

Measuring Agricultural Policies

Measuring Domestic Support

To develop a consistent measure of 1998 domestic support, we organize data from the 1998 OECD Producer Support Estimates (PSE), Agriculture Market Access Data (AMAD) tariffs, and WTO export subsidy notifications into a policy database that is consistent with the concept of domestic support as defined in the AMS (app. table 2-1). We do not use AMS data, since countries' AMS notifications to the WTO have been sporadic. PSE data are also not comprehensive: They are only available for OECD members.¹ However, three OECD countries, the European Union, Japan,

and the United States, account for over 80 percent of WTO domestic support reduction commitments.

While both the PSE and the AMS are measures of domestic support, their concepts differ. Thus, without further manipulation, the PSE database cannot be used for analyzing options for domestic policy reform using current WTO criteria. The PSE is a broad concept designed to measure overall developments in agricultural policies, across countries, based on a measure of current benefits to farmers (or costs to consumers and taxpayers). The PSE has two components: market price support and budgetary outlays. It includes the effects of trade policies (import barriers and export subsidies) in its measure of market price support, which is calculated as the gap between the domestic producer price and a current world reference price for each commodity. It also includes all government budget expenditures on farm programs, including exempt

¹AMS equivalents were estimated for 11 of the 15 OECD countries for 1998. Poland was selected to represent the transition economies. Turkey was excluded since it does not have any WTO domestic support reduction commitments. Iceland was excluded because it is not represented in the economic models used in this report.

Appendix table 2-1—Domestic subsidy expenditure in OECD countries, categorized by production impacts (excludes market price support programs)

	Australia	Canada	EU	Iceland	Japan	Korea	Mexico
<i>Percentage of value of production net of subsidies</i>							
Fixed payment per unit of output¹							
Unlimited/amber	0.3	0.8	0.0	0.0	0.1	0.0	0.0
Limited							
Amber	0.0	0.0	1.3	17.8	1.4	0.0	0.0
Blue	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fixed payment per unit of intermediate input²							
Unlimited/amber	0.0	2.1	0.5	0.0	0.0	0.8	0.3
Limited							
Amber	0.0	0.0	0.0	1.3	1.2	0.0	0.2
Blue ³	0.0	0.0	9.5	0.0	0.0	0.0	0.0
Direct and whole-farm payments⁴							
Unlimited/amber	0.0	1.3	0.0	0.0	0.0	0.0	0.0
Limited/amber	0.0	0.0	0.0	0.0	0.0	0.5	0.0
Green	0.8	0.3	1.6	9.8	0.0	0.0	4.0
Capital-based payments⁵							
Unlimited/amber	0.0	1.0	0.0	2.4	2.6	1.9	0.0
Limited/amber	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Green	0.1	0.0	1.7	0.0	0.0	0.0	1.0
Other policies with minimal impacts⁶	1.3	0.1	2.9	1.2	0.2	0.0	0.5
Total green	2.2	0.4	6.3	11.0	0.2	0.0	5.5
Total amber (excl. market price support)	0.3	5.2	1.8	21.5	5.3	3.2	0.5
Total blue	0.0	0.0	9.5	0.0	0.0	0.0	0.0

Continued

Appendix table 2-1—Domestic subsidy expenditure in OECD countries, categorized by production impacts (excludes market price support programs) —continued

	Norway	New Zealand	Poland	Switzerland	U.S.
	Percentage of value of production net of subsidies				
Fixed payment per unit of output¹					
Unlimited/amber	0.0	0.0	0.0	0.0	1.8
Limited					
Amber	0.0	0.0	0.0	0.0	0.0
Blue	29.5	0.0	0.0	0.0	0.0
Fixed payment per unit of intermediate input²					
Unlimited/amber	0.0	0.3	1.7	0.3	1.7
Limited					
Amber	0.0	0.0	0.0	0.2	0.0
Blue ³	0.2	0.0	0.0	0.0	0.0
Direct and whole-farm payments⁴					
Unlimited/amber	0.0	0.0	0.0	0.0	1.8
Limited/amber	0.0	0.0	0.0	0.0	0.0
Green	0.5	0.0	0.0	8.9	2.8
Capital based payments⁵					
Unlimited/amber	2.2	0.0	0.9	1.7	0.0
Limited/amber	0.0	0.0	0.0	0.0	0.0
Green	0.0	0.0	0.0	0.0	0.0
Other policies with minimal impacts⁶	5.4	0.0	0.7	13.4	3.3
Total green	5.9	0.0	0.7	22.3	6.1
Total amber (excl. market price support)	2.2	0.3	2.6	2.2	5.3
Total blue	29.7	0.0	0.0	0.0	0.0

