Science, Opportunity, Traceability, Persistence, and Political Will: Necessary Elements of Opening the U.S. Market to Avocados from Mexico

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1 Introduction

Technical barriers are often significant obstacles to market access for agricultural exporters. One approach to easing such technical trade restrictions is to shift from most restrictive instruments such as complete bans to less restrictive instruments of pest control. The key to such an alternative is often a systems approach to risk management, whereby a set of procedures are specified that reduce the pest-risk externality associated with trade of a commodity. The system measures add to exporter production costs but enable market access to occur. Adoption of systems approaches rest on a firm foundation in Article 5.6 of the WTO SPS Agreement which states that Members shall ensure that their measures "are not more trade-restrictive than required to achieve their appropriate level of sanitary or phytosanitary protection" (WTO 1994; Josling et al. 2005).

Since 1997, a long and contentious dispute between Mexico and the United States over U.S. restrictions on importation of Hass avocados has been partially resolved by replacing an import ban with trade under a system of risk mitigation measures. This case illustrates that progress can be made in easing technical trade restrictions - at least when the risk issues can be sharply delineated and addressed and governments are firmly committed to the negotiations. Easing of the longstanding import ban on Mexican avocados is trade-facilitating progress that has opened the U.S. market to Mexican producers in successive steps.

2 Background

2.1 The Avocado Quarantine

The ban on imports of Mexican avocados was promulgated in 1914 when there were no known controls (chemical or natural predators) for certain host-specific avocado pests prevalent in Mexico but not present in the United States. Subsequent development of modern pesticides and cultural practices has allowed the Mexican state of Michoacan to establish an industry of approved export-oriented avocado orchards. These orchards have successfully met the pest control standards of countries such as Canada and Japan, where avocados are not grown but there are potential concerns about transmission of fruit fly infestations. Mexican quarantine authorities have argued that the Michoacan avocado export protocols also provide adequate protection against pest risks of U.S. concern: that the region has low incidence of pests of quarantine significance, that the Hass avocado is not a host, or at least not a preferred host, for fruit flies, and that a systems approach to handling fruit for export has proven effective in eliminating risks of pest infestations being carried abroad. Mexico has contended that the U.S. ban cannot be justified on a risk basis, but was maintained to protect the U.S. industry economically. The U.S. avocado industry, concentrated in southern California, bitterly opposed opening the U.S. domestic market to Mexican avocados. The industry acknowledged that it receives prices well above those of Mexican exports, but asserted that it fears pest infestations associated with trade not competition in the marketplace. Domestic U.S. producers challenged Mexican assessments of pest risks and the effectiveness of the systems approach to risk management.

Caught in the middle of this controversy has been the U.S. Department of Agriculture. Twice during the 1970s USDA took preliminary steps to ease the avocado import ban, but in both cases the decision was aborted.[1] The issue lay unresolved through the 1980s, until NAFTA negotiations started in 1991 provided an opportunity for Mexico to raise its concerns again. Avocados dominated the agenda of many meetings of a joint Phytosanitary Working Group, where scientists from USDA's Animal and Plant Health Inspection Service (APHIS) and Mexico's Direccion General de Sanidad Vegetal (DIGSV) sparred over data requirements, research design, and interpretation of research results concerning possible lifting of the import ban. The technical debates centered on assessment of pest popula-

[1] Roberts and Orden (1996) provide a detailed analytic chronology of the avocado dispute.

tions, the host status of Hass avocados for fruit flies, and the adequacy of various proposed pest-risk mitigation strategies.

It took four years of bi-lateral procedural negotiations, data collection and analysis before USDA agreed to consider a Mexican plan for easing the avocado quarantine under a systems approach to pest risk mitigation. With some further safeguards, a proposed rule was published by USDA in July 1995 to allow imports of Mexican avocados grown and processed under specified conditions (USDA 1995). The proposed systems approach required annual surveys to determine pest incidence and pre-harvest, harvest, transport, packing, and shipping measures designed to reduce pest risks.[2] The distribution of imports was to be further limited to the northeastern United States, to avoid geographic proximity with regions susceptible to pest risks, and to four winter months when the risk of establishment of pests was mitigated by adverse weather.[3] Traceability was required, with identification required so that any infested fruit detected through inspections could be tracked back to the orchard from which it originated. USDA concluded that its proposed approach would provide an adequate level of security to domestic growers. Overall, USDA reported that with the proposed systems approach in place a seed pest or fruit fly outbreak was estimated to occur on average less than once every 1,000,000 years and a stem weevil outbreak might occur on average once every 11,402 years.

