

Chapter 4. Questionable Technical Barriers to 1996 U.S. Agricultural Exports

4.1. Introduction

The strengthened disciplines of the 1994 GATT Agreements were designed to increase constraints on unnecessary obstacles to international agricultural trade. Yet since the WTO was formed, disputes over technical barriers have emerged with greater frequency. It may be that the institutional changes, discussed in Chapter Two, have simply increased the visibility of technical barriers. Or that the increased volume of world trade has encouraged a proportionate increase in use of technical trade restrictions. Or the WTO limits on tariff and other non-tariff barriers may have encouraged governments to substitute towards less transparent technical barriers in order to maintain existing levels of economic protection.

Regardless of the reason for the visibility of recent disputes, such disagreements suggest that governments may still widely apply technical barriers of questionable merit. The political economy paradigm, explicated in Chapter Three, outlines the incentives for policymakers to use technical barriers to disguise economic-based protection for domestic industries. However there has been little formal quantification of the extent of technical barrier misuse, when measured by the criteria of the SPS and TBT Agreements.

The purpose of this chapter is to quantify the extent of technical barrier misuse as a restriction on U.S. agricultural exports. Section 4.2 presents a unique new data source for questionable technical barriers developed through a USDA survey of U.S. agricultural export markets. In Section 4.3 technical barriers identified in the survey are characterized according to their legal classification, regulatory goal, type of market restriction, policy instrument, level of processing of the affected commodities, product category, and geographical region in which the barriers arise. A general description of the survey results and simple statistics for the trade barriers are presented for each category. In Section 4.4 questionable technical barriers identified in the data set are ranked by their estimated impact on U.S. agricultural exports, and characteristics of the barriers with the most and least impacts are compared. Cross-tabulations of the data are calculated and summarized in Section 4.5 to further characterize technical barriers by type of market restriction. In Section 4.6 the individual technical barriers are aggregated among countries to identify the number and estimated trade impact of questionable technical barriers by government imposing the restriction. Some limitations of the data are discussed in Section 4.7 and a summary and conclusions are presented in Section 4.8.

4.2. USDA Survey of Questionable Technical Barriers

One of the limitations in previous attempts to characterize questionable technical barriers has been the lack of a systematic database on the existence and extent of specific disputed measures. The only prior attempt that has been made to systematically identify these barriers on an international basis was through the Trade Control Measures database of the United Nations Committee on Trade and Development [UNCTAD]. This database covers all non-tariff barriers, including technical barriers, but has been criticized for very limited coverage of specific issues (Ndayisenga and Kinsey 1994). Therefore, it is necessary to elicit primary data about technical barriers to quantify the extent of their misuse.

This research draws on a unique new data source: the 1996 USDA Survey of Technical Barriers to U.S. Agricultural Exports. The Survey is an information base developed by USDA's Economic Research Service [ERS] and Foreign Agricultural Service [FAS] based on a survey of expert opinion about foreign markets for U.S. agricultural exports. The survey was not designed to provide a catalogue of all foreign technical barriers to U.S. agricultural products in 1996, but rather to identify those questionable technical measures which caused actual or potential export revenue losses to U.S. firms and might be subject to challenge under the Uruguay Round Agreements.

The full 1996 USDA Survey was compiled after a somewhat more modest survey analysis provided useful preliminary information about the extent to which questionable technical barriers were in place. A 1995 USDA survey served as a pre-test for the more extensive 1996 data collection. In 1996, the coverage area was expanded to include 132 countries, two regional trading blocks, and 98 percent of the U.S. export market for agricultural products.

The 1996 survey design incorporated four distinct stages.⁴² First, ERS personnel compiled a preliminary list of technical barriers from a variety of trade publications and internal USDA sources, including the initial survey results from 1995. The list included measures which were currently enforced or had been recently proposed, decreased or potentially decreased U.S. agricultural exports, and appeared to be in violation of one or more disciplines of the GATT Agreements. It specifically excluded regulations which were in place but which were not enforced and specifically included measures which were enforced but not officially written in the regulatory code.

In the second stage of the survey, analysts in six USDA agencies reviewed the preliminary list of technical barriers.⁴³ Personnel in FAS and ERS deleted issues which had been resolved and experts in the regulatory agencies provided more precise descriptions of each

⁴² Roberts and DeRemer (1997) and Thornsby, Roberts, DeRemer and Orden (forthcoming) provide more detail on the survey process.

⁴³ The six USDA agencies are the Foreign Agricultural Service (FAS), the Economic Research Service (ERS), the Animal and Plant Health Inspection Service (APHIS), the Food Safety Inspection Service (FSIS), the Agricultural Marketing Service (AMS/USDA), and the Grain Inspection Packers and Stockyards Association (GIPSA).

measure. The revised list of technical barriers was then sorted by country and distributed to USDA staff in FAS field offices. All 50 FAS field offices were included in the 1996 survey.

In the third stage of the survey, the FAS attaches again revised the list of issues by adding or deleting specific barriers and making revisions in cases where the status of a measure had changed. FAS field staff members were also asked to estimate the change in U.S. export revenue associated with potential resolution of each identified issue. Simultaneously, the revised list was distributed to private industry groups participating in the FAS cooperator program.⁴⁴ Cooperators were asked to review the list of issues, but did not estimate revenue losses.

In the fourth stage of the survey design, the revised lists returned by FAS field staff and cooperators were reviewed again by technical experts in the six USDA agencies for completeness and consistency. These experts were instructed to delete measures that were considered, in their judgement, to be scientifically justifiable or otherwise in conformity with the Uruguay Round Agreements.

Each of the technical barriers in the final survey is a foreign government measure which stipulates a product standard, a related production and processing method, or a conformity assessment procedure as a condition of entry for an imported good. This definition includes measures that have as their *prima facie* objective the correction of production externalities, consumption externalities, or information asymmetries. Questionable technical barriers that were included in the final data compilation include foreign regulations which appear to violate at least one of the principles of the Uruguay Round Agreements. The final results therefore reflect an expert consensus-based view of questionable technical barriers faced by U.S. agricultural exports in June 1996.

4.3. Characterization of Questionable Technical Barriers to U.S. Agricultural Exports

The Survey identifies 302 questionable technical barriers faced by U.S. agricultural exports. Sixty-one countries and two regional trading blocks are identified as having one or more questionable technical barriers in place.⁴⁵ The total estimated trade impact [ETI] from these barriers is over \$4.9 billion, or approximately seven percent of the total value of 1996 U.S. agricultural exports. Of the \$4.9 billion, almost \$3.7 billion represents trade that was restricted in 1996 and approximately \$1.2 billion represents 1996 trade that may be restricted in the future. Survey responses indicate that there were no questionable technical barriers applied to U.S. agricultural products by 71 countries in 1996. A list of those countries included in the Survey for

⁴⁴ The cooperator program at FAS includes approximately 40 groups representing specific U.S. commodity sectors.

⁴⁵ The 1996 USDA Survey includes two regional trading blocks where FAS personnel were able to report distinct regulatory policies that were enacted by the regional governing bodies. Separate observations were reported for additional barriers that were enacted unilaterally by member countries of the regional trading blocks. In order to simplify reporting of the results, the word “countries” will be used throughout the remainder of this dissertation to refer to the European Union [EU] and Gulf Coast Country [GCC] Survey observations as well as those for separate countries.

which no questionable barriers were reported, and those for which one or more such barriers were identified, is provided in Appendix B.

The technical barriers in the Survey can be categorized according to their legal classification, regulatory goal, type of market restriction, policy instrument, level of processing of the affected commodities, product category, and geographical region in which barriers arise. Simple statistics will provide an overview of the extent of questionable technical barriers when evaluated in each of these categories.

4.3.a. Legal Classification

As discussed in Chapter Two, the type of measure (a technical restriction) determines if a regulation is governed by the TBT Agreement, but the purpose of the measure (to protect human, animal, or plant life or health) determines if it is governed by the SPS Agreement. Over 86 percent of the barriers included in the Survey are considered questionable because they potentially violate a principle of the SPS Agreement while a much smaller number (nine percent) are disciplined by the TBT Agreement. Similarly, 90 percent of the total estimated trade impact identified in the Survey is found among SPS barriers, with only five percent found among TBT barriers. The average trade impact per barrier is \$17.08 million and \$9.00 million for SPS and TBT barriers, respectively. A few barriers identified in the Survey (five percent) could not be strictly classified as falling under only the SPS or TBT Agreement, as shown in Table 4.1. These 16 measures either serve more than one purpose, and so may be covered by multiple Agreements, or appear to violate another provision of GATT 1994.