1/ Includes variable and fixed payments per unit of output. 2/ Includes variable and fixed payments per unit of input. Includes crop insurance and payments on area or animal numbers if these affect relative returns and crop mix. Excludes disaster payments and credit subsidies. Environmental and conservation-oriented are assumed to be exempt as defined by Annex 2 of the URAA and are not included here. 3/ Includes programs in EU, Iceland, and Norway with offsetting supply controls. The EU has some blue policies with unique regulations that are not necessarily supply control but which are included here. 4/ Includes payments assumed to accrue jointly to land, labor, and/or capital—or to just land. Includes payments based on area (but not animal numbers) if these do not affect crop mix. Includes long-term real estate subsidies. There are no "blue land based payments," as blue box programs are usually commodity specific. 5/ Includes some exempt policies, reflecting that some of these payments are possibly production distorting. Includes payments based on specific nonland assets. May include short-term credit subsidies. 6/ Includes all other PSE data not included elsewhere. Includes URAA Annex 2 exempt policies except those assumed to accrue to land, such as decoupled direct payments. Includes environmental and conservation payments, disaster payments, and credit subsidies.

(green box programs), nonexempt (amber box), and blue box forms of domestic support (see box).

The AMS is a narrower measure. In contrast to the PSE, the AMS measures only the domestic support that is subject to URAA disciplines (amber box policies). In general, the AMS excludes explicit trade policies (import barriers and export subsidies) that are covered by the PSE because these policies have separate conditions placed on them by the URAA. The AMS calculation also excludes support that does not exceed 5 percent of the member's total value of production (10 percent for developing countries). Trade policies are included in the market price support component of the AMS only for commodities for which there is an administered price support program. In contrast to the PSE, the AMS calculation of market price support is measured as the gap between the current administered

price and a fixed reference price for each commodity. The reasoning is that the gap then reflects only those variables over which policymakers have control, rather than current market conditions.

For our analysis, we define "domestic support" as an economic concept based on the AMS. To calculate the PSE-based AMS, we reorganized and augmented the PSE data in four steps. First, we decomposed PSE data on budgetary outlays into green, amber, and blue box forms of support based on WTO notifications, when available, and ERS calculations.

Next, we identified commodities for which there are administered price support programs (app. table 2-2). For these commodities, we include a measure of market price support in our calculation of the AMS. Because our objective is to model production and consumption responses to changes in relative prices under policy

Classification of policy measures included in the OECD Producer Support Estimate

Producer Support Estimate (PSE) Sum of A to H

Examples of programs

A. Market Price Support

1. Based on unlimited output
2. Based on limited output

U.S. milk and sugar programs
EU and Canadian milk programs

B. Payments based on output

1. Based on unlimited output
2. Based on limited output

Norway deficiency payments program
Japanese rice payment, U.S. and Canadian crop insurance programs

C. Payments based on area planted animal numbers

1. Based on limited area or numbers
2. Based on unlimited area or numbers

EU compensatory payments

D. Payments based on historical entitlements

1. Based on historical plantings, animal numbers or production
2. Based on historical support programs

Mexico PROCAMPO
U.S. production flexibility contracts

E. Payments based on input use

1. Based on use of variable inputs
2. Based on use of on-farm services
3. Based on use of fixed inputs

Input subsidies, interest concessions
Extension services, pest and disease control
Capital grants, interest, and tax concessions

F. Payments based on input constraints

1. Based on constraints on variable inputs
2. Based on constraints on fixed inputs
3. Based on constraints on a set of inputs

Limits on fertilizer and pesticides
U.S. CRP
Organic farming

G. Payments based on over-all farming income

1. Based on farm income level
2. Based on established minimum income

Income tax concessions, Canadian NISA

H. Miscellaneous payments

1. National payments
2. Subnational payments

General Services Support Estimate

Consumer Support Estimate

Source: OECD (2000).

Appendix table 2-2—Commodities with administered market price support programs

	Wheat	Rice	Coarse grains	Oilseeds (includes soybeans)	Sugar (refined)	Milk	Beef and sheep	Other meat (pigs, etc.)	Wool	Miscellaneous
Australia										
Canada						X				
European Union	X	X	X		X	X	X			horticulture
Iceland						X	X	X		
Japan	X	X	X		X	X	X	X		potatoes
Korea		X	X	X			X			
Mexico					X					
Norway	X		X			X	X	X		potatoes
New Zealand										
Poland	X					X		X		
Switzerland	X		X	X		X	X	X		
Turkey										
United States					X	X				peanuts

Source: WTO notifications.