2.2 Domestic Opposition to Change

With the geographic and seasonal restrictions in USDA's proposed rule, partial easing of the ban opened less than 5% of the annual U.S. market to Mexican avocados. Even this partial access was fought aggressively by the domestic industry. The opposition was coordinated by the California Avocado Commission (CAC), which had closely monitored the deliberations from the outset of the NAFTA negotiations. The industry made the argument that the avocado quarantine should not be sacrificed to the political imperative of achieving a trade agreement. This was an aggressive strategy by the industry that turned on its head the conventional perception that regulatory processes are often under excessive pressure not from

[2] Pest of concern were identified as avocado-specific (three seed weevils, one stem weevil and one seed moth) and non-specific (three fruit flies).

[3] The region referred to as the northeastern United States or northeast in this paper includes two regions often separated in avocado shipment data: the northeast and east central regions. Mexican avocados were allowed into Alaska starting in 1993.

foreign but from domestic interest groups. Numerous declarations were made by the U.S. growers to the effect that "science might be traded off in a rush to sign a trade deal."[4]

The CAC argument was that imports of Mexican avocados under the proposed systems approach posed an unacceptable risk of pest infestation to domestic groves. The industry asserted that the surveys of pest incidence had failed to establish low population levels in the Michoacan growing area, that the proposed monitoring protocols were inadequate, and that Hass avocados were a better host of fruit flies than Mexico acknowledged. Technical criticism of the pest surveys were detailed, including, for example, objections to incorrect trap placement, weak trapping bait, insufficient climatological records, and inadequate trapping densities.[5] Any infestations of domestic groves that resulted from impor-tation of Mexican avocados would be costly to contain due to U.S. pesticide regulations and the close proximity of the domestic groves to residential neighborhoods. Thus, the CAC recommended that Mexico should be allowed to export avocados only under stringent conditions: that it could establish pest-free zones, that the imported avocados were treated with a pesticide which assured at a very high probability level that exotic pests were eliminated, or that additional scientific research unequivocally established that Hass avocados were not hosts of pests which are injurious to avocados and other fruits and vegetables grown in the United States.[6]

The conditions specified by the CAC for amendment of the avocado quarantine could effectively have precluded importation of Hass avocados from Mexico. The first condition, establishing and maintaining a pest free zone, required substantial eradication, monitoring, and quarantine enforcement costs well beyond the perimeters of commercial export groves in Mexico. Although it might eventually prove feasible technically, such an approach was regarded as uneconomical by Mexican officials who believed pest risks were already negligible. On the second condition, all parties agreed that no adequate post-harvest treatment was available. The third condition, strictly interpreted, also could not be met. The results of DIGSV's fruit fly host status research had indicated that fruit flies will attack Hass avocados shortly after they have been harvested. It was anticipated that additional research to rigorously establish the host status of Hass avocados would confirm that they are non-preferred hosts, but not the higher standard of "unequivocal non-host" that the CAC recommended.

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[4] "Free Trade with Mexico" Betsey Blanchard Chess, California Grower, 6/91, p19

[5] Statement by the California Avocado Commission, Docket No. 94-116-1, 1/3/95.

[6] Statement by the CAC for Docket No. 94-116-1, ANPR Concerning the Importation of Fresh Hass Avocado Fruit Grown in Michoacan, Mexico, 2/95, p 2

Industry opposition orchestrated by the CAC was effective in temporarily blocking change to the quarantine when USDA announced it would not make a decision on a final rule to allow avocado imports in time for the 1995-96 winter shipping season. The CAC kept up its pressure in 1996. It threatened legal action to block lifting of the ban and attempted to circumscribe USDA authority through an amendment to congressional appropriations legislation for APHIS. Full-page advertisements were placed in several national newspapers by the CAC. Against the backdrop of a hangman's noose or smoking gun, these ads claimed that "The USDA is about to sign the death warrant for a billion dollar American industry."[7] The CAC also filed a new petition with USDA in March 1996, asserting that pest surveys results for 1995-96 showed higher levels of host-specific and fruit fly infestations in Mexican orchards than had previously been reported and that there had been procedural irregularities in the rulemaking process that involved violation of federal conflict-of-interest law.[8] The CAC petition argued that the new pest survey results and procedure irregularities invalidated the rulemaking process and requested another public comment period before a final ruling was made to allow avocado imports from Mexico.