Table 4.1. WTO legal classification of questionable technical barriers identified in the 1996 USDA Survey

Legal Classification	Number of Barriers	Estimated Trade Impact	Average Trade Impact per Barrier
		----- \$ million -----	
SPS	259	4424.73	17.08
TBT	27	243.06	9.00
Multiple or other provisions of GATT 1994	16	240.09	15.01
Totals	302	4907.88	16.25

There are several possible reasons for the limited number of TBT barriers included in the Survey results. The SPS Agreement is specifically addressed to agricultural products, in contrast to the TBT Agreement, which covers technical requirements applied to a wide variety of products. Since the USDA survey was also specifically addressed to agricultural products, the principal focus was on barriers covered by the SPS Agreement. The Survey results indicate that disputes over SPS regulations are more frequent and contentious than those over TBT

regulations for agricultural trade. In addition, the set of barriers considered questionable under the SPS Agreement may be larger as the SPS Agreement requires a risk assessment for establishing measures different from the international standards, while the TBT Agreement does not. Sensitivity over human health and safety issues may also make SPS issues more visible, and more likely to be reported by survey respondents. Although it is not possible to separate the impacts of each of these factors on the Survey coverage of TBT barriers, it is reasonable to infer that there is an appreciably larger effect from questionable SPS barriers on U.S. agricultural exports than from TBT barriers.

The SPS and TBT Agreements provide guidelines to evaluate the criteria on which technical barriers might be considered questionable. The following list summarizes nine of these criteria that were discussed in detail in Chapter Two.

1. the policy is unscientific; there is no credible evidence that by importing the commodity there is a risk to human, animal, or plant health or a legitimate technical objective
2. the policy sets an acceptable level of risk that is internally inconsistent; standards are not consistent with those for other products
3. the policy is not-least-trade restrictive; an alternate but less restrictive protocol can be used effectively
4. unnecessarily redundant testing, lengthy, cumbersome or repetitive import checks are required
5. the policy violates national treatment including pests or diseases that are endemic or exist in the importing country
6. the policy violates the most-favored-nation principle by establishing discriminatory treatment of trading partners
7. the policy fails to recognize equivalence of exporter measures
8. the policy is not published, notified, or arbitrarily enforced; there is a lack of transparency
9. the policy violates the emergency procedures doctrines.

A systematic examination of the USDA Survey results indicates that a majority of the barriers identified are potentially questionable based on the principles of either being unscientific (number one above) or not-least-trade-restrictive (number three). There are substantially fewer barriers in the Survey that appear to set an internally inconsistent acceptable level of risk (number two), or to violate either the principle of most-favored-nation treatment (number six) or the emergency procedures doctrine (number nine). However a formal numerical categorization of the Survey barriers based on specific potential challenge under the WTO Agreements is not plausible prior to specific case-by-case dispute resolution. In such cases, the legal criteria of the

dispute will ultimately be a determination made by representatives of the countries involved. A particular regulatory measure may be challenged based on one of more of the provisions of the Agreements and the legal case will address each provision separately.⁴⁶

4.3.b. Regulatory Goal

Questionable technical barriers identified in the 1996 USDA Survey are classified by regulatory goal in Table 4.2. Almost two-thirds of the measures identified in the Survey are addressed to concerns over commercial production; the protection of commercial animal and plant health. Although there were fewer measures addressing concerns over food safety, the estimated trade impact per goal for the food safety measures is \$26.12 million, the largest identified in the Survey. There are 37 measures identified that address quality issues. The total estimated trade impact for these barriers is \$342.80 million. Less than ten measures in the Survey address concerns over the protection of the natural environment from harmful non-indigenous species [HNIS], compatibility, or conservation.

Table 4.2. Regulatory goal of questionable technical barriers identified in the 1996 USDA Survey

Regulatory Goal	Incidence of Goal	Estimated Trade Impact	Average Trade Impact per Goal
		----- \$ million -----	
Commercial production	200	2553.20	12.77
Food safety	73	1906.70	26.12
Product quality	37	342.80	9.26
HNIS	6	47.84	7.97
Compatibility	5	40.34	8.07
Conservation	1	12.50	12.50
Non-classifiable	2	4.50	2.25
Totals	324	4907.88	15.15

The regulatory goals in Table 4.2 are defined following the descriptions found in Roberts, Josling, and Orden (1998). As shown, the 302 measures identified in the Survey addressed a greater number of regulatory goals (324) because there may be more than one stated goal for a

⁴⁶ For example, in the U.S.-EU beef hormone dispute the original complaint by the U.S. charged that the EU measure violated disciplines in Articles 1, 2, 3, and 5 of the SPS Agreement. The August 1997 Panel Report ruled in favor of the U.S. arguments and found that the EU policy was in violation of the SPS Agreement because it was not based on a risk assessment (Art. 5.1) or existing international standards (Art. 3.1), that the EU had not established a scientific justification for the measure (Art. 3.3), and had set a level of protection that arbitrarily or unjustifiably varied from other EU measures, resulting in a disguised restriction on trade (Art. 5.5). The Appellate Body Report in January 1998 upheld the Panel Report findings that the EU measure was not based on a risk assessment and that the EU had not established a scientific justification. However, the Appellate Report overruled the other two findings of the initial Panel Report (Roberts 1998).

particular policy measure. One example of such a measure is the ban of U.S. poultry meat from New Zealand over both food safety and animal health concerns.

4.3.c. Market Restriction

Individual barriers identified in the Survey are divided into three categories in Table 4.3 based on how the market is being restricted. *Market access* barriers are questionable import bans denying any exports of a particular U.S. product to a country. There are 107 such barriers identified in the Survey. The \$722.65 million estimated trade impact for access barriers estimates the value of U.S. exports if the policy were changed and the product gained access. A greater number, 164, of *market expansion* barriers are identified in the Survey. These measures hinder, but do not prohibit, U.S. exports of a certain product to a country. The \$2971.72 million estimated trade impact for expansion barriers indicates the value of additional trade that would result if these barriers were resolved. *Market retention* barriers are those measures, under consideration by a foreign government, which may adversely affect U.S. exports in the future. Only 42 market retention barriers are identified in the Survey. The \$1213.51 million estimated trade impact for retention barriers indicates the value of 1996 exports that is potentially threatened.

Table 4.3. Type of market restriction from questionable technical barriers identified in the 1996 USDA Survey

Type of Market Restriction	Incidence of Restriction	Estimated Trade Impact	Average Trade Impact per Restriction
		----- \$ million -----	
Access	107	722.65	6.75
Expansion	164	2971.72	18.12
Retention	42	1213.51	28.89
Totals	313	4907.88	15.68

The value of total U.S. agricultural exports in 1996 was \$69.7 billion (FAS 1997). If all of the questionable market access and expansion barriers were removed, U.S. agricultural exports are estimated by FAS field staff to expand by 5.3 percent from the 1996 value. If the market retention barriers were imposed, U.S. agricultural exports could contract 1.7 percent from the 1996 value.

The average estimated trade impact per barrier affecting market access is approximately one-third that for the market expansion barriers, suggesting that access is totally denied by measures in the Survey to products in relatively smaller markets. In larger markets affected by these measures, access is allowed but on a restricted basis. The largest estimated trade impact per barrier occurs among the market retention barriers, suggesting that the stakes tend to be high

(or at least are estimated to be high) when the possibility exists of removing or restricting access to a market that is already established.

There are some regulations in the Survey that can lead to more than one type of market restriction. For example, one regulation may currently restrict trade of a certain product to a certain country and may also threaten to eliminate all such trade in the future. Thus, the same regulation has two separate impacts on the market. So, while there are 302 barriers represented in the 1996 Survey, there are 313 market restrictions reported in Table 4.3.

4.3.d. Policy Instrument

Table 4.4 shows a classification of the questionable technical barriers identified in the 1996 USDA Survey by the policy instrument employed. There is a wide array of policy instruments available to governments to meet their stated regulatory goals. As shown, process standards are the most prevalent policy instrument employed among the questionable technical barriers identified. The estimated trade impact from the 118 process standards is \$2.7 billion with an average impact of almost \$23 million per barrier. Less than ten barriers are identified where either package standards or information requirements were employed. Bans or partial bans are reported in 87 cases, for a total estimated trade impact of approximately \$595 million. Although product standards are employed in fewer cases (70) the estimated trade impact is almost double (\$1.2 billion). There were 25 barriers identified in the Survey that are non-classifiable by policy instrument due to either non-transparent or arbitrarily enforced standards.

