Chapter 2

Agricultural Support in the United States

Farm policy in the United States has its roots in the New Deal of the 1930s and the 1949 Agricultural Act, and it has developed through subsequent Farm Acts in 1985, 1990, 1996, 2002 and 2008. This chapter offers a brief review of the policy background and then evaluates the evolution of agricultural support during the past 25 years.

2.1. Policy background

Much of today's farm commodity policy has its origins in programmes established under the New Deal in the context of the Great Depression of the 1930s. The Agricultural Act of 1949 constitutes what is known as the "permanent" legal framework that governs support for commodity prices and incomes in the United States. The US Congress regularly enacts legislation that amends the provisions of the permanent law through various Acts, also known as Farm Bills, the latest form of such legislation being the Food, Conservation and Energy Act of 2008 (the 2008 Farm Act), which became law in June 2008 (Jones, Hanrahan and Womach, 2001).

Although the various Farm Acts all give most prominence to the issue of farm income and commodity price support policy, they actually encompass a much wider range of concerns related to agriculture, including agricultural trade and foreign food aid, conservation and environment, forestry, domestic food assistance (primarily food stamps), agricultural credit, rural development, agricultural research and education, and marketing-related programmes.

Originally, commodity programmes were designed to stabilise and boost farm income through the provision of price and income support for a specific list of commodities, to aid economic recovery and development during the Depression and post-war eras. This was achieved through a combination of taxpayer-funded production payments and supply management, in the form of acreage limits and commodity storage programmes.

Since then, agricultural policies have been amended to address additional objectives. Over time, increased concern over the federal budget deficit strengthened pressure for agricultural policy reform. For example, beginning with the 1985 Farm Act, and continuing with farm legislation passed in 1990 and 1996, the United States undertook major initiatives in domestic agricultural policy reform, including the elimination of deficiency payments and the introduction of Production Flexibility Contracts (PFC) under the 1996 Farm Act (Annex A; Box 2.1). There was a gradual shift away from production controls and price supports as the primary instrument of policy for crops, and towards the increasing use of budgetary payments, culminating in the ending of the supply management commodity programmes in the 1996 Farm Act.

The policy debate concerning the 2008 Farm Act took place against the backdrop of the Doha round of multilateral trade negotiations (during which, discussions on farm subsidies led to the US being challenged as to the legality under the existing trade rules of some of its support programmes, particularly for cotton) – and of a high federal budget deficit. The Congressional Budget Office estimates the total cost of the 2008 Farm Act at USD 284 billion over FY 2008-12. More than two-thirds of the funds are projected for domestic food assistance programmes, with the overwhelming majority financing the Supplemental Nutrition Assistance Program (SNAP) (previously the Food Stamp Program).

Box 2.1. **Key features of the Farm Acts since 1985**

1985 Farm Act

- Reducing target prices.
- Freezing programme payment yields.
- Using percentage of past market prices for calculating loan rates.
- Giving the Secretary discretion to further reduce wheat and corn loan rates.
- Using stocks to calculate Area Reduction Programs (ARPs).
- Establishing marketing loans for cotton and rice.
- Setting up the Export Enhancement Program (EEP) and the Dairy Export Incentive Program (DEIP).
- Establishing the Conservation Reserve Program (CRP).

1990 Farm Act

- Introducing 15% "normal flex acres" and 10% "optional flex acres".
- Extending marketing loan provisions to oilseeds in 1991 and to wheat and feed grains in 1993.
- Allowing oilseeds and alternative crops to be planted on land in a 0/85-92 programme without loss of payments.
- Using stocks-to-use ratios to calculate ARPs.

1996 Farm Act

- Replacing crop deficiency payments and target prices with payments decoupled from current prices and production levels.
- Retaining fixed payments yields.
- Eliminating most planting restrictions.
- Fixing and reducing over time federal income support payments.
- Retaining marketing loan provisions.
- Discontinuing authority for loan extensions.
- Phasing-out the dairy support price (although interim legislation modified this provision).
- Suspending sugar marketing allotments.
- Making peanuts a "no-net-cost" programme.
- Consolidating cost share and technical assistance programmes for crop and livestock producers into the Environmental Quality Incentives Program.
- Extending CRP authorisation and capping enrolment.

2002 Farm Act

- Continuing the marketing assistance loan program.
- Replacing production flexibility contract payments with direct payments for crops.
- Creating a new counter-cyclical payments programme.
- Increasing payments for environmental conservation and protection.
- Eliminating supply controls for peanuts.

Box 2.1. **Key features of the Farm Acts since 1985** *(cont.)*

2008 Farm Act

- Retaining direct payments, counter-cyclical payments and marketing assistance loan benefits.
- Creating a new revenue support programme, the Average Crop Revenue Election.
- Introducing some changes to the dairy price support programme.
- Increasing support prices (*e.g.* loan rates and target prices) for a number of programme crops and sugar.
- Creating a new programme for diversion of sugar to ethanol; and increasing funding for biofuels research demonstration.
- Introducing a new disaster assistance programme to formalise previous *ad hoc* arrangements.
- Significantly increasing funding for domestic food assistance programmes.
- Ending the Export Enhancement Program.

Programmes for farmers are projected to receive 30% of the budget, of which: around 15% (USD 8.3 billion) is made up of farm support programmes; just over 7% of crop insurance; and 9% of support for conservation.

However, the real cost of the 2008 Farm Act is unpredictable, because the amount actually paid out varies with average annual market prices and crop yields. For example, higher commodity prices would lead to smaller price-related payments than otherwise would be the case.