2.3 Initial Economic Assessment

USDA's regulatory procedures for SPS decisions require sequential analysis—first determination that there is essentially no risk associated with a proposed rule and second, on that basis, that economic impacts of the rule be assessed. Such a sequential approach to decision making places greater emphasis on risk assessment than on comprehensive cost-benefit analysis. When the mandate of regulatory authorities is stated in such strong terms for protecting the domestic economy from negative SPS externalities arising from trade, as it often is, then product bans and other severe quarantine measures emerge quite naturally as policy outcomes. A product ban is a high level of intervention to address an SPS externality, but a ban does eliminate the externality risk to the extent that legal trade is its proximate cause.

Even within the risk assessment dimension, there is plenty of room for dispute. First, issues arise about whether an externality threat exists in a given situation. Second, a ban may or may not be least trade distorting—

[7] For example, *The Washington Post*, 3/11/96, p. A16.

[8] "American Avocado Growers Uncover New Field Surveys on Mexican Avocado Pest Infestations," PR Newswire, 3/28/96.

perhaps there is another way to eliminate the externality risk, one that allows the product to be traded under some specified conditions. Either way, when the policy decision is perceived only in the risk assessment dimension, there is no impetus to ask whether the cost of the policy is warranted by the benefits, that is whether the level of intervention needed to achieve the risk-reduction objective is also desirable on economic criteria, such as maximizing the expected contribution of the affected markets to national welfare.

In the avocado case, the contestation over the proposed rule brought to light information about pest risks that provided the basis for a cost-benefit analysis taking uncertainty about pest infestation into account (Orden and Romano 1996; Orden et al. 2001). The issues that arise in evaluating the economic effects of either full or partial easing of the import ban are illustrated in Figures 1 and 2, assuming a fixed world price for the product and no tariffs or other trade barriers. The first figure shows the effects of free trade when a pest infestation may raise domestic costs. The domestic price P_{D1} falls to the world price P_W and consumer surplus increases (by C+D+E) whether or not an infestation occurs. Producer surplus falls by C+D (the trade effect) and additionally by G (the infestation effect) if pests raises production costs and lower yields with certainty, shifting domestic supply from S to S'. Consumers are always better off, producers are always worse off, and the net effect on welfare (E-G) can be positive or negative. On a probabilistic basis, the expected domestic supply function will lie between S and S', with its location depending on the assumed level of pest infestation risk.

The analysis is more complicated when only a limited quantity of imports is allowed, say due to some technical restriction. Ignoring regional considerations, the limited imports would lower the domestic price if there is no pest infestation, but to P_{D2} in Figure 2 not to the world price level. The effects on consumers, producers and net welfare are fractions of the outcomes with unrestricted free trade. Pest infestation reduces domestic supply and affects the domestic price in the opposite direction from imports. The equilibrium price can rise or fall. When the domestic price rises, as shown from P_{D1} to P_{D3} in Figure 2, consumers are worse off (by c+d). Producers' surplus rises (by c) with the higher prices but falls due to higher production costs (by f+i+k). Producers may be better or worse off than at the initial equilibrium (better if c>f+i+k). Producers may also be better or worse off than with trade but without a pest infestation (better if c+e>i+k). Whatever the outcome for producers, social welfare falls (by d+f+i+k) compared to its level at the initial equilibrium, or (by d+f+i+k+g) compared to its level with trade but without pest infestation.

If the net effect of trade and a pest infestation is for the equilibrium domestic price to fall (not shown in Figure 2), consumers are made better off and producers worse off than without trade or pest infestation. Consumers gain less, and producers may lose more or less than with trade but without pest infestation, and net welfare may rise or fall (compared to the initial equilibrium) depending on whether the net consumer gain from lower prices exceeds the infestation losses of producers.