Table 4.4. Policy instrument utilized in questionable technical barriers identified in the 1996 USDA Survey

Policy Instrument	Incidence of Instrument	Estimated Trade Impact	Average Trade Impact per Instrument
		----- \$ million -----	
Ban	66	383.84	5.82
Partial ban	21	211.45	10.07
Process standards	118	2701.36	22.89
Product standards	70	1202.62	17.18
Package standards	8	41.22	5.15
Information requirements	8	127.94	15.99
Non-classifiable	25	239.45	9.58
Totals	316	4907.88	15.53

The policy instruments in Table 4.4 are defined following the descriptions in Roberts, Josling, and Orden (1998). They are listed in descending order of, arguably, trade restrictiveness. A ban is the most restrictive type of technical barrier since it completely

prohibits entry of the specified product. A partial ban is a restriction based on seasonal or regional limitations. Process, product, and package standards are all technical specifications addressed to specific conditions exporters must meet to gain entry to the market. In certain cases, if the cost of compliance is high, technical specifications may be more trade restrictive than partial bans. Process standards specify the inputs and/or production technology used in production. Product standards specify the final characteristics of a product that will be acceptable. Package standards specify container attributes such as dimensions or biodegradability. Information requirements are controls on voluntary industry claims or labeling specifications that must accompany the product for entry to the market.

As shown in Table 4.4, one technical barrier can enact more than one type of policy instrument. There were fourteen such cases included in the Survey. One example of such a case is the restriction on U.S. grapefruit exports to South Korea. Grapefruit from California is subject to mandatory incubation and testing procedures so that both process and product standards are used as policy instruments.

4.3.e. Processing Level

Technical barriers identified in the Survey can be characterized based on the level of processing for the commodity being affected by the barrier, as shown in Table 4.5. Among processing levels the smallest number of barriers (37) is identified in the bulk category, but the bulk commodities have the highest average estimated trade impact per barrier (\$31.77 million). There were another 40 barriers identified among intermediate goods but the total trade impact is only \$365.95 million. Final unprocessed products account for 116 cases (38 percent) of all the barriers identified. Although eight fewer barriers to final-processed products were identified, the total estimated trade impact is almost four times as large and accounts for 55 percent of the total estimated trade impact in the Survey. One barrier in the Survey was non-classifiable by level of processing since it was a restriction applied to both processed and unprocessed final products. There are two factors that affect average estimated trade impact per barrier: the volume of trade and the per unit value of the product. The first factor may explain the high estimated trade impact per barrier among the bulk products, while the later situation may explain the increasing estimated trade impact per barrier between final-unprocessed, intermediate, and final-processed products.

Table 4.5. Processing level for commodities affected by questionable technical barriers identified in the 1996 USDA Survey

Level of Processing	Number of Barriers	Estimated Trade Impact	Average Trade Impact per Barrier
		-----\$ million-----	
Bulk	37	1175.54	31.77
Intermediate	40	365.95	9.15
Final-unprocessed	108	652.78	6.04
Final-processed	116	2713.11	23.39
Non-classifiable	1	0.50	0.50
Totals	302	4907.88	16.25

The processing labels are defined following the classification scheme developed by FAS which provides U.S. agricultural export and import data for bulk, high-value intermediate, and consumer-oriented foods and beverages [BICO] (FAS 1997). In the Survey categorization, bulk and intermediate goods coincide with the bulk and intermediate categories of BICO. Final goods coincide with the consumer-oriented category of BICO, but are further divided into processed and unprocessed products. Unprocessed products include fresh fruit, fresh vegetables, nursery products, cut flowers, and logs. Final-processed products include all other BICO defined consumer-oriented products. See Appendix C for the product categories and specific commodities included in each level of processing.

4.3.f. Product Category

The Survey results can be further described based on the specific product category that is affected by the trade barriers. As shown in Table 4.6, the largest number of barriers is found among the fruit commodities (56) followed by further processed foods (38), grains (27), and vegetables (27). The largest total estimated trade impacts are found in further processed foods (\$1263.62 million) and grains (\$1048.31 million) which account for a smaller number of barriers with much larger average estimated trade impacts per barrier.

As expected, when the barriers are applied to broadly defined product categories the average estimated trade impact per issue is large. For example, the average estimated trade impact of barriers involving all agricultural products is \$132.63 million and the average estimated trade impact of barriers involving all animal products is \$100.50 million. Exceptions are barriers involving all fruit and citrus, and all fruit and vegetables where the average estimated trade impacts per barrier are \$2.76 million and \$9.52 million, respectively.

Table 4.6. Product category affected by questionable technical barriers identified in the 1996 USDA Survey

Product Category	Number of Barriers	Estimated Trade Impact	Average Trade Impact per Barrier
		----- \$ million -----	
Fruits and Vegetables	105	635.28	6.05
Fruit	56	398.91	7.12
Vegetables	27	91.91	3.40
Citrus	14	102.10	7.29
All fruit and citrus	5	13.80	2.76
All fruit and vegetables	3	28.56	9.52
Grains and Feed	39	1181.31	30.29
Grains	27	1048.31	38.83
Oilseeds	8	77.00	9.63
Feedgrains and forages	4	56.00	14.00
Livestock and Poultry	85	853.13	10.04
Poultry	21	80.04	3.81
Beef	17	279.80	16.46
Pork	10	74.80	7.48
Beef and pork	2	61.00	30.50
Dairy	2	26.00	13.00
Eggs	4	11.25	2.81
Livestock genetics	18	55.88	3.10
All meat	9	63.36	7.04
All animal products	2	201.00	100.50
Other Categories	73	2238.17	30.66
Further processed foods	38	1263.62	33.25
Seed	16	212.15	13.26
Forestry	6	87.00	14.50
Fish	5	91.10	18.22
Cotton	3	52.30	17.43
Nuts	1	1.50	1.50
All products	4	530.50	132.63
Totals	302	4907.88	16.25

4.3.g. Geographic Region

The technical barriers identified in the Survey are categorized in Table 4.7 based on the geographic region in which the country imposing the restriction is located. The largest number

of barriers is found in the countries of the Americas (91) followed by East Asia (67) and Europe (67). Less than 20 questionable technical barriers were identified in Africa or the Middle East. The largest estimated trade impact (\$2325.30 million) and average trade impact per barrier (\$29.81 million) is seen in the countries of East Asia. Both the smallest total estimated trade impact (\$39.6 million) and estimated trade impact per barrier (\$6.4 million) are identified in the Middle Eastern countries.

Table 4.7. Geographic region where questionable technical barriers identified in the 1996 USDA Survey are imposed

Geographic Region	Number of Barriers	Estimated Trade Impact	Average Trade Impact per Barrier
		-----\$ million-----	
Africa	19	179.70	9.46
Americas	91	1233.81	13.56
East Asia	78	2325.30	29.81
Europe	67	899.55	13.43
Middle East	11	39.60	3.60
Oceania	36	229.92	6.39
Totals	302	4907.88	16.25

4.4. Distribution of Questionable Technical Barriers to U.S. Agricultural Exports by Estimated Trade Impact

As shown in Tables 4.1, 4.5, 4.6, and 4.7, the average estimated trade impact per barrier in the Survey is \$16.25 million. This section provides a distribution of the 302 barriers identified by their estimated trade impact and a categorization of barriers with the most and least impacts. Table 4.8 shows a distribution of barriers in the Survey by value of their estimated impact on trade. Only 18 barriers have an estimated trade impact of \$50 million or more. Of the total 302 barriers identified, 118 (nearly 40 percent) of the barriers have an estimated trade impact between \$5 million and \$50 million, and 166 (55 percent) have an estimated trade impact less than \$5 million including three barriers estimated to have a zero impact on trade. These are cases where the barrier is in place but it is not considered to be the most limiting factor for trade in these markets.

