	Shrimp	GA	Terminated	10/21/03	11/08/05
	Shrimp	TX	Terminated	10/21/03	11/08/05
	Shrimp	AL	Terminated	12/04/03	11/08/05
	Shrimp	AZ	Terminated	02/13/04	11/08/05
	Shrimp	NC	Terminated	02/23/04	11/08/05
	Shrimp	LA	Terminated	11/18/04	11/08/05
2006 (7)	Fresh Potatoes	ID	Terminated	02/11/05	03/23/06
	Concord Grape Juice	PA, NY, OH	Terminated	02/25/05	03/23/06
	Olives	CA	Terminated	01/21/05	03/24/06
	Fresh Potatoes	WA	Denied	03/06/06	03/29/06
	Lychees	FL	Terminated	02/23/04	04/12/06
	Avocados	FL	Terminated	11/16/05	12/12/06

*: AL: Alabama; AK: Alaska; AR: Arkansas; AZ: Arizona; CA: California; CO: Colorado; CT: Connecticut; FL: Florida; GA: Georgia; ID: Idaho; IL: Illinois; IN: Indiana; KA: Kansas; KY: Kentucky; LA: Louisiana; ME: Maine; MA: Massachusetts; MI: Michigan; MS: Mississippi; MT: Montana; NV: Nevada; NH: New Hampshire; NY: New York; NC: North Carolina; OH: Ohio; OK: Oklahoma; PA: Pennsylvania; SC: South Carolina; TN: Tennessee; TX: Texas; UT: Utah; VA: Virginia; WA: Washington; WV: West Virginia; WY: Wyoming

APPENDIX IV: DENIED/TERMINATED PETITIONS (CONTINUTED)

Year	Commodity	State*	Denied/ Terminated	Petition Date (MM/DD/YY)	Decision Date (MM/DD/YY)
2007 (7)	Snapdragons	IN	Terminated	12/28/05	02/01/07
	Concord Grape Juice	WA	Terminated	02/21/06	02/01/07
	Concord Grape Juice	MI	Terminated	02/21/06	02/01/07
	Concord Grape Juice	PA. NY, OH	Denied	02/16/07	03/22/07
	Burley Tobacco	KY. TN, VA, NC, WV, ID, OH, MS	Denied	02/16/07	03/22/07
	Honey	MI	Denied	02/16/07	03/22/07
	Avocados	CA	Denied	02/15/07	04/06/07
2010 (15)	Concord Grape Juice	WA	Terminated	02/21/06	02/01/07
	Concord Grape Juice	MI	Terminated	02/21/06	02/01/07
	Concord Grape Juice	PA. NY, OH	Denied	02/16/07	03/22/07
	Burley Tobacco	KY. TN, VA, NC, WV, ID, OH, MS	Denied	02/16/07	03/22/07
	Honey	MI	Denied	02/16/07	03/22/07
	Avocados	CA	Denied	02/15/07	04/06/07
	Coffee	PR	Denied	07/14/10	09/20/10
	Wool	ID, UT, WY	Denied	07/14/10	09/20/10
	Wool	MT	Denied	07/14/10	-
	Lamb	OH	Denied	07/23/10	09/20/10
	Lamb	ID, UT, WY	Denied	07/23/10	09/20/10
	Apples	ME	Denied	07/30/10	09/20/10
	Multi-species Fish	CT, ME, MD, MA, NH, NJ, NY, RI	Denied	08/03/10	10/06/10
	Tilapia	AR	Denied	08/03/10	10/05/10
	Blueberries	NH	Denied	08/13/10	10/05/10

*: AL: Alabama; AK: Alaska; AR: Arkansas; AZ: Arizona; CA: California; CO: Colorado; CT: Connecticut; FL: Florida; GA: Georgia; ID: Idaho; IL: Illinois; IN: Indiana; KA: Kansas; KY: Kentucky; LA: Louisiana; ME: Maine; MD: Maryland; MA: Massachusetts; MI: Michigan; MS: Mississippi; MT: Montana; NV: Nevada; NH: New Hampshire; NJ: New Jersey; NY: New York; NC: North Carolina; OH: Ohio; OK: Oklahoma; PA: Pennsylvania; PR: Puerto Rico; RI: Rhode Island; SC: South Carolina; TN: Tennessee; TX: Texas; UT: Utah; VA: Virginia; WA: Washington; WV: West Virginia; WY: Wyoming