In their empirical analysis, Orden and Romano and Orden et al. divided the domestic U.S. avocado market into two submarkets—the northeastern winter regional market and the national aggregate for all other regions and seasons. In the northeastern winter regional market, the domestic price was assumed to fall to the price level of exports from Mexico, substantially below the earlier domestic price. For the rest of the U.S., an equilibrium price was determined by domestic supply and aggregate demand with the northeastern winter regional market excluded.

The proposed partial easing of the avocado import ban had expected effects if no pest infestation occurred. In the northeastern region, the winter season price fell by 35% and consumption increased. The domestic price for the remaining aggregated U.S. market fell by 1.3%, as displacement effects from the northeastern winter market were absorbed by a combination of expanded consumption elsewhere and reduced domestic supply. A net national welfare gain of $2.5 million resulted (about 2% of initial total consumer plus producer surplus), mostly due to the lower price in the northeast. Consumer surplus increased by $2.2 million outside of the northeast, but producer surplus fell by a similar amount, so the net welfare gain was small outside of the northeastern winter market. In contrast, a full liberalization of trade (which was not under consideration by USDA at this time) was estimated to depress domestic avocado production by as much as 50% after full adjustment to lower prices, and to raise consumer surplus by nearly $90 million nationwide.

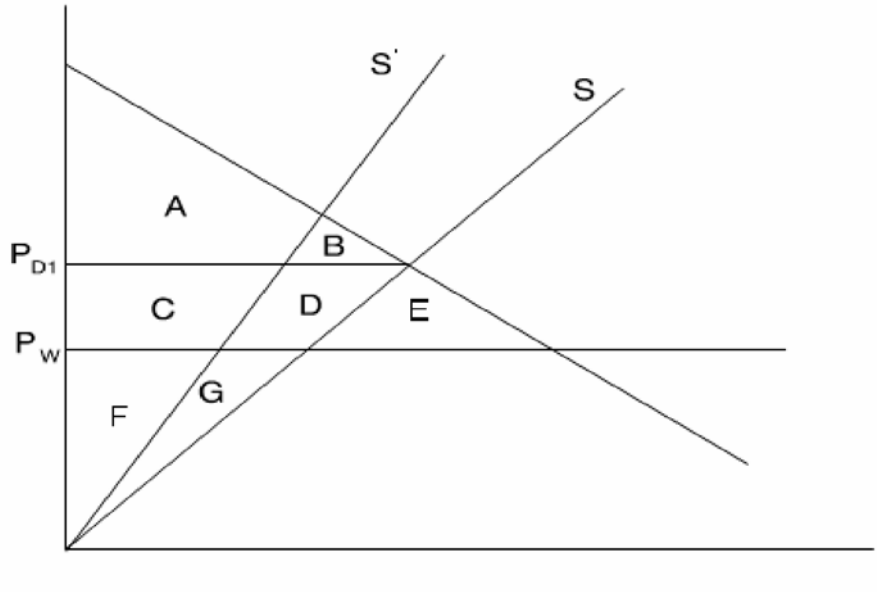

Fig. 1. Effects of free trade with pest infestations affecting supply

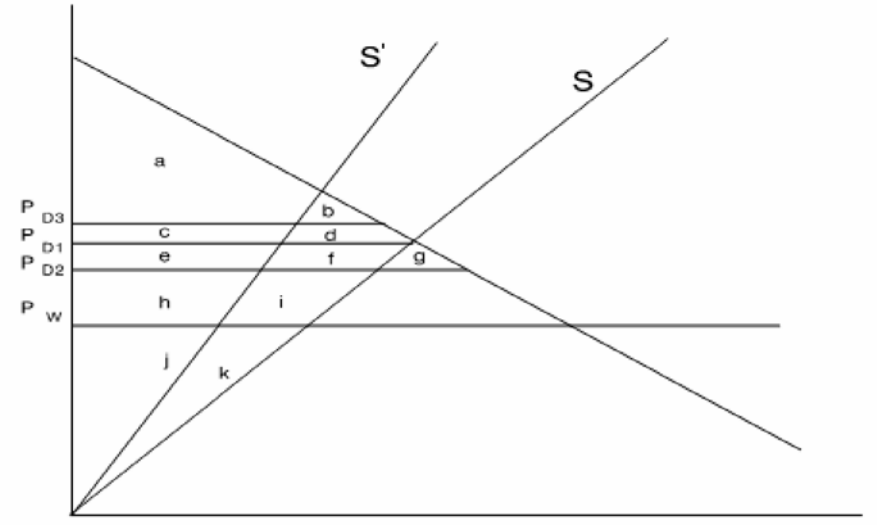

Fig. 2. Effects of limited trade with pest infestations affecting supply

These studies also considered the economic effects of the proposed rule if an avocado pest infestation occurred. A pest infestation increased marginal costs and lowered yields, reducing domestic supply. In the worst-case scenario, reduced availability of avocados under the partial easing of the import ban pushed up the equilibrium domestic price (excluding the northeastern winter regional market) by 30%. The domestic price increase partly offset the effects on producers of lower output and higher production costs but their net loss was $14.7 million, almost seven times as large as from partial easing of the ban alone. A larger economic effect of the pest infestation was felt by consumers outside of the northeastern winter market: their surplus fell by $43.5 million with the increased domestic price. Partial easing of the avocado quarantine would not be sound phytosanitary or economic policy under these circumstances. Yet on a probabilistic basis, it took a much higher likelihood of pest infestation than reported by USDA to turn expected net welfare effects negative. For full trade liberalization, even under the worst-case pest infestation, there was a positive benefit-cost relationship as consumer gains from lower prices more than offset the domestic producer losses.