Although successive Farm Acts have set down parameters and guidelines for policies for a specific number of years, the process of agricultural policy making is relatively continuous. For example, Congress has provided *ad hoc* emergency and supplementary assistance under separate legislation, such as the emergency payments made over 1999-2001 and the American Recovery and Reinvestment Act of 2009 (Box 2.2). Moreover, many of the federal programmes that currently support renewable energy production in general, and agriculture-based energy production in particular, are outside the purview of USDA and have legislative origins unconnected to the Farm Act.

Box 2.2. **The American Recovery and Reinvestment Act of 2009**

The American Recovery and Reinvestment Act of 2009 (ARRA), which became law on 17 February 2009, provides over USD 789 billion in tax and spending proposals aimed to stimulate the economy and create employment. Around USD 28 billion (3.5%) of this amount is administered by the USDA to be used for: nutrition assistance (74%); rural development (16%) conservation and forestry (5%); and farm assistance and trade (4%). An estimated USD 19.8 billion is allocated on a mandatory basis to increase the monthly benefits of the SNAP. The remaining USD 7.9 billion is to support more than 90 000 grants, loans and other employment-creating projects.

In particular, aside from funding the SNAP, the most important Farm Bill-related features of the Act are as follows:

- Increased assistance for other nutrition programmes.
- Expanded opportunities for broadband loans and grants to rural communities; construction of and improvements to water and waste facilities in rural areas.

Box 2.2. **The American Recovery and Reinvestment Act of 2009** *(cont.)*

- Direct and guaranteed loans for single family housing.
- Support for community facilities in rural communities.
- Assistance for farmers, including direct operating loans targeted to beginning and socially disadvantaged farmers.
- Funding for conservation programmes, including floodplain easements, watershed operations and watershed rehabilitation.
- Re-authorisation of the Trade Adjustment Assistance Program for farmers.
- Funding to protect and conserve national forests and farmland.

In the first year of implementation, the key landmarks include:

- Provision of over USD 100 billion in tax relief for businesses and families.
- Help for over 38 million people relying on food assistance by providing an average increase in benefits of USD 80 per month to low-income households of four.
- Provision of loans to 85 420 rural residents for the purchase, repair or renovation of their homes.
- Provision of USD 500 million to treat over 134 000 acres of forest to reduce the risk of wildfire.
- An increase of loans available to farmers through the long-standing Farm Operating Loan Program. 2 636 loans, worth USD 173 million, were provided to farmers to help them buy farm equipment, seed, feed and fuel. Approximately half of these loans went to beginning farmers and 25% to socially disadvantaged farmers.
- Provision of grants worth USD 50 million to finance renewable energy projects that will benefit 223 000 homes.
- Help for more than 5 000 schools to purchase equipment to improve the safety and quality of the food served to children.

In 2010, the remaining funds were to be allocated to the following areas:

- USD 3.4 billion investment to be committed to bring broadband internet to an estimated 1.2 million households, 230 000 businesses and 7 800 institutions, such as hospitals and schools across rural America.
- USD 900 million – on top of the USD 570 million already allocated – to be provided to help 300 businesses grow, innovate and create jobs.
- Nearly USD 750 million – in addition to the USD 470 million already committed – to be provided to finance more than 850 projects to improve healthcare for 3 million, and educational services for 2.5 million, rural residents.
- Nearly USD 1 billion – on top of more than USD 2 billion already committed – to be provided for water and waste water systems projects in 530 communities.

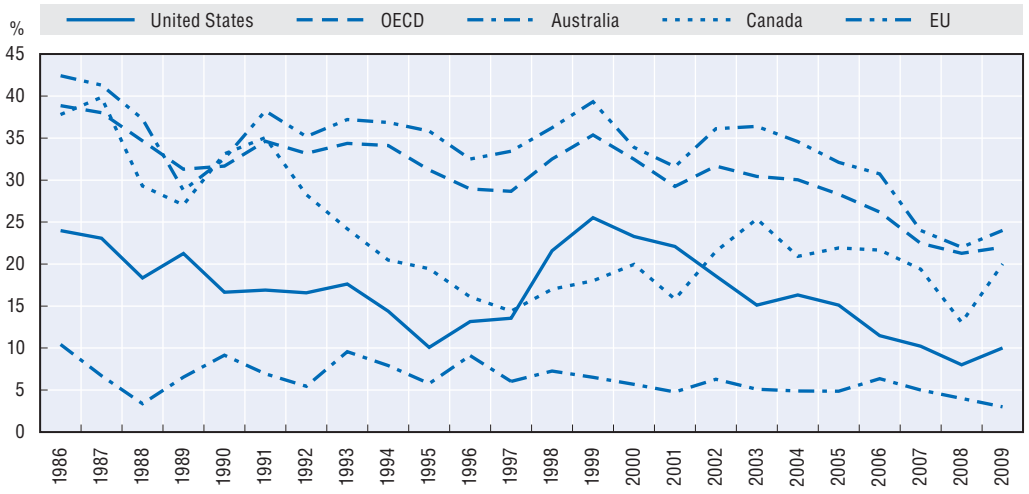
Source: www.Recovery.gov; www.usda.gov/wps/portal/arra?navid=USDA_RECOVERY.