Table 4.8. A distribution of questionable technical barriers identified in the 1996 USDA Survey by estimated trade impact

Estimated Trade Impact per Barrier	Number of Barriers
----- \$ million -----	
at least 50	18
25-49.99	19
10-24.99	51
5-9.99	48
1 - 4.99	97
0.5 - 0.99	22
0.1 - 0.49	29
less than 0.1	15
0	3
Total	302

The characterization of the 18 barriers with the largest estimated trade impact and of the 166 barriers with the smallest estimated trade impact is shown in the next two sections. This will serve to highlight some distinctions between the two groups.

4.4.a. Characterization of Questionable Technical Barriers with at least \$50 million in Estimated Trade Impact

There are 18 barriers identified in the Survey with at least \$50 million in estimated trade impact per barrier. The average trade impact per barrier for these 18 barriers, \$140.37 million, is more than eight times larger than the average trade impact per barrier for all barriers in the Survey.

When regulatory goals are considered, ten goals of the barriers are directed towards protection of commercial animal or plant health and ten goals address questions of food safety (see Table 4.9). There is an approximate \$1.64 billion estimated trade impact from the food safety measures and the average impact per regulatory goal is highest in this category.

Table 4.9. Regulatory goals of questionable technical barriers with at least \$50 million in estimated trade impact

Regulatory Goal	Incidence of Goal	Estimated Trade Impact	Average Trade Impact per Goal
		----- \$ million -----	
Commercial production	10	1371.50	137.15
Food safety	10	1641.31	164.13
Product quality	2	62.70	31.35
HNIS	1	12.70	12.70
Totals	22	3088.21	140.37

The 18 barriers with impacts greater than \$50 million impose 20 market restrictions on U.S. agricultural exports. Thirteen of the 20 market restrictions are classified as market access or expansion while seven are classified as market retention barriers (see Table 4.10). The 13 market access and expansion barriers with impacts of at least \$50 million are estimated to block agricultural trade of \$2259.60 million, accounting for over 60 percent of the \$3694.37 million in total trade impacts attributed to all such barriers. The implication is that if these 13 barriers alone were resolved, 1996 U.S. agricultural exports might increase by 3.3 percent compared to 1996. The market retention barriers with impacts of at least \$50 million are estimated to potentially block trade of \$828.61 million, accounting for 68 percent of the \$1213.51 million in total impact attributed to all such barriers. If these seven barriers are not resolved and the restrictions take effect, U.S. agricultural exports could decrease by 1.2 percent compared to 1996.

Table 4.10. Type of market restriction from questionable technical barriers with at least \$50 million in estimated trade impact

Type of Market Restriction	Incidence of Restriction	Estimated Trade Impact	Average Trade Impact per Restriction
		----- \$ million -----	
Access	2	200.00	100.00
Expansion	11	2059.60	187.24
Retention	7	828.61	118.37
Totals	20	3088.21	154.41

Among the 18 barriers with the largest trade impacts, 12 enact process standards as a policy instrument (see Table 4.11). Although the average trade impact per barrier using process standards is comparable to those using other instruments, the relatively large number of process standards have a total estimated trade impact over \$2 billion.

Table 4.11. Policy instrument utilized by questionable technical barriers with at least \$50 million in estimated trade impact

Policy Instrument	Incidence of Instrument	Estimated Trade Impact	Average Trade Impact per Instrument
		----- \$ million -----	
Partial ban	1	125.00	125.00
Process standards	12	2046.31	170.55
Product standards	5	802.60	160.52
Non-classifiable	1	114.00	114.00
Totals	19	3088.22	162.54

As shown in Table 4.12, some of the barriers with at least \$50 million in estimated trade impact apply to broadly defined product categories; for example, further processed foods (4 barriers), all agricultural, fish, and forestry products (1 barrier), or all animal products (1 barrier). The average trade impact per barrier in each of these three product categories is \$200 million or more. The largest number of barriers with estimated trade impacts of at least \$50 million are applied to grains, with three barriers specifically addressed to wheat.

Table 4.12. Product categories affected by questionable technical barriers with at least \$50 million in estimated trade impact

Product Category	Number of Barriers	Estimated Trade Impact	Average Trade Impact per Barrier
		----- \$ million -----	
Fruits and Vegetables			
Fruit	1	67.80	67.80
Grains and Feed			
Grains	5	822.81	164.56
Livestock and Poultry			
Beef	1	150.00	150.00
Pork	1	50.00	50.00
Beef and pork	1	50.00	50.00
All animal products	1	200.00	200.00
Other Categories			
Further processed foods	4	1028.60	257.15
Seed	1	114.00	114.00
Forestry	1	55.00	55.00
Fish	1	50.00	50.00
All products	1	500.00	500.00
Totals	18	3088.21	171.57

When geographic region is considered, four of the 18 barriers with at least \$50 million in estimated trade impact are imposed by countries in the Americas, eight such barriers are imposed by countries in East Asia, and six are imposed by countries in Europe (see Table 4.13). There are no barriers in this category identified in the Africa, Oceania, or Middle East regions.

Table 4.13. Geographic region where questionable technical barriers with at least \$50 million in estimated trade impact are imposed

Geographic Region	Number of Barriers	Estimated Trade Impact	Average Trade Impact per Barrier
		----- \$ million -----	
Americas	4	761.00	190.25
East Asia	8	1771.40	221.43
Europe	6	555.81	92.64
Totals	18	3088.21	171.57

4.4.b. Characterization of Questionable Technical Barriers with less than \$5 million in Estimated Trade Impact

A much larger number of barriers with small estimated trade impacts are identified in the Survey. The total estimated trade impact from all 166 barriers with impacts less than \$5 million per barrier is \$200.05 million.

Similar to barriers with estimated trade impacts greater than \$50 million, the barriers with estimated trade impacts less than \$5 million are concentrated among regulations addressing concerns over commercial plant and animal health (see Table 4.14). The 166 barriers are addressed to 172 regulatory goals. Of the goals that were classifiable, the average trade impact per regulatory goal is highest among the food safety barriers.

Table 4.14. Regulatory goals of questionable technical barriers with less than \$5 million in estimated trade impact

Regulatory Goal	Incidence of Goal	Estimated Trade Impact	Average Trade Impact per Goal
		----- \$ million -----	
Commercial production	109	128.11	1.18
Food safety	39	47.76	1.22
Product quality	19	17.34	0.91
HNIS	1	0.01	0.01
Compatibility	2	2.34	1.17
Non-classifiable	2	4.50	2.25
Totals	172	200.05	1.16

There were 168 market restrictions imposed by the 166 barriers with less than \$5 million estimated trade impact. As shown in Table 4.15, 152 of these restrictions were classified as market access or expansion and only 16 were classified as market retention. Like the barriers with at least \$50 million in estimated trade impacts examined in the previous section, the highest percentage of restrictions for the barriers with less than \$5 million in estimated trade impacts are identified as limiting market expansion. In contrast to the barriers with the most trade impact, a much higher proportion are identified as market access restrictions and a much smaller proportion of the smallest barriers are identified as market retention restrictions.

Table 4.15. Type of market restriction from questionable technical barriers with less than \$5 million in estimated trade impact

Type of Market Restriction	Incidence of Restriction	Estimated Trade Impact	Average Trade Impact per Restriction
		----- \$ million -----	
Access	65	73.15	1.13
Expansion	87	105.89	1.22
Retention	16	21.01	1.31
Totals	168	200.05	1.18

Over 36 percent of the barriers with less than \$5 million in estimated trade impact enact process standards as the policy instrument (see Table 4.16). Bans and partial bans are more frequently used among these barriers when compared to those with impacts greater than \$50 million. Bans and partial bans account for 30 percent of the incidence of instruments, and an even higher percent (36) of the total estimated trade impact instruments.

Table 4.16. Policy instrument utilized by questionable technical barriers with less than \$5 million in estimated trade impact

Policy Instrument	Incidence of Instrument	Estimated Trade Impact	Average Trade Impact per Instrument
		----- \$ million -----	
Ban	39	56.34	1.44
Partial ban	13	16.45	1.27
Process standards	63	50.10	0.80
Product standards	36	46.14	1.28
Package standards	5	3.22	0.64
Information requirements	2	2.15	1.07
Non-classifiable	14	25.65	1.83
Totals	172	200.05	1.16

Of the 166 barriers with the smallest estimated trade impacts, many tend to be applied to very specific commodities; some examples are live crayfish, game meat, smoked eel, or dry peas. When grouped together in product categories, the largest number of barriers in this group is applied to fruit, followed by further processed foods and vegetables (see Table 4.17).