3 Opening of the U.S. Market

3.1 Partial Easing of the Ban in 1997

Despite continued industry opposition, in February 1997 USDA issued a final rule permitting limited importation of avocados from Mexico under the systems approach. In rejecting the industry arguments about pest risk, USDA reasserted its positive assessment of the safety of the proposed approach and responded to numerous comments received during the public comment period of the rulemaking process. USDA also responded to the concerns raise in the March 1996 CAC petition and subsequent CAC communication about the pending decision. It found neither substantive nor procedural grounds for further delay of a decision to allow limited imports under the systems approach being adopted (USDA 1997). In its economic assessment, USDA evaluated effects of the rule based on diversion of from 10 to 50% of past Mexican exports during November-February to the U.S. market. A diversion of 50% resulted in imports near the level estimated by Orden and Romano. For this level of imports, USDA found similar price effects in the Northeast region and the rest of the country, but its estimates of producer surplus losses and consumer surplus gains were larger. Once the final rule was published, and imports

scheduled to be allowed for the first time starting in November 1997, the domestic avocado industry did not file suit to block the USDA decision.

Under the USDA ruling, Mexican avocados began to enter the U.S. market during the winter of 1997-98. After four shipping seasons, no pest infestations had been detected in the imported avocados, lending credibility to the systems approach. Shipments of California avocados to the northeast winter market were largely displaced by imports from Mexico - the California shipments fell to just 1.0 million pounds during 1999-2000 from an average of 7.7 million pounds during 1986-94, as shown in Table 1 (USDA 2001). Wholesale prices of avocados imported from Mexico averaged about 25% less than wholesale prices of domestic avocados during this period. This differential was consistent with the prediction of a regional price difference from the rest of the U.S. market once imports from Mexico became available in the northeast. Avocados from Mexico and California also appear to be imperfect substitutes in the northeast market, where a similar wholesale price differential persisted. Wholesale prices remained above import prices, which averaged about $0.72 per pound. This was consistent with historical import price-wholesale price differentials observed for avocados from Chile (USDA 1997).

Table 1. California avocado shipments (million pounds)

Region	1986-1994 Average			1999-2000 Season		
	Total	Nov-Feb	Nov-April	Total	Nov-Feb	Nov-April
Pacific	128.8	22.8	51.7	150.3	25.0	58.7
Southwest	60.0	14.7	26.7	59.5	11.3	24.9
West Central	12.5	2.8	5.1	15.2	2.9	6.1
East Central	17.6	4.1	7.5	23.1	0.7	5.7
Northeast	16.9	3.6	6.7	24.4	0.3	6.0
Southeast	9.2	2.2	4.0	23.5	4.8	9.7
Total	244.9	50.3	101.8	295.9	45.0	111.2

Source: United States Department of Agriculture, 2001.