2.2. Evolution of agricultural support

Transfers to producers

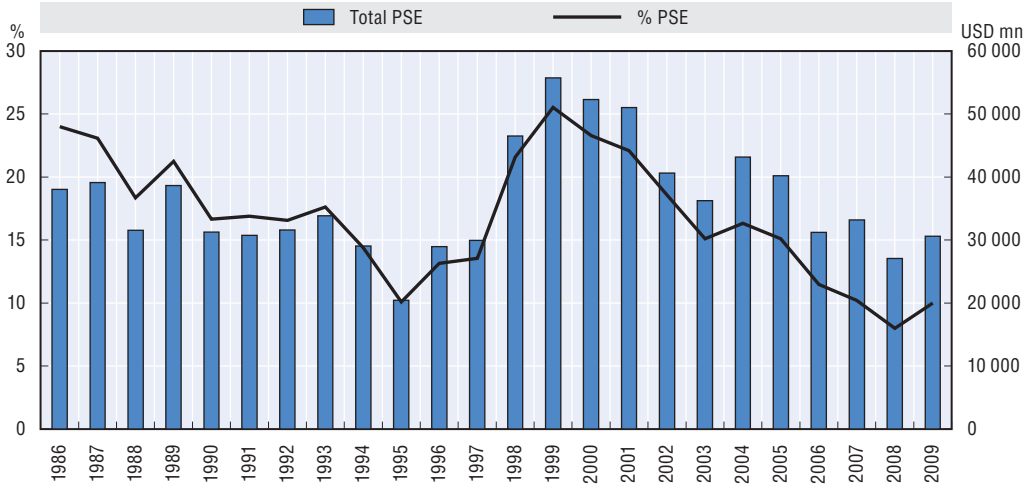
On average, US support levels to producers are relatively moderate in comparison with average levels in other OECD countries (Figure 2.1). Overall, although US support levels for agriculture have varied widely over time and across commodities, the evolution of the Producer Support Estimate (PSE) and related support indicators clearly indicate a substantial decrease since 1986 (Figure 2.2).

Figure 2.1. **Evolution of producer support in selected OECD countries, 1986-2009**



Source: OECD, *PSE/CSE Database*, 2010.

Figure 2.2. **Evolution of US support indicators, 1986-2009**



Source: OECD, *PSE/CSE Database*, 2010.

A feature of US support levels is that they move inversely with world commodity prices. Since 1986, support in the US has peaked twice. The first peak occurred in 1986-87 and the second lasted from 1998 to 2000 (Figure 2.2). Both peaks occurred at times when world commodity prices were depressed in terms of US dollars. Support levels subsequently declined somewhat and then fell to relatively low levels, when world prices rose rapidly. However, the price increase was temporary and US support increased markedly in the late 1990s, reaching record levels in nominal terms and very high levels relative to the value of production.

Likewise, the record high commodity prices witnessed in 2007 and 2008 led to very low levels of support. In 2007-09 support to the US was the third-lowest in the OECD area, after New Zealand and Australia (Figure 2.1). The % PSE fell from 22% in 1986-88 to 9% in 2007-09 – less than half the OECD average.

The level of market protection provided to producers, as measured by the Producer Nominal Protection Coefficient (PNPC), also decreased over time and is much lower than the corresponding average PNPC in the OECD area.[1] While in 1986-88 prices received by US farmers were 13% higher than world prices, in 2007-09 they were only 2% higher.

The US Nominal Assistance Coefficient (NAC), which measures the extent to which receipts come from the marketplace, declined at a lower rate than the OECD average, but still remains lower than the OECD average (Table 2.1). In 2007-09, US producers' gross farm receipts were 1.11 times higher than they would have been on the world market, while for the OECD area on average they were 1.28 times higher.

Table 2.1. **NAC and PNPC, United States and OECD average**

	1986-88	1999-2001	2007-09
Producer NPC			
United States	1.13	1.17	1.02
OECD	1.28	1.34	1.13
Producer NAC			
United States	1.28	1.31	1.11
OECD	1.59	1.48	1.28

Source: OECD, *PSE/CSE Database*, 2010.

The decrease in the level of the PSE between 1986-88 and 2007-09 is entirely the result of declining market price support (MPS) (Table 2.2). On the other hand, budgetary support has slightly increased, mainly due to the increase in payments that do not require production and, to a lesser extent, due to the increase in input payments. Increases in these two forms of support more than offset the decrease in payments based on current parameters and payments based on output.

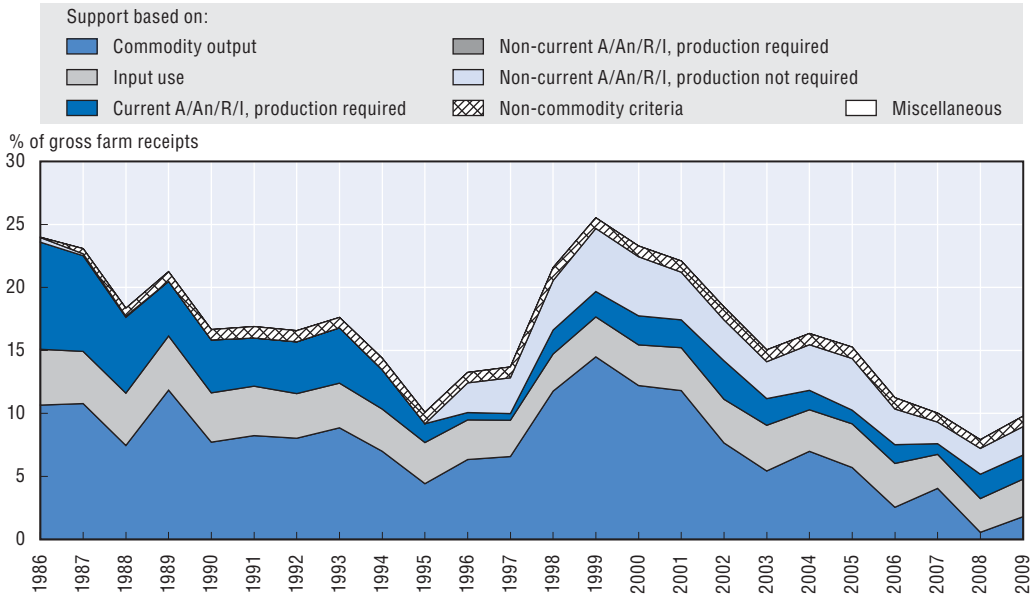
Table 2.2. **Explaining the change in the PSE over time (%)**