Appendix table 2-3—Links between OECD PSE data, WTO notifications, and effects of policies on production

	WTO "color"	Australia	Canada	EU	Japan	Korea	Mexico
Fixed \$/unit of output							
Unlimited	Amber	B1	B1	B1	B1		B1
Limited							
Nonexempt	Amber		B2	B2	B2		
Blue	Blue			B2			
Fixed \$/unit of intermediate input							
Unlimited	Amber		C1, E1	C1 (except livestock), E1 (livestock)		C1, E1	C1, E1
Limited							
Nonexempt	Amber				F2		C2
Blue	Blue			C2			
Direct, whole-farm payments							
Unlimited	Amber		(1 - .17) x G1				
Limited	Amber						
Exempt	Green	G	.17 x G1	D1, D2, F1, G1, G2, F2 (except beef)		G	D1+G2
Capital based payments							
Unlimited	Amber		E3		E1 + E3	E3	
Limited	Amber					F2	
Exempt	Green	E3		E3			E3
Other minimal impacts							
	Green	E2	H	C1 (lvstck), E1 (ex. lvstck), E2, F2(ex. beef), F3,H	E2	E2	E2

Continued—

reform, we attempt to measure the actual price wedges implied by the trade policies that are linked to a market price support program. Therefore, we incorporate the actual applied tariffs from the AMAD database and export subsidies based on WTO notifications. We do not use the broader measure of market price support as calculated in the OECD PSE, or the more narrow measure used in the AMS. In effect, we use tariff elimination to represent market price support elimination, recognizing that they are not fully equivalent. By eliminating the tariff, we may be overstating the effects of eliminating a domestic price support program, since in practice, the domestic program could be administratively removed while leaving tariffs in place. Such barriers can be beneficial to the domestic sectors without the need for administered prices, but the administered prices provide an additional layer of short-run protection to producers and also a strong incentive for the government to maintain effective barriers.

Third, we differentiate and model the impacts that different types of domestic subsidies can have on production and trade. Domestic subsidy expenditures are conceptualized as being separable into five generic types: subsidies linked to output; subsidies linked to inputs; whole-farm transfer payments that do not distort relative returns among sectors and which are often capitalized in land values; sector-specific subsidies to capital inputs; and subsidies with minimal trade impacts (app. table 2-3). The categorization of countries' policies according to their production effects is based on the new OECD PSE classification system and descriptions of the operation of specific policies and programs in the WTO notifications and other sources.

The AMS calculation also excludes support that does not exceed 5 percent of the member's total value of production (10 percent for developing countries). This *de minimis* support is included in our analysis on the

Appendix table 2-3—Links between OECD PSE data, WTO notifications, and effects of policies on production—*continued*

	WTO "color"	Norway	New Zealand	Poland	Switzerland	US
Fixed \$/unit of output						
Unlimited	Amber					B1
Limited						
Nonexempt	Amber					
Blue	Blue	B1, B2, C2 + 0.86*E1				
Fixed \$/unit of intermediate input						
Unlimited	Amber		E1	E1	C1 (corn), E1 (wheat)	Part of C1 & E1
Limited						
Nonexempt	Amber		F1,F3		F2 (beef)	
Blue	Blue	C1				
Direct, whole-farm payments						
Unlimited	Amber					G1, part D2
Limited	Amber					
Exempt	Green				D, G, F1, F2 (except beef)	Part of D2 & E3
Capital-based payments						
Unlimited	Amber	0.14*E1 + F2 + F3		E3	E3	
Limited	Amber					
Exempt	Green	F3				
Other minimal impacts	Green	E2 + E3	G	E2	B2+C1 (except corn)+C2+E2 +H2 +F3	E2,F,H2, & Part (C1&E1,E3)

Notes: Colors refer to whether the policies are subject to WTO disciplines. Letters refer to OECD PSE classification codes.

Source: ERS calculations.

assumption that trade distortions do not begin or end when a threshold is reached.²

Domestic subsidies are incorporated into the computable general equilibrium models (CGE) used in this report based on their linkage to production. Output subsidies directly stimulate output. Subsidies on intermediate and capital inputs raise output by lowering input costs. Some output and input subsidies (blue box) are offset with supply limitations; we incorporate these limitations explicitly as increases in aggregate land area or land productivity when the blue box programs are removed. The most important program modeled this way is the EU compensatory and set-aside payments program, which is modeled as an input subsidy linked to the production of specific crops, with explicit supply constraints to capture the set-aside requirements. Direct, whole-farm payments to farm households do not affect the crop mix or directly affect

aggregate production levels, but are capitalized in aggregate land values. We represent whole-farm programs in the CGE models as government transfers to households. These programs include the U.S. Production Flexibility Contracts, the Canadian National Income Stabilization Accounts (NISA), Mexican PROCAMPO payments, and some green box programs in the EU and EFTA countries, including landscape maintenance payments, environmental schemes, and disaster payments.