Table 4.17. Product categories affected by questionable technical barriers with less than \$5 million in estimated trade impact

Product Category	Number of Barriers	Estimated Trade Impact	Average Trade Impact per Barrier
		----- \$ million -----	
Fruits and Vegetables	65	84.56	1.30
Fruit	35	45.66	1.30
Vegetables	17	14.91	0.88
Citrus	8	12.10	1.51
All fruit and citrus	4	8.80	2.20
All fruit and vegetables	1	3.09	3.09
Grains and Feed	10	8.47	0.85
Grains	3	2.00	0.67
Oilseeds	5	3.47	0.69
Feedgrains and forages	2	3.00	1.50
Livestock and Poultry	57	66.13	1.16
Poultry	13	27.04	2.08
Beef	10	14.80	1.48
Pork	6	6.80	1.13
Dairy	1	1.00	1.00
Eggs	3	1.25	0.42
Livestock genetics	15	10.88	0.73
All meat	7	3.36	0.48
All animal products	1	1.00	1.00
Other Categories	35	40.90	1.17
Further processed foods	22	10.64	0.48
Seed	7	25.16	3.59
Forestry	2	2.00	1.00
Fish	2	1.10	0.55
Nuts	1	1.50	1.50
All products	1	0.50	0.50
Totals	166	200.05	1.20

In contrast to barriers with estimated trade impacts greater than \$50 million which were concentrated in three regions, barriers with estimated trade impacts less than \$5 million are found in all six of the geographical regions. Of the 166 barriers identified, 33 percent are imposed by countries in the Americas and 23 percent are imposed by countries in Europe (see Table 4.18). The proportion of barriers identified in East Asia is only one-half as much for

barriers with less than \$5 million in estimated trade impact (22 percent) as it is for barriers with at least \$50 million in estimated trade impact (44 percent).

Table 4.18. Geographic region where questionable technical barriers with less than \$5 million in estimated trade impact are imposed

Geographic Region	Number of Barriers	Estimated Trade Impact	Average Trade Impact per Barrier
		----- \$ million -----	
Africa	10	13.30	1.33
Americas	55	74.55	1.36
East Asia	36	41.17	1.14
Europe	38	36.01	0.95
Middle East	8	9.60	1.20
Oceania	19	25.42	1.34
Totals	166	200.05	1.20

4.5. Cross-tabulation of Questionable SPS Barriers to U.S. Agricultural Exports by Type of Market Restriction

In the previous two sections, individual Survey observations were characterized by a number of factors and questionable technical barriers with the most and least estimated trade impacts were compared. In this section, the barriers governed by the TBT Agreement, multiple Agreements, or other provisions of GATT 1994 are dropped from the analysis. A series of cross-tabulations is calculated for the remaining SPS barriers by type of market restriction. In order to highlight further distinctions, SPS barriers for each type of market restriction are sub-classified by geographic region. This final set of tables presents cross-tabulation results for those cases where the total estimated trade impact is greater than \$50 million and/or the number of barriers is greater than ten for the chosen criteria. This will highlight categories where there are either a large number of barriers, or few barriers with large estimated impacts on trade, or both.

Table 4.19 characterizes the questionable SPS barriers identified in the Survey by type of market restriction, level of processing, and geographic region. Most questionable SPS market access barriers are imposed on final products (either processed or unprocessed). There are only four SPS market access barriers in the bulk commodities and only ten barriers applied to intermediate goods. The majority of SPS market access barriers are fairly evenly distributed among the Americas, East Asia, and Europe, with the Americas having a significantly lower estimated trade impact per barrier.

Table 4.19. SPS barriers in the 1996 USDA Survey by type of market restriction, level of processing, and geographic region

	Type of Market Restriction					
	Access		Expansion		Retention	
	No.	Estimated Trade Impact	No.	Estimated Trade Impact	No.	Estimated Trade Impact
		--\$ mill--		--\$ mill--		--\$ mill--
Level of Processing						
Bulk	4	62.50	24	550.70	5	440.00
Intermediate	10	15.00	23	164.13	7	155.17
Final-unprocessed	51	255.30	43	256.51	6	88.41
Final-processed	35	343.85	42	1755.31	18	337.35
Totals	100	676.65	133	2727.15	36	1020.93
Geographic Region						
Africa	1	11.00	13	99.80	2	2.50
Americas	28	89.55	42	411.60	19	627.41
East Asia	30	212.13	35	1919.40	4	74.95
Europe	24	277.45	25	209.15	8	267.36
Middle East	---	---	4	32.80	1	4.71
Oceania	17	86.52	14	54.40	2	44.00
Totals	100	676.65	133	2727.15	36	1020.93

--- no questionable technical barriers identified in this category

The largest number of SPS barriers are classified as market expansion issues. Although the majority of questionable expansion barriers are imposed on final products (processed and unprocessed) there are a significant number of bulk and intermediate goods affected with large estimated trade impacts in the bulk products. The number of expansion barriers is greater than ten for every region except the Middle East. The largest number of barriers is found in the Americas but the largest estimated trade impact, by far, is found in East Asia.

Half of the questionable SPS market retention barriers are imposed on final-processed products. The total estimated trade impact in this category is \$337.35, but when divided by the number of barriers, the average estimated trade impact per barrier for retention barriers applied to final-processed products is only \$18.74 million. The fewest number of retention barriers is found in bulk products but the total estimated trade impact is \$440.00 million. The majority of retention barriers are identified in the Americas (19), followed by Europe (8), and East Asia (4). Total estimated trade impact follows a similar pattern; \$627.41 million is identified in the Americas, followed by Europe (\$267.36 million), and East Asia (\$74.95 million).

Table 4.20 shows how the SPS market access, expansion, and retention barriers are divided among product categories. Half of the access barriers and the largest total estimated trade impact are found in fruit products. The number and estimated trade impact of access barriers for vegetable and poultry products are almost equal. There are fewer barriers identified among beef products but the total estimated trade impact is large (\$154.80 million). Among the

expansion barriers, there are more than ten barriers identified for fruit, grain, further processed, and seed products. Among these four product categories, the estimated trade impact per barrier is highest for further processed products. There are four expansion barriers that affect all agricultural products and have a total estimated trade impact of \$530 million. In contrast, among retention barriers, grain barriers have the largest estimated trade impact but the greatest number of barriers is found in further processed foods.

Table 4.20. SPS barriers in the 1996 USDA Survey by type of market restriction and product category

Product Category	Type of Market Restriction					
	Access		Expansion		Retention	
	No.	Estimated Trade Impact -- \$ mill --	No.	Estimated Trade Impact -- \$ mill --	No.	Estimated Trade Impact -- \$ mill --
Fruits and Vegetables	50	253.80	41	240.49	6	88.41
Fruit	31	177.10	19	123.82	4	87.40
Vegetables	13	50.00	8	24.40	2	1.01
Citrus	5	25.20	9	76.90	---	---
All fruit and citrus	1	1.50	4	12.30	---	---
All fruit and vegetables	---	---	1	3.09	---	---
Grains and Feed	5	62.52	26	590.30	4	406.00
Grains	4	62.50	18	518.00	3	406.00
Oilseeds	1	0.02	4	16.30	---	---
Feedgrains and forages	---	---	4	56.00	---	---
Livestock and Poultry	36	298.23	25	136.73	12	276.54
Poultry	12	53.00	6	20.20	3	4.84
Beef	6	154.80	2	3.50	3	8.50
Pork	7	70.80	2	2.00	1	2.00
Beef and pork	1	11.00	1	50.00	---	---
Dairy	---	---	1	1.00	---	---
Eggs	1	0.10	3	11.15	---	---
Livestock genetics	7	7.98	6	46.25	---	---
All meat	2	0.55	4	2.60	3	60.20
All animal products	---	---	---	---	2	201.00
Other Categories	9	62.10	41	1759.63	15	249.98
Further processed	2	3.50	15	1022.85	7	70.82
Seed	2	7.00	14	68.28	6	136.87
Forestry	1	10.00	5	77.00	---	---
Fish	3	40.10	2	51.00	---	---
Cotton	---	---	1	10.00	2	42.30
Nuts	1	1.50	---	---	---	---
All products	---	---	4	530.50	---	---
Totals	100	676.65	133	2727.15	36	1020.93

--- no questionable technical barriers identified in this category

In the following three tables, further distinctions are drawn between the SPS barriers affecting market access, expansion, and retention, respectively. These tables report results only when the total estimated trade impact is greater than \$50 million and/or the number of barriers is greater than ten for a particular cross-tabulation in order to highlight those categories where there are either a large number of barriers, or few barriers with large estimated impacts on trade, or both. Because the entries are limited in this way, each category will represent a different subset of barriers within the Survey and the summed values reported in these tables will differ from those reported above. Comparison of these values with totals in the preceding tables will indicate what percentage of barriers and estimated trade impact from the Survey is included.