	1998-2001/1986-88	2007-09/1998-2001	2007-09/1986-88
Change in PSE	**41.9**	**–41.1**	**–16.4**
Contribution of market price support	**17.3**	**–25.6**	**–19.1**
Contribution of budgetary payments	**24.6**	**–21.9**	**2.7**
Payments based on output	15.7	–15.1	–5.7
Payments based on input use	0.1	4.0	5.8
Payments based on current A/An/R/I, production required	–20.8	0.9	–19.6
Payments based on non-current A/An/R/I, production not required	25.8	–6.0	17.2
Payments based on non-commodity criteria	3.9	0.8	5.0

A = area; An = animal numbers; R = receipts; I = income.
Contribution to % change is calculated assuming all other variables are held constant.
Source: OECD, *PSE/CSE Database*, 2010.

On average, over the 1986-2009 period, the main form of support has been output-based, although it has declined significantly since 2006 (Figure 2.3). The combined share of the most distorting policies (commodity output and non-constrained use of variable inputs) in the PSE decreased from 52% over 1986-88 to 31% over 2007-09. On the other hand, the share of the least production-distorting and trade-distorting support (payments with no requirement to produce) increased ten-fold, reaching 30% over 2007-09. Moreover, payments based on non-commodity criteria are also important in the United States, and are mainly composed of payments based on long-term resource retirement (*e.g.* CRP).

Figure 2.3. **US PSE level and composition by support categories, 1986-2009**



Source: OECD, *PSE/CSE Database*, 2010.

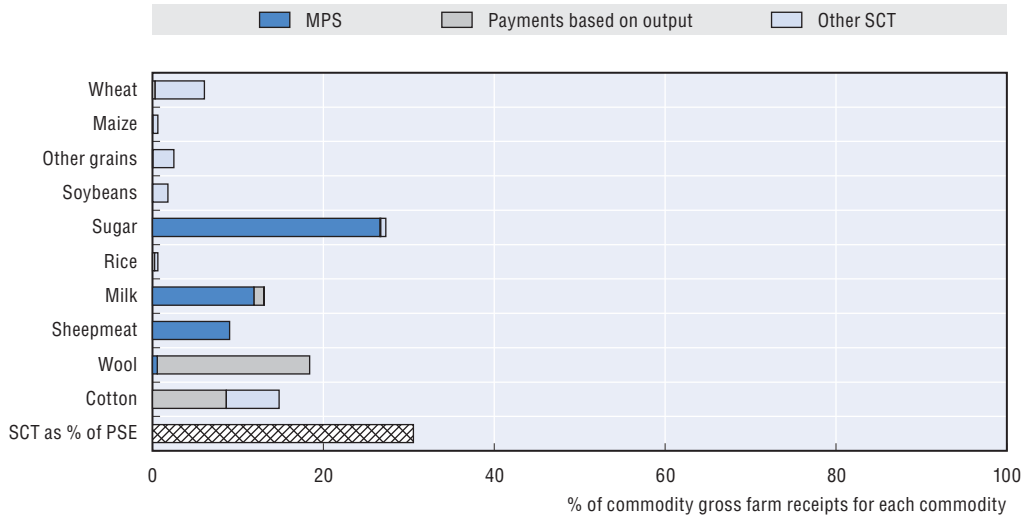
The majority of support payments are made with conditions attached, primarily environmental. In 1986-88, payments with input constraints comprised only 24% of total producer support and mostly represented support based on current production parameters such as output production, input use, area or animal numbers. By 2007-09, these payments accounted for half of total producer support and in the main represented support not requiring commodity production (Figure 2.4).

Figure 2.4. **US payments with input constraints, 1986-88 and 2007-09**

Source: OECD, *PSE/CSE Database*, 2010.

The increase in the relative importance of payments that do not require commodity production (*e.g.* Counter Cyclical Payments, Direct Payments and Production Flexibility Payments) is reflected in the decreasing share of support directed at specific commodities. The share of Single Commodity Transfers (SCT), to producers decreased from 71% of the PSE in 1986-88 to 31% in 2007-09 (Figure 2.5).

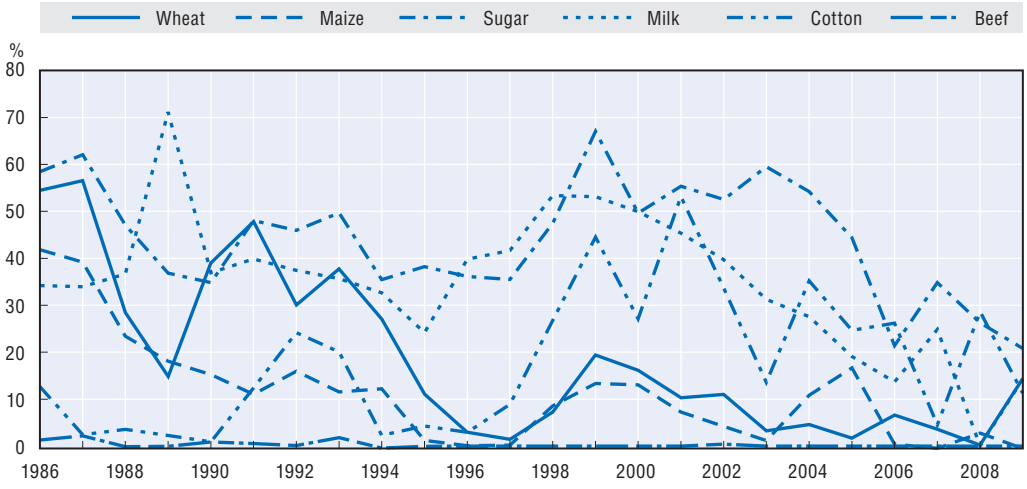
Figure 2.5. **Producer Single Commodity Transfers by commodity, 2007-09**



Source: OECD, *PSE/CSE Database*, 2010.