With the limited opening of trade under the 1997 rule, imports after the first year averaged over 23 million pounds from over 500 separate shipments (21.5 million pounds in 560 shipments in 1998-99, 25.9 million pounds in 669 shipments in 1999-2000, and 22.5 million pounds in 576 shipments in 2000-01). The level of imports from Mexico were well above the displaced California shipments and nearly double the import demand of 13 million pounds in the Northeast winter market predicted by Orden and Romano at the lower prices expected once imports from Mexico were allowed.

The extent to which Mexican imports exceeded either displacements of California sales or predictions from the economic model suggest that one effect of easing of the quarantine has been expanded consumer demand due to better seasonal availability of avocados. To the extent that market expansion occurs, it provides benefits to consumers and Mexican producers at little cost to domestic producers. Prior to 1997, Chile was the major supplier of avocados during the September-December period, and from 1997 to 2001 Chile accounted for nearly five times as much of the total U.S. supply as Mexico. Avocados from Mexico competed with Chilean exports, but did not dampen total Chilean market sales. The value of avocado imports from Chile grew from $16 million in 1997-98 to $51 million in 1998-99, $35 million in 1999-2000, and $74 million in 2000-01. Simultaneous growth in imports from Mexico and Chile has occurred in the context of a drop in U.S. production, which fell by an average of 35 million pounds during the three seasons 1997-98 to 1999-2000 compared to the average for the two preceding seasons. This shows that imports can serve to stabilize the market in the face of domestic supply variability, thus stabilizing consumer product availability and prices, as well as offering a product competitive with domestic production.

Table 2. Pest risk reductions under a systems approach to importation of Mexican avocados

Risk mitigation measures	Pests of quarantine concern					
	Fruit flies: *Anastrepha spp.*	Small avocado seed weevils: *Conotrachelis spp.*	Avocado stem weevil: *Copturus aguacatae*	Large avocado seed weevil: *Heilipus lauri*	Avocado seed moth: *Stenoma catenifer*	Hitchhikers and other pests
	Percentage risk reduction					
Field surveys	40 – 60	95 – 99	80 – 95	95 – 99	95 – 99	40 – 75
Trapping and field treatments	55 – 75	0	0	0	0	3 – 20
Field sanitation	75 – 95	15 – 35	70 – 90	15 – 35	15 – 35	20 – 40
Host resistance	95 – 99.9	0	0	0	0	0
Post-harvest safeguards	60 – 90	0	0	0	0	40 – 60
Packinghouse inspection and fruit cutting	25 – 40	50 – 75	40 – 60	50 – 75	50 – 75	30 – 50
Port-of-arrival inspection	50 – 70	50 – 70	50 – 70	50 – 75	50 – 75	60 – 80
Winter shipping only	60 – 90	0	0	0	0	50 – 75
Limited U.S. distribution	95 – 99	95 – 99	90 – 99	95 – 99	95 – 99	75 - 95

Source: United States Department of Agriculture, 2001

3.2 Increased Access in 2001

Based on the early success of the avocado import program, in September 1999 Mexico requested that USDA expand its geographic and seasonal access to the U.S. market. USDA acted within a year to obtain public comments on this request. In November 2001, it issued an amended final rule (USDA 2001). This rule confirmed the risk-reducing effects of the systems approach (see Table 2). The revised rule added access for avocados from

Mexico to a west-central region and increased the shipping season to six winter months. Adding the west-central region increased the domestic shipments with which Mexican avocados would compete from a past average of 7.7 million pounds over 1986-94 to 10.5 million pounds. Increasing the length of the import season increased the domestic shipments with which the Mexican avocados would compete from 7.7 million pounds to 14.1 million pounds for the original access area, and to 19.3 million pounds for the expanded area. Thus, the market access was increased substantially for Mexico by the 2001 rule. Issuance of the revised rule encountered less industry opposition than the initial easing of the quarantine. Still, USDA had to overrule a late CAC petition to suspend its decision process based on a court ruling against the U.S. government on an earlier decision to permit citrus imports from Argentina and the CAC filed suit (still pending) to overturn the new rule.