In Tables 4.21, 4.22, and 4.23, questionable SPS barriers are aggregated across regions, processing, and product categories for market access, expansion, and retention barriers. As shown in Table 4.21, market access is most frequently restricted in final products. Questionable measures are more frequently applied to unprocessed products in the Americas and East Asia and to processed products in Europe and Oceania. The impacts and incidence are larger among the meat commodities in Europe while barriers affecting fruit commodities are concentrated in East Asia and the Americas.

Table 4.21. SPS market access barriers in the 1996 USDA Survey by geographic region, level of processing, and product category

	Geographic Region*			
	Americas	East Asia	Europe	Oceania
	Estimated Trade Impact (number of barriers) ---- \$ million ----			
Level of Processing				
Final-Unprocessed	31.25 (17)	205.05 (26)	---	---
Final-Processed	---	---	259.45 (20)	58.00 (6)
Totals	31.25 (17)	205.05 (26)	259.45 (20)	58.00 (6)
Product Category				
Fruit	22.10 (11)	139.00 (14)	---	---
Beef	---	---	154.80 (6)	---
Pork	---	---	68.00 (4)	---
Totals	22.10 (11)	139.00 (14)	222.80 (10)	---

--- less than ten barriers or \$50 million in estimated trade impact identified in this category

* there are no categories in the Africa or Middle East regions with more than ten barriers or \$50 million in estimated trade impact

The SPS market expansion barriers in the Survey are categorized in Table 4.22. There are a large number of barriers with relatively small estimated trade impacts per barrier among the final-unprocessed products and fewer barriers with larger trade impacts in the bulk commodities. By far the largest estimated trade impact is found among final-processed products in the East Asia region.

When product categories are considered by region for SPS market expansion barriers there are a larger number of barriers in the fruit commodities and a smaller number of barriers in the grain commodities in the Americas, but the estimated trade impact shows the opposite relationships; impacts per barrier are small in the fruit commodities and larger in the grain commodities. In East Asia, there is a large estimated trade impact from barriers among further processed foods and one large barrier affecting all agricultural products. In European countries, the largest impacts are found in beef and pork, and forestry products. Grain is the most prevalent product category facing barriers in the African region.

Table 4.22. SPS market expansion SPS barriers in the 1996 USDA Survey by geographic region, level of processing, and product category

	Geographic Region*			
	Africa	Americas	East Asia	Europe
	Estimated Trade Impact (number of barriers) ----- \$ million -----			
Level of Processing				
Bulk	62.70 (5)	269.00 (6)	142.00 (4)	---
Intermediate	---	55.88 (7)	58.05 (4)	---
Final-Unprocessed	---	57.52 (20)	183.94 (17)	---
Final-Processed	---	---	1535.41 (10)	144.35 (16)
Totals	62.70 (5)	382.40 (33)	1919.41 (35)	144.35 (16)
Product Category				
Fruit	---	28.32 (10)	90.50 (7)	---
Citrus	---	---	69.50 (5)	---
Grains	62.00 (4)	259.00 (5)	140.00 (3)	---
Beef and Pork	---	---	---	50.00 (1)
All products	---	---	500.00 (1)	---
Further processed foods	---	---	983.80 (5)	---
Forestry	---	---	---	66.00 (3)
Fish	---	---	50.00 (1)	---
Totals	62.00 (4)	287.32 (15)	1833.80 (22)	116.00 (4)

--- less than ten barriers or \$50 million in estimated trade impact identified in this category

* there are no categories in the Middle East or Oceania regions with more than ten barriers or \$50 million in estimated trade impact

The SPS market retention barriers are sub-categorized by geographic region, level of processing, and product category in Table 4.23. In the Americas SPS market retention barriers are most prevalent among intermediate and final-processed products with three large barriers among the bulk products, which are grains. In East Asia, SPS retention barriers are prevalent among final-unprocessed products, which are fruit categories. In Europe the largest number of SPS retention barriers are applied to further processed foods, with the largest estimated trade impact among two large barriers applied to all animal products.

Table 4.23. SPS market retention barriers in the 1996 USDA Survey by geographic region, level of processing, and product category

	Geographic Region*		
	Americas	East Asia	Europe
	Estimated Trade Impact (number of barriers) ----- \$ million -----		
Level of Processing			
Bulk	406.00 (3)	---	---
Intermediate	155.17 (7)	---	---
Final–unprocessed	---	72.95 (3)	---
Final–processed	50.78 (6)	---	257.36 (7)
Totals	611.95 (16)	72.95 (3)	257.36 (7)
Product Category			
Fruit	---	71.95 (2)	---
Grains	406.00 (3)	---	---
All animal products	---	---	201.00 (2)
Further processed foods	---	---	60.01 (5)
Seed	136.87 (6)	---	---
Totals	542.87 (9)	71.95 (2)	261.01 (7)

--- less than ten barriers or \$50 million in estimated trade impact identified in this category

* there are no categories in the Africa, Middle East or Oceania regions with more than ten barriers or \$50 million in estimated trade impact

4.6. Aggregation of Questionable Technical Barriers to U.S. Agricultural Exports by Country

The previous sections examined the characteristics of individual questionable technical barriers identified in the Survey. In this section, measures identified in the Survey are aggregated by country to provide another profile of the incidence and impact of technical barriers. This analysis helps to clarify whether use of questionable technical barriers is concentrated among a few “problematic” countries or more dispersed. In addition, the extent to which questionable technical barriers affect trade with each country is evaluated in absolute terms, by the estimated trade impact, and in relative terms, where total trade impact is measured as a percentage of agricultural exports to that country.

4.6.a. Number of Questionable Technical Barriers

The distribution of the number of questionable technical barriers by country is skewed to the left, as shown in Table 4.24. Over 65 percent of the 63 countries imposing any barriers have between one and four barriers each. Six countries are identified with 10-20 questionable barriers and two countries are identified with more than 20 such barriers.

Table 4.24. Distribution of countries in the 1996 USDA Survey by number of questionable technical barriers

Number of Barriers	Number of Countries
more than 20	2
10-20	6
5-9	13
2-4	25
1	17
0	71
Total	134

Table 4.25 lists the eight countries with ten barriers or more reported in the Survey. These countries account for 46 percent of all the questionable technical barriers identified. South Korea has the most questionable technical barriers reported (27). Japan and Australia also have 20 or more questionable barriers reported. Of the eight countries listed in Table 4.25, four are from East Asia and three are from the Americas.

Table 4.25. Countries with ten or more questionable technical barriers identified in the 1996 USDA Survey

Country	Number of Barriers
South Korea	27
Japan	21
Australia	20
China	18
Mexico	15
Chile	15
Taiwan	12
Argentina	12
Total	140

4.6.b. Estimated Trade Impact

The estimated trade impact per barrier is aggregated by country to calculate total estimated trade impacts among U.S. export markets. The majority of countries with one or more questionable technical barriers identified in the Survey have total estimated trade impacts between \$1 million and \$50 million (see Table 4.26). There are only three countries with total estimated trade impacts of \$500 million or more.

Table 4.26. Distribution of countries in the 1996 USDA Survey by total aggregate estimated trade impact from questionable technical barriers

Estimated Trade Impact	Number of Countries
----- \$ million -----	
more than 1000	1
500 - 1000	2
100 - 499.9	5
50 - 99.9	7
10 - 49.9	23
1 - 9.9	22
less than 1	3
Total	63

Seven of the eight countries shown in Table 4.25 with more than ten barriers also have more than \$50 million in total estimated trade impact, as shown in Table 4.27. In addition, the EU (counted as one “country”), Brazil, Colombia, Egypt, Canada, Russia, India, and South Africa are reported to have total estimated trade impacts from questionable technical barriers greater than \$50 million. South Korea and Japan, the two countries with the largest number of questionable barriers, are also the two countries with the highest total estimated trade impact.