Two-fifths of this support is attributable to support provided to dairy, 9% to cotton and 6% to sugar. The % SCT of wheat decreased from 47% in 1986-88 to 6% in 2007-09; for maize, from 35% to 0.6%; for rice, from 50% to 0.6; for sugar, from 56% to 27%; and for dairy, from 35% to 13%. For cotton, it increased from 1% to 15% and for sheepmeat, from 1% to 9%. While market price support dominates for sugar, dairy and sheepmeat, payments based on output represent the most important form of support for cotton.

Figure 2.6. **Evolution of Single Commodity Transfers by commodity, 1986-2009**

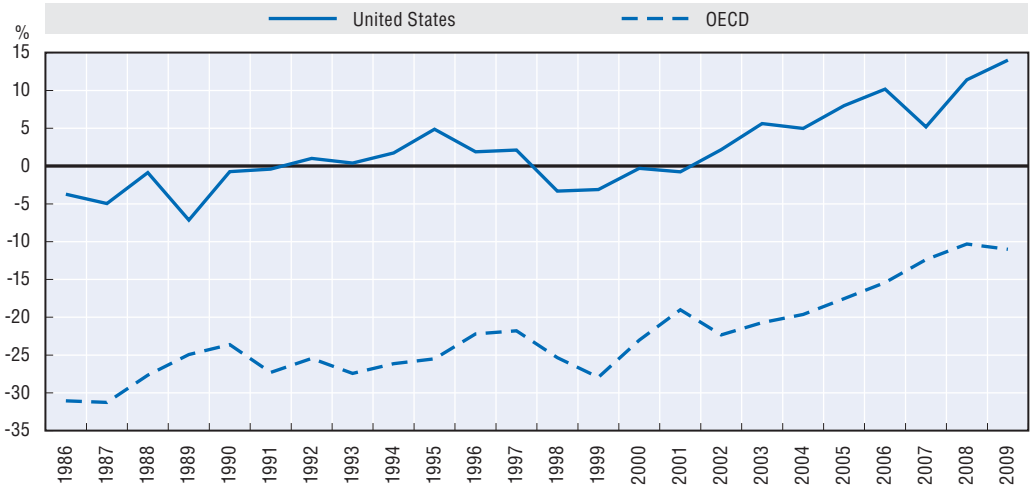


Source: OECD, *PSE/CSE Database*, 2010.

Transfers to consumers

Transfers to consumers associated with agricultural policies, as measured by the Consumer Support Estimate (CSE), follow different patterns from those of other OECD countries. The percentage US CSE, which is the share of CSE in consumption expenditure (measured at the farmgate) has remained positive for all years since 2002 (Figure 2.7). This implies that the CSE in the US constitutes an implicit subsidy, rather than tax – as is the case in the OECD area. This is primarily attributed to domestic food consumption aid, particularly food stamps.

Figure 2.7. **Evolution of Consumer Support Estimate in the United States and OECD average, 1986-2009**



Source: OECD, *PSE/CSE Database*, 2010.

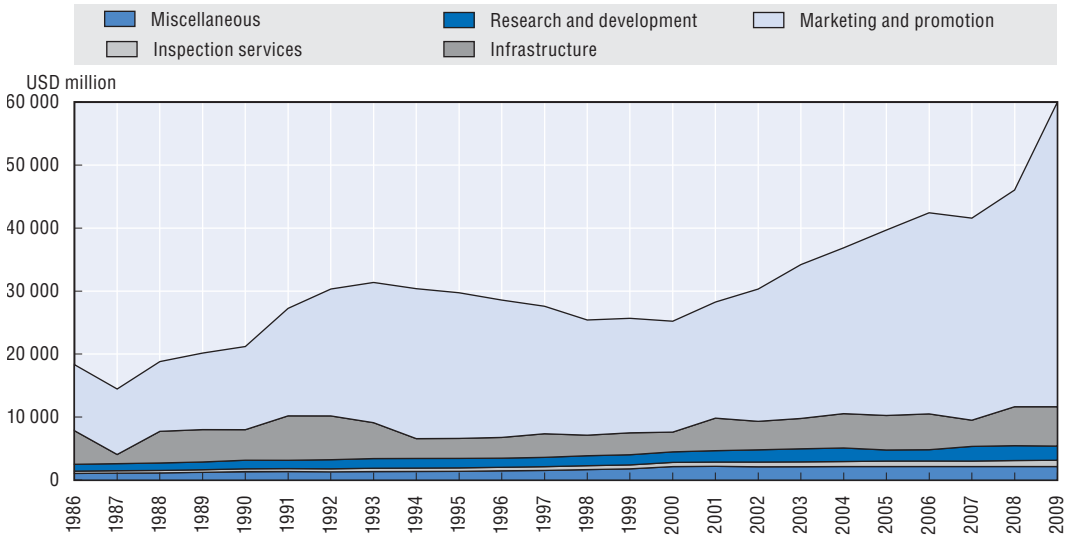
General support to the agricultural sector

Support provided to the sector as a whole, as opposed to individual producers, is measured by the General Service Support Estimate (GSSE) indicator. In the US, GSSE support to the agricultural sector has been growing in importance over time. In 2007-09, GSSE transfers comprised around 45% of total support to agriculture, compared with 27% in 1986-88. The overwhelming majority of GSSE expenditures are for marketing and promotion (primarily the post-farmgate share of domestic food assistance costs), which accounted for over three-quarters of total GSSE expenditures in 2007-09 (Figure 2.8).