3.3 Further Opening in 2005

With the additional opening of the U.S. market, avocado imports from Mexico rose from 27.9 million pounds in 2001, to 58.8 million pounds in 2002, and 76.8 million pounds in 2003. The government of Mexico requested in November 2000 that the regulations be amended again to allow importation into all 50 states throughout the year. APHIS undertook another pest risk assessment. Although substantial reductions in risk had been associated with the seasonal and geographic shipping restrictions (see Table 2), APHIS eventually concluded that removing these restrictions while retaining other aspects of the systems approach to risk management would result in fewer than 450 infected fruit entering the U.S. annually, and posed "an overall low likelihood of pest introduction" (USDA 2004). In part this pest risk assessment rested on the six years of accumulated evidence, in which no pests had been detected in over 10 million inspected fruit. New scientific evidence was also available by 2003 demonstrating that the Hass avocado was not a host to certain fruit flies (Aluja et al. 2004). APHIS issued a new final rule on November 30, 2004 that specified conditions for year-around importation of Mexican avocados into 47 states (all except California, Florida and Hawaii) starting in 2005, with access to all states after a two-year implementation delay. Thus, nearly fifteen years after the avocado trade issue was brought to the fore during the NAFTA negotiations, and nearly eight years after the initial partial opening of the

U.S. market, a fundamental reversal of the 1914 ban was accomplished.[9] In doing so, APHIS continued to restrict imports to eligible orchards operating under a systems approach to risk management. Requirements remained in effect for surveys for avocado-specific pests, certification of compliance with pre-harvest and post-harvest handling requirements, traceability, and sample fruit testing. APHIS also continued to require surveying for fruit flies, rejecting the conclusion that Hass avocados were a "non host" in favor of the more conservative status of "very poor host" (USDA 2004).

Projected economic effects of the 2004 final rule are presented in Tables 3 and 4 (USDA 2004).[10] The economic model used for these projections updates average data to a recent two-year base period (October 2001-October 2003) and is more sophisticated than previous modeling in several respects (USDA 2004; Peterson et al. 2004). On the supply side, California, Mexico and Chile are included as producing regions. The year is divided into two periods: October 15-April 15 (period 1) corresponding to the period in which Mexican avocados have been imported under the 2001 rule, and April 16-October 14 (period 2) during which imports from Mexico have not previously been allowed. Avocados from the three countries are treated as imperfect substitutes by consumers, instead of perfect substitutes, accommodating differences in wholesale prices that have persisted by country of origin during the past six years. The Mexican producer price for exported avocados is held constant (at $0.63 per pound) because of extensive additional productive capacity eligible for certification, while supply from California and Chile are price responsive. The fuller specification of the seasonality, substitutability and third supplier allows more precise estimation of the effects of a change in the import rule than would be possible with a simpler model structure such as utilized by Romano and Orden or the earlier USDA assessments. Sensitivity analysis was conducted by simulating the model while drawing its key parameters from assumed random distributions around the benchmark values.

[9] Just as the NAFTA negotiations gave a boost to efforts to have the avocado ban reconsidered, intensive discussions between Mexico and the U.S. about bilateral SPS trade regulations after a case of BSE was discovered in Washington state may have created an environment conducive to bringing closure to the assessment of a revised rule on avocados in 2004.

[10] Peterson served as a consultant to USDA in developing the model used for their economic assessment, which is based on earlier model development in Peterson et al. (2004).

Table 3. Estimated near-term changes in annual quantities and prices with 2004 rule

	Initial Prices and Quantities	Importation Excluding CA, FL and HI	Importation into All 50 States
		million pounds	
Quantity total supplied by:	581.071	633.542	660.868
California	346.011	320.821	303.866
Chile	176.814	158.695	147.695
Mexico	58.247	154.026	209.307
		dollars per pound[a]	
Wholesale Price of: Avocados supplied by:			
California	$1.63	$1.43	$1.29
Chile	$1.29	$1.20	$1.15
Producer Price for:			
California	$1.02	$0.81	$0.67
Chile	$0.59	$0.49	$0.44

[a] Prices weighted by regional and time period quantities. Producer and wholesale prices for avocados from Mexico are assumed constant in the model.
Source: USDA, 2004.