Table 4.27. Countries with greater than \$50 million in total aggregate estimated trade impact identified in the 1996 USDA Survey

Country	Estimated Trade Impact
	-----\$ million-----
South Korea	1212.81
Japan	698.50
EU	505.96
Mexico	327.30
Brazil	369.06
China	330.15
Colombia	256.00
Egypt	109.10
Canada	99.75
Russia	86.23
Taiwan	83.84
Chile	74.35
Australia	68.40
India	65.52
South Africa	51.50
Total	4338.47

4.6.c. Estimated Percentage Trade Impact

The total estimated trade impact of questionable technical barriers, by itself, does not give a complete picture of their potential misuse. There is a great deal of variation in the volume and value of U.S. agricultural exports to particular countries. This variation could mask the relative magnitude of the estimated trade impacts of barriers identified in the Survey. Therefore, the estimated trade impact is normalized and converted to a percentage impact measure to provide further insights.

There are several ways to calculate percentage impact. One approach is to estimate trade impact per country from the Survey divided by total 1996 U.S. agricultural exports to that country, as measured by BICO. Table 4.28 shows a distribution of the 63 countries with one or more barriers reported in the Survey by this estimated percentage impact.

If the estimated trade impact from questionable technical barriers is large relative to the amount of agricultural exports to that country, the percentage impact will be large. There are two countries with percentage impacts greater than 100. If there were no 1996 exports, then the percentage impact will approach infinity as total estimated trade impact is divided by zero. There are two such cases shown in Table 4.28.

Table 4.28. Distribution of countries in the 1996 USDA Survey by estimated percentage trade impact from questionable technical barriers relative to all 1996 U.S. agricultural exports

Percentage Impact*	Number of Countries
N/A (division by zero)**	2
>100	2
76-100	1
51-75	5
26-50	6
11-25	12
1-10	24
<1	11
Total	63

* percentage impact is calculated as total estimated trade impact divided by total 1996 U.S. agricultural exports (BICO)

** when technical barriers, and other trade restrictions, are prohibitive, no U.S. agricultural exports were recorded in 1996 and the calculated percentage impact from questionable technical barriers goes to infinity

Excluding the two countries where the percentage estimated trade impact goes to infinity, Table 4.29 lists the eight countries with percentage impacts greater than 50 percent. Only three countries (Brazil, India, and Chile) with percentage impacts greater than 50 also had total estimated trade impacts greater than \$50 million (see Table 4.27). The three countries with

estimated trade impacts more than \$500 million have percentage impacts less than 50. In these three countries, while the absolute impacts from questionable technical barriers on trade are large the total amount of agricultural trade with these countries is also large. Therefore, the proportion of agricultural trade affected by questionable technical barriers in these countries is lower than that of those countries shown in Table 4.29 where the total amount of 1996 agricultural trade is not as large.

Table 4.29. Countries with greater than 50 percent estimated trade impact identified in the 1996 USDA Survey relative to all U.S. agricultural exports

Country	Percentage Impact*
Slovakia	412.20
Czech Republic	107.41
Azerbaijan	90.74
Lithuania	75.14
Brazil	63.47
Hungary	58.44
India	57.52
Chile	52.76
Average	114.71

* percentage impact is calculated as total estimated trade impact divided by total 1996 U.S. agricultural exports (BICO)

Sixteen countries are selected from the Survey that have more than ten barriers, shown in Table 4.25, or greater than \$50 million in estimated trade impact, shown in Table 4.27. These 16 countries account for 64 percent of all the barriers identified in the Survey and 89 percent of the total estimated trade impact. Table 4.30 reinforces the point that countries which are identified with the greatest extent of technical barrier misuse against U.S. agricultural trade in absolute terms, are generally countries that import relative large volumes of U.S. agricultural products. Therefore, in relative terms, the percentage impact from questionable technical barriers is not as large as it is in some other countries.

Table 4.30. Countries from the 1996 USDA Survey with more than ten barriers or greater than \$50 million in total aggregate estimated trade impact

Country	Number of Barriers	Estimated Trade Impact	Percentage Impact*
		-----\$ million-----	ETI/exports
South Korea	27	1212.81	28.42
Japan	21	698.50	4.20
Australia	20	68.40	17.20
China	18	330.15	15.07
Mexico	15	327.30	5.74
Chile	15	74.35	52.76
Taiwan	12	83.84	2.66
Argentina	12	31.96	18.80
Brazil	9	369.06	63.47
Canada	9	99.75	1.27
Egypt	7	109.10	8.61
EU	6	505.96	4.80
Colombia	5	256.00	41.07
Russia	6	86.23	6.40
India	6	65.52	57.52
South Africa	6	51.50	15.88
Totals	194	4370.43	21.49

* percentage impact is calculated as estimated trade impact divided by 1996 U.S. agricultural exports

Since there is additional variability among the level of trade by commodity, a second approach to calculate percentage impact is to consider trade volume in the specific commodities that are being affected by questionable technical barriers. Percentage impact is calculated as the total estimated trade impact from the Survey results divided by U.S. exports of the commodities subject to questionable technical barriers in the previous year, as defined in the USDA Survey. While the overall percentage impact calculated relative to total U.S. agricultural exports is not high for the majority of the countries with high total estimate trade impacts, these additional calculations may show that trade is particularly impacted in specific commodities. Again, if the total estimated trade impact from questionable technical barriers is large relative to the amount of specified exports to that country, the percentage impact will be large. If there were no exports of these commodities in the previous year (1995), then the percentage impact will approach infinity.

The distribution of percentage impact by commodity is shown in Table 4.31. Six countries have percentage impacts approaching infinity, 11 additional countries have percentage impacts greater than 250 percent, 21 countries have impacts between 100 and 250 percent, and 25 countries have impacts less than 50 percent. A large number of countries with greater than

100 percent impacts, indicates that questionable technical barriers are having a very limiting effect on trade in specific commodities.

Table 4.31. Distribution of countries in the 1996 USDA Survey by estimated percentage trade impact relative to 1995 U.S. exports of the commodities subject to questionable technical barriers

Percentage Impact*	Number of Countries
N/A (division by zero)**	6
more than 1000	5
501-1000	2
251-500	4
101-250	11
51-100	10
11-50	21
0-10	4
Total	63

* percentage impact is calculated as estimated trade impact divided by 1995 U.S. commodity group exports (USDA Survey)

** when technical barriers, and other trade restrictions, are prohibitive, no U.S. exports in those commodities were recorded in 1995 and the calculated percentage impact from questionable technical barriers goes to infinity

Excluding the six countries where the percentage estimated trade impact approaches infinity, Table 4.32 shows the eleven countries with estimated percentage impacts by commodity greater than 250 percent for all barriers and of those affecting market access, expansion, and retention. Of the countries listed, only Australia and Brazil were identified earlier in Table 4.27 among those countries having absolute total estimated trade impacts greater than \$50 million. Three countries (Lithuania, Czech Republic, and Brazil) have both percentage impacts across all U.S. agricultural exports greater than 50 percent, as shown in Table 4.29, and percentage impacts by commodity greater than 250 percent. As shown by Table 4.32, when access barriers are in place the quantity of those commodities exported in the previous year (1995) tended to be small as well. Thus the percentage impacts for access barriers becomes very large.

Table 4.32. Countries with greater than 250 percent estimated trade impact identified in the 1996 USDA Survey relative to 1995 U.S. exports of the commodities subject to questionable technical barriers by type of market restriction

Country	Percentage Impact*			
	All barriers	Access	Expansion	Retention
Cote D'Ivoire	7500	---	7500	---
Jamaica	2083	2083	---	---
Sweden	2033	14000	36	---
Bulgaria	1765	1765	---	---
Finland	1581	---	1581	---
New Zealand	713	3695	27	---
Australia	599	18972	183	---
Lithuania	478	**	261	---
Czech Republic	421	11321	108	---
Brazil	385	5000	288	104
France	259	543	39	---
Average	1620	6375	1114	104

--- no questionable barriers reported in this category

* percentage impact is calculated as estimated trade impact divided by 1995 U.S. commodity group exports (USDA Survey)

** no 1995 U.S. exports of these specific products reported, percentage impact goes to infinity

When the percentage impact by commodities subject to technical barriers is calculated for the countries with the highest absolute total impact the resulting value is often much smaller, indicating a larger total volume of 1995 trade flow in the commodities identified (see Table 4.33). In particular South Korea and Japan, which had the largest absolute estimated trade impacts, as shown earlier in Table 4.27, have very small percentage impacts by commodities subject to questionable technical barriers. Besides Australia, only Brazil, Chile, and Taiwan are countries with a total estimated trade impact greater than \$50 million and a percentage impact of all barriers by commodity greater than 100. Again, the percentage impact gets very large when exports approach zero, as is often the case for access barriers.