Total support to the agricultural sector

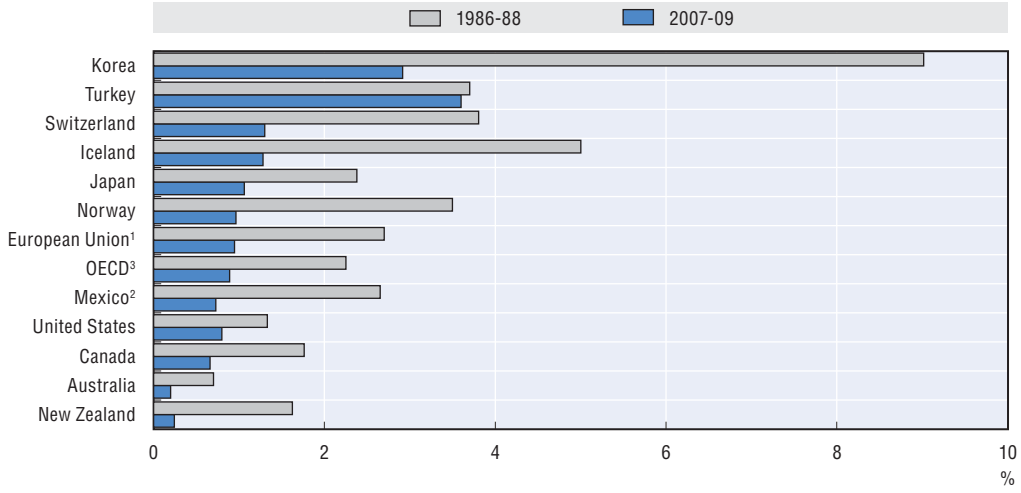
Total support provided to the agricultural sector as a whole is measured by the Total Support Estimate (TSE). The TSE is the sum of the PSE, GSSE and the cost to taxpayer of consumer subsidies, less import tariff receipts. The US percentage TSE, which is the share of TSE in GDP, is lower than the average of the OECD area and has decreased over time. In 2007-09, total support to agriculture represented 0.8% of GDP, down from over 1% in 1986-88 (Figure 2.9).

Figure 2.8. **Evolution of support to General Services, 1986-2009**



Source: OECD, *PSE/CSE Database*, 2010.

Figure 2.9. **Total Support Estimate by country**



Note: Countries are ranked according to 2006-08 levels.

1. EU12 for 1986-94 including ex-GDR from 1990; EU15 for 1995-2003; EU25 for 2004-06 and EU27 from 2007.
2. Austria, Finland and Sweden are included in the OECD total for all years and in the EU from 1995. The OECD total does not include the non-OECD EU member states. TSE as a share of GDP for the OECD total in 1986-88 excludes the Czech Republic, Hungary, Poland and the Slovak Republic as GDP data is not available for this period.
3. For Mexico, 1986-88 is replaced by 1991-93.

Source: OECD, *PSE/CSE Database*, 2009.

Distribution of commodity support

Diversity within the farm sector results in an unequal distribution of all government payments (including commodity and conservation programmes). The allocation of government payments depends on a number of factors, including farm size (area), location and types of commodities produced.

According to the 2007 Agricultural Resource Management Survey (ARMS), about 40% of all US farms (834 339 farms) received government payments in 2007 (Annex Table E.9). The

share is lowest (23.5%) for households operating the smallest farms (sales of less than USD 10 000). Over 50% of households operating farms in each of the larger size classes receive payments. In 2007, the average payment per farm, USD 9 792, was down 24% from 2006 – largely due to reductions in price-linked commodity programme payments brought about by high commodity prices (*e.g.* counter-cyclical payments, marketing loan benefits).

A large majority of farms do not receive government payments and are not directly affected by farm programme payments. Nevertheless, these farms – and the households that operate them – may still be affected indirectly by the impact of government payments on farmland values and commodity markets.[2] Among recipients, payment levels increase with production levels and base areas, and therefore the higher payments go to the farm households operating the larger farms, despite their higher average incomes and wealth.

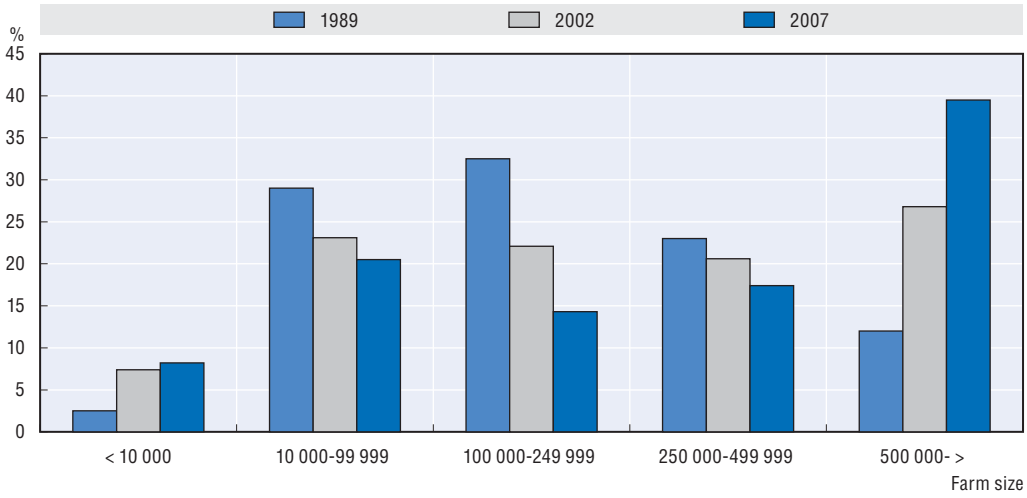
Even for farms that receive payments, government payments typically represent a small share of gross farm income (revenue from farming activities, and government support payments) and an even smaller share of farm operator household income. The relative importance of government payments in gross cash income is disproportional to farm size (*i.e.* as farms increase by sales class, the share of payments in gross cash income decreases). In 2007, for example, for farms with less than USD 50 000 in sales, government payments represented 18-20% of gross cash farm income, while for commercial farms (farms with sales of USD 500 000 or more) government payments accounted for only 4%.