The net effect of allowing Mexican avocados into all 50 states year-round is that exports from Mexico increase by 151.1 million pounds (259.4 %), as shown in Table 3, while supply from California falls by 42.1 million pounds (12%) and imports from Chile decrease by 29.1 million pounds (16.4%). Wholesale and producer prices of California avocados fall $0.35 on average over the year (20.8 and 33.3%, respectively), while these prices fall $0.15 for Chile (10.8 and 25.4%, respectively). Consumer surplus rises by $184.4 million within the US, as shown in Table 3, while producer surplus falls by $114.4 million for California, leaving a net U.S. welfare gain of $70.1 million (counting the producer surplus loss of $24.3 million for Chile leaves a net global gain of $45.8 million).

Table 4. Estimated near-term welfare gains and losses with 2004 rule

	Importation Excluding CA, FL and HI		Importation into All 50 States	
	million dollars			
	Change in Welfare[a]	Standard Deviation[b]	Change in Welfare[a]	Standard Deviation[b]
Losses in Producer Welfare				
California	-$71.37	$14.27	-$114.39	$20.48
Chile	-$15.71	$5.29	-$24.35	$5.79
Gains in Consumer Welfare				
Period 1[c]				
Region A[d]	$4.02	$0.99	$7.84	$1.18
Region B[e]	$21.92	$2.08	$29.66	$2.34
Region C[f]	$14.17	$3.34	$27.33	$2.48
Period 2[g]				
Region A	$24.998	$2.70	$32.42	$4.22
Region B	$31.76	$3.38	$41.08	$5.29
Region C	$24.81	$5.29	$46.12	$6.34
Total	$121.66	$3.61	$184.45	$1.93
Net U.S. Welfare Gain[h]	$50.29	$14.27	$70.06	$20.48

[a] The difference between baseline values for October 15, 2001-October 15, 2003 and values with the 2004 rule.
[b] Standard deviations of the sensitivity analysis distributions.
[c] October 15-April 15.
[d] The 31 northeast and central states (and the District of Columbia) approved to receive Hass avocado imports from Mexico during the six-month period October 15-April 15 under the 2001 rule.
[e] Fifteen Pacific and southern states excluding California, Florida and Hawaii.
[f] California, Florida and Hawaii.
[g] April 16-October 14.
[h] The sum of welfare losses for California producers and U.S. consumer welfare gains for all regions and both periods.

Based on the risk assessment, adopting the 2004 final rule to open the U.S. avocado market is consistent with its obligations under the WTO to utilize least-trade distorting SPS measures. In doing so, USDA regulators have been willing to accept a substantial net loss to domestic producers. Peterson et al. show that these losses may be offset over a five year period as avocado demand increases due to population and income growth. But this offset was not incorporated in USDA's analysis, which presented the trade, production, consumption and welfare gains and losses shown in Tables 3 and 4 as the consequences of the 2004 rule.

4 Conclusion

The sequential issuance of the 1997, 2001 and 2004 USDA rules allowing avocado imports from Mexico are an example of successful adoption of a systems approach to risk mitigation. The 1997 rule only opened the market to a small extent, but it did so despite significant domestic industry opposition. The 2001 ruling more than doubled the proportion of the total U.S. market to which Mexico had access, but that proportion remained less than 10%. Economic consequences for the domestic industry, and gains for Mexican producers and U.S. consumers, were relatively limited.

Substantial further progress occurred in 2004 under the precedent set in the first two rules. USDA's initial systems approach rested on numerous risk mitigation measures. Among these, the seasonal restriction of winter shipping only and the limited geographic access, first to 19 then to 34 states, were determined to be necessary components of risk management. Nevertheless, after inspections failed to detect any pest infestations in imports under the system approach, and as scientific evidence became available to substantiate the poor host status of avocados for fruit flies, USDA reconsidered its position and relaxed these two restrictive measures. Net economic effects of this revision to its import rules are much larger than before. Several of the system approach requirements still in place remain subject to question and there may be additional modifications to the required procedures. Either way, the long avocado case from 1991 to 2005 illustrates how difficult it is to make progress on trade expansion when there are complex risk issues at stake and a strong domestic industry is affected by the decision making outcome. It also represents a noteworthy success in this regard.

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