Table 4.33. Percentage impact relative to 1995 U.S. exports of the commodities subject to questionable technical barriers for countries with more than \$50 million in total aggregate estimated trade impact by type of market restriction

Country	Percentage Impact*			
	All barriers	Access	Expansion	Retention
South Korea	22	48902	21	---
Japan	12	828	11	---
EU	37	371	43	23
Mexico	14	50000	12	14
Brazil	385	5000	288	104
China	57	18702	39	---
Colombia	99	100	44	100
Egypt	12	---	11	100
Canada	4	---	4	---
Russia	74	**	24	100
Taiwan	102	**	95	100
Chile	139	122	---	---
Australia	599	18972	183	---
India	70	**	24	---
South Africa	14	---	13	110
Average	109	11916	58	81

--- no questionable barriers reported in this category

* percentage impact is calculated as estimated trade impact divided by 1995 U.S. commodity group exports (USDA Survey)

** no 1995 U.S. exports of these specific products reported, percentage impact goes to infinity

In Table 4.34, the percentage impact is calculated among commodity groups for the countries with the largest absolute trade impact from all barriers. On average percent impacts are higher among the fruit and vegetable and processed product categories. In particular, percent impacts are greater than 250 percent for fruit and vegetables in China, Chile, and Australia; for grain products in Brazil; for animal products in Brazil and Chile; and for processed products in Taiwan and Egypt.

Table 4.34. Percentage impact relative to 1995 U.S. exports of the commodities subject to questionable technical barriers for countries with more than \$50 million in total aggregate estimated trade impact by product group

Country	Product Group			
	Fruits and Vegetables	Grains and Feed	Livestock and Poultry	Further Processed
	Percentage impact*			
South Korea	113	---	7	70
Japan	44	21	---	10
EU	---	100	36	---
Mexico	52	7	10	---
Brazil	197	449	369	46
China	803	26	175	---
Colombia	20	100	---	---
Egypt	235	4	168	398
Canada	8	---	15	1
Russia	---	---	54	100
Taiwan	101	---	58	1383
Chile	11641	76	2434	---
Australia	4910	158	**	160
India	---	214	**	12
South Africa	---	32	40	---
Average	1647	108	259	402

--- no questionable barriers reported in this category

* percentage impact is calculated as estimated trade impact divided by 1995 U.S. commodity group exports (USDA Survey)

** no 1995 U.S. exports these specific products reported, percentage impact goes to infinity

4.7. Limitations of the Data

The 1996 USDA Survey provides a systematic data source for evaluation of the incidence and impact of questionable technical barriers to U.S. agricultural exports. Previous attempts at such an evaluation have been constrained by the lack of consistent data. The Survey was elicited to overcome this constraint and includes primary data reflecting expert consensus-based views on questionable technical barriers. Identification of the 302 barriers confirms the wide scope of technical barriers in international agricultural markets, as described in the tables above. The estimates provided for actual or potential U.S. trade losses from technical barriers contribute to a greater understanding of the relative importance of questionable technical barriers.

The design of the USDA survey also has some limitations in terms of interpretation of the data as indicators of the prevalence and effect of technical barriers to agricultural trade. Since the data set only includes questionable technical restrictions faced by U.S. agricultural exports,

the most significant limitation for a world-wide assessment is a lack of trade restrictions against the agricultural exports of other nations. No U.S. technical barriers and no barriers except against U.S. exports are included. The data do not represent an inventory of world technical barriers, but only those faced by U.S. agricultural exports.

There are only a limited number of barriers in the Survey which are questionable under the GATT TBT Agreement. Although restrictions under this Agreement were considered in the Survey, the major focus of the survey was on barriers questionable under the SPS Agreement. Therefore, while the Survey can be considered a complete documentation of questionable SPS barriers faced by U.S. agricultural products in 1996, it cannot be considered complete for the TBT barriers.

The number of barriers reported is a reflection of the level of commodity aggregation. For example, if a restriction is placed against imports of U.S. pork and beef it will be counted as one barrier against an aggregated product instead of two barriers; one each for beef and pork. However, through the iterative survey process and review of Survey results, the aggregation procedure was consistently applied across observations. Therefore, the count of barriers is consistent within the data set, although the number of barriers in the Survey results may not be directly comparable with other data sources.

Although the estimated trade impacts can be viewed as an order-of-magnitude indication of the significance of the barriers for U.S. exporter, these values are consensus estimates supplied by FAS economists and reviewed by USDA regulatory personnel, not results derived from formal empirical trade models. The values reflect estimates of the trade impact of the barriers, a loss in trade revenue at constant 1996 world prices. Associated welfare changes are not included in the estimation. The survey results provide only limited evidence about potential gains that could be realized from regulatory reform.

Even with these data limitations, the 1996 USDA Survey provides a consistent, reliable source of information about the incidence and impact of questionable technical barriers as they were applied to U.S. agricultural exports in June 1996. As international interest in these regulatory measures grows, other agencies or researchers may provide further data characterizing the extent of technical barrier misuse. In addition, over time, the WTO notification and dispute resolution records will provide a systematic source of data concerning technical barriers. At this time, the USDA Survey provides the most complete, systematic source of data available.

4.8. Conclusions

The 1996 USDA Survey of Technical Barriers to U.S. Agricultural Exports provides a new primary data source for questionable technical trade measures. Previously there has not been a systematic database for evaluating the existence and extent of these barriers on an aggregate basis. Results indicate that questionable technical barriers are widely used. Although no questionable technical barriers to U.S. agricultural exports in 1996 were reported for over one-half of the countries included in the survey, there were a total of 302 barriers identified

among 63 countries. The estimated trade impact of the questionable barriers was almost \$5 billion. The extent of proliferation of questionable technical barriers is illustrated by the finding that the majority (55 percent) of these barriers had small estimated trade impacts of less than \$5 million each. There were only 18 barriers reported with estimated trade impacts greater than \$50 million. Yet these 18 barriers accounted for almost 63 percent of the total trade impacts from questionable technical barriers.

The largest number of barriers with the greatest total estimated trade impact limited expansion of trade in existing markets. However, the highest average trade impact per barrier occurred when the retention of current trade was threatened, suggesting that the stakes tend to be high when there is a possibility of removing access to a market that is already established.

Bulk products, primarily concentrated in the grains product category, faced relatively few questionable barriers, but the average estimated trade impact per barrier was large. There were a large number of barriers applied to final-unprocessed products, but the average estimated trade impact per barrier was low. Final-unprocessed products were primarily concentrated in the fruit and vegetable commodities. The largest number of barriers and the greatest estimated trade impact was identified among final-processed products with further processed foods constituting the majority of these cases.

The pattern of questionable technical barriers follows the broad patterns of U.S. agricultural trade flows. Barriers in the Americas are concentrated among the grain and seed product groups. Barriers in East Asia are more prevalent among fruit and further processed foods. Barriers in Europe are concentrated in the animal products. There are fewer barriers in the Oceania, Africa, and Middle East regions with no concentration in any particular product category.

When the data is summarized by country, sixteen countries account for 64 percent of the barriers and 89 percent of the total estimated trade impact identified in the Survey. While the estimated trade impact of technical barriers applied by these countries appears large, when compared with total agricultural trade flow the percentage impact is much lower. Only three countries with a total estimated trade impact from questionable technical barriers greater than \$50 million also have an estimated percentage impact relative to all 1996 U.S. agricultural exports greater than 50 percent.

Results from the 1996 USDA Survey clearly indicate that technical barriers are used in international trade to provide economic-based protection for domestic producers. While only sixteen countries accounted for over one-half of the barriers and over \$4 billion in lost trade revenues identified, there were 47 countries utilizing questionable technical barriers with smaller impacts. These results indicate several areas of concern for free-trade advocates despite the intentions of the WTO to limit the misuse of technical barriers. The total disruptions to trade flows could potentially be much larger if a similar proliferation of barriers occurs among the other countries in the Survey.