The amount of government payments varies by the sales classification of the particular farm operation. In 2007, 57% of all farms receiving government payments had less than USD 50 000 in sales. This group accounted for 19% of all programme payments to farmers. Payment farms with less than USD 10 000 in sales received, on average, USD 2 040. Average payment per farm increased as farm sales increased, with farms generating over USD 1 million in sales receiving USD 75 601, on average. Million-dollar farms represented less than 3% of all farms receiving payments in 2007, but received over 22% of all government payments. For farms that receive government payments, they account, on average, for around 5% of gross farm income, although for smaller farms the share is much higher than the average (*e.g.* 21% for farms with less than USD 10 000 in sales and 15% for farms between USD 10 000 and USD 49 999 in sales).

Most payments are received by larger farms as commodity production is concentrated on larger farms (Figure 2.10). While commercial farms received approximately half of government payments in 2007, they accounted for only 18% of farms receiving payments, and the average household income of their operators is almost three times higher than the average US household income. The largest of the commercial family farms (those with gross annual sales of USD 500 000 or more) received 15.4% of payments even though they accounted for only 4.3% of farms receiving payments.

The concentration of government payments to higher-income households has increased over time. In 1989, half of these payments went to principal operators whose households earned, on average, more than USD 45 808 (in 2003 dollars); one-quarter went to households earning, on average, more than USD 94 784; and 10% went to households with incomes, on average, above USD 189 149. By 2003, half of commodity payments went to households with income, on average, above USD 75 772; one quarter went to households earning more than USD 160 142, while 10% of payments went to households earning more than USD 342 918.

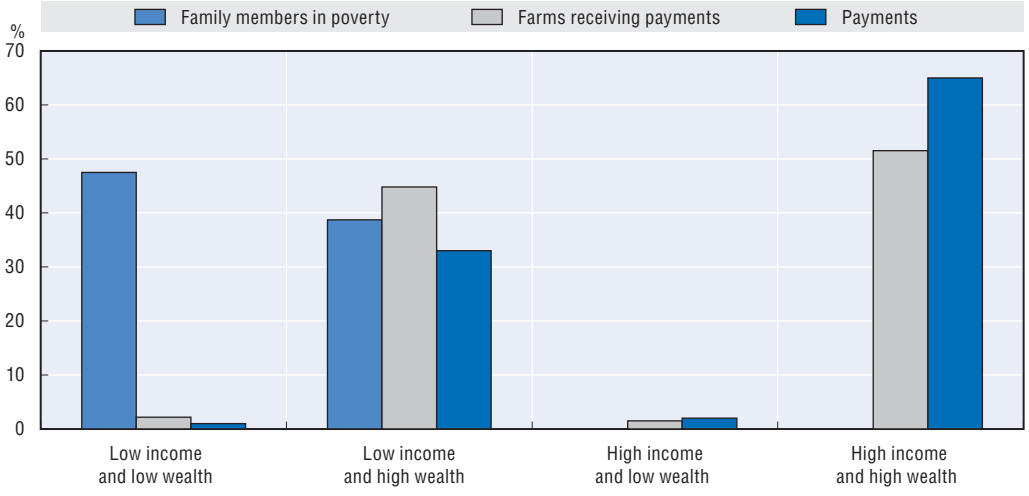
Figure 2.10. **Government commodity payments by farm size, 1989, 2002 and 2007**



Source: OECD calculations based on USDA, *The Census of Agriculture*, 2007.

The conclusion that most of the government commodity support does not benefit those with the greatest need is also confirmed when distribution of commodity payments is expressed in terms of measures of households' economic well-being discussed in Section 1.3. As shown in Figure 2.11, 98% of payments are received by those who have higher wealth than the average US household, and as much as 65% of payments are received by those who have both higher incomes and wealth. This latter group, representing 49% of all farm households, does not have family members below the official poverty threshold. In contrast, the low income-low wealth group which has 48% of family members in poverty received about 1% of government payments.

Figure 2.11. **Government commodity payments by farm household's economic well-being measures, 2008**



Source: OECD calculations based on ERS, USDA, Agricultural Resource Management Survey.

Overall, to the extent that there is some perceived low income problem that provides a rationale for government payments, the above analysis suggests that payments are not being distributed in a way which targets those farmers with income problems. In fact, the

very design of the programmes ensures that the bulk of the payments go to either farms with high production levels (in the case of payments linked to production such as marketing loan benefits) or farmers with large area bases (in the case of counter-cyclical payments and direct payments).

The skewed distribution of government payments for the programme crops in favour of farms with high sales and incomes is also observed for the dairy sector. According to the 2007 ARMS, dairy farms in the sales category between USD 100 000 to 249 999 received as much as 40% of the Milk Income Loss Contract (MILC) payments, and almost half of the payments benefited farmers belonging to income size class of more than USD 50 000.