Direct, whole-farm payments are assumed to have minimal effects on production and trade; they are incorporated into the CGE models as payments to the farm household that increase aggregate consumption of all goods, including agricultural products. The extent to which farm household transfer payments may affect production is the subject of debate. Tielu and Roberts (1998) describe how decoupled payments may stimulate aggregate production through their effects on increasing farm investment by increasing wealth and lowering risk, reducing farm exit by raising land val-

² This overstates domestic support. For example, it includes U.S. support for programs such as crop insurance and irrigation subsidies that are considered de minimis for reporting to the WTO.

Appendix table 2-4—Sensitivity test: Effects of removing domestic subsidies in developed countries under alternative assumptions about coupling of direct payments to farm households

	World	Australia/ New Zealand	Japan/Korea	U.S.	Canada	EU	EFTA
Percentage change from the base year							
<i>Remove all domestic subsidies, no direct payments removed</i>							
World agricultural price	3.55						
Returns to farmland		4.11	-1.28	-1.38	1.93	-7.26	-21.43
Total social welfare (\$ billion)		0.24	-3.66	0.97	0.28	6.06	0.82
<i>Remove all domestic subsidies, with direct payments assumed mostly decoupled</i>							
World agricultural price	3.6						
Returns to farmland		3.65	-1.3	-8.71	-1.52	-14.49	-32.58
Total social welfare (\$ billion)		0.25	-3.89	1.04	0.31	5.92	0.83
<i>Remove all domestic subsidies, with direct payments assumed fully coupled</i>							
World agricultural price	4.78						
Returns to farmland		5.09	-0.63	-4.31	6.43	-7.2	-22
Total social welfare (\$ billion)		0.37	-6.5	1.23	0.34	5.52	0.81

Source: Diao, Somwaru, and Roe in this report.

ues, and encouraging continued output by creating expectations of future payments. The effects linked to wealth and risk are likely to be small (Young and Westcott, 2000; Burfisher, Robinson, and Thierfelder, 2000). We conduct a sensitivity experiment to test the importance to our analytical results of our assumption that whole-farm, land-based payments have minimal output effects. We analyze and compare the effects on production and trade of the full elimination of decoupled domestic subsidy payments, under the two assumptions that they have minimal effects on production, and that they behave as fully coupled output subsidies (app. table 2-4). We find that the assumption about the coupling of direct payments has relatively small effects on the results of our analysis. The change in the world agricultural price index from a full domestic subsidy removal by developed countries would be 4.8 percent if the direct payments are considered to be *fully* coupled, compared to 3.6 percent if they are minimally coupled. When direct payments are assumed to be fully coupled, welfare gains would be larger for the United States and Canada but slightly smaller for the EU and EFTA. Returns to farmland would be larger (or less negative) because higher world prices would help offset farmers' loss of the transfer payments. The relatively small effects from even an extreme assumption about the rate of coupling suggest that the potential benefits from reducing these kinds of programs may be quite small.

Finally, we estimate countries' 1998 support levels relative to their 1998 ceilings under the URAA by assum-

ing that the change in AMS levels, based on each country's most recent WTO notification, would be the same as the changes in PSE level, if there are missing years of AMS data. We then compare the implied AMS expenditures to their URAA ceiling commitments. To estimate support as a percent of ceiling in the final year of the URAA implementation, we assume 1998 levels of support are continued through 2000.

Tariff and Export Subsidy Data

Data on import tariffs are from the AMAD database. In order to analyze supply and demand responses to relative price changes, we use applied tariff data when available for developing countries, because there is often a substantial difference between their bound rates and the tariffs that they actually apply to imports. We use Uruguay Round bound rates for developed countries; their bound and applied rates are generally the same. The AMAD data include the over-quota tariff rates from TRQ regimes in its tariff database. This approach can lead to an overestimate of the tariff in the cases where imports are below the quota (and enter at lower, within quota rates) or where over-quota tariffs are not enforced. We adjusted AMAD tariffs in our analysis in those cases where the tariff represented an unenforced TRQ. The countries and commodities for which tariff rates were reduced from AMAD rates include imports of coarse grains and oilseeds by Japan, and imports of wheat and corn by Mexico.

Export subsidy rates were calculated using UN trade data and export subsidy value data from the WTO.