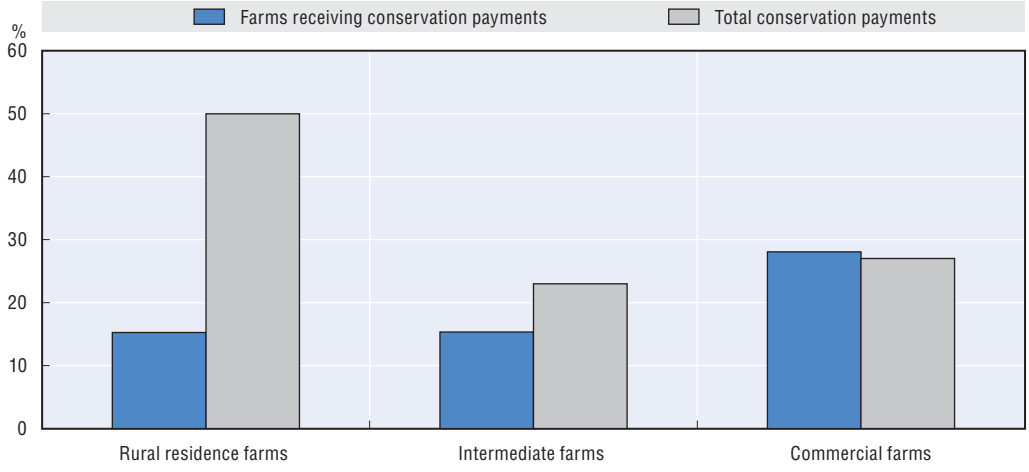
Distribution of conservation payments

Distribution by size and farm typology

As shown in Figure 2.12, about 17% (342 570) of all farms received conservation payments in 2007. These payments averaged USD 5 613 per farm, accounting for 7% of gross cash farm income and 49% of total government payments. Many farms that received conservation payments also received commodity programme payments and other forms of government support.

Conservation payments and payments from commodity-related programmes go to different types of farms. While price and income support payments are concentrated among larger farms, smaller farms and rural residence farms (which include retirement farms) are much more dependent on conservation payments as a source of income than other farms. Smaller farms tend to enrol a larger share of their farming operations in conservation programmes, particularly whole-farm enrolment in CRP, and operators of these farms often receive a larger share of their household income from land retirement payments and non-farm sources.

Figure 2.12. **Distribution of conservation payments by farms and farm typology, 2007**



Source: OECD calculations based on ERS, USDA, Agricultural Resource Management survey, 2007.

Of the farms receiving conservation payments, rural residence farms accounted for the largest share. In 2007, 59% of farms receiving conservation payments were rural residence farms, and they received 50% of total conservation payments. Commercial farms

made up 17% of the farms receiving conservation payments: they accounted for 27% of total conservation payments.

Around 15% of rural residence farms and 15% of intermediate farms received conservation payments in 2007, with payments averaging USD 5 620 and USD 9 887 per farm, respectively. Compared with rural residence and intermediate farms, a larger percentage of commercial farms received conservation payments, but these payments represented a smaller share of total government payments and gross cash income. In 2007, 26% of commercial farms received conservation payments. The average conservation payment for commercial farms was USD 8 984 per recipient farm, which represented 27% of all government payments and only 1% of gross cash income.

Conservation payments accounted for 84% of all government payments and 23% of gross cash income on rural residence farms in receipt of conservation payments in 2007 and represented over half (53%) of all government payments going to intermediate farms receiving conservation payments and accounted for 13% of gross cash income on these farms.

Distribution by farm and household income

In 2007, 13% of farms with net cash farm incomes of less than USD 10 000 received conservation payments, with payments averaging USD 3 759 per recipient farm. These farms received 39% of conservation payments and accounted for 59% of farms receiving conservation payments. In contrast, 25% of farms with net cash incomes of USD 100 000 or more received conservation payments and conservation payments averaged USD 10 152 per recipient farm. These farms received 17% of conservation payments and accounted for 9% of farms receiving conservation payments.

Farm households with household incomes of USD 200 000 or more (over 7% of all farm households and nearly 8% of all farm households receiving conservation payments), received 10% of total conservation payments. Twenty-seven per cent of all farm households receiving conservation payments had household income of USD 50 000-99 999: they received nearly 21% of all conservation payments in 2007. Forty-seven per cent of all conservation payments went to farm households with household incomes of less than USD 50 000 (46% of all farms receiving conservation payments).

Distortiveness, transfer efficiency and risk effects of producer support

To evaluate the changes in the composition of support over time, the OECD's *Policy Evaluation Model* (PEM) was used to derive indicators of the net effect of the policy set taken as a whole. Using an index number approach developed by Anderson and Neary (1996; 2003), the level and composition of support are combined to derive a single money-metric indicator of the impact of support with respect to a specific outcome – here, farm income, quantity produced, and value of exports.

The process works like this: Choose a specific form of support as a basis of comparison – market price support in this case – and ask the question "If all support were to be replaced with market price support, how much would be required in order to result in the same level of farm income (or quantity, etc.)?" The model answers this question by holding the outcome of interest constant and letting the level of MPS adjust in response to changes in other policies. By imposing a policy scenario where all other forms of support are removed, the model finds the amount of MPS that holds the selected outcome constant, yielding the desired measure of equivalency.

The PEM is a partial-equilibrium model of four major crop groupings, plus milk and beef, considered at an aggregate national level. While designed with the PSE in mind, not all policies in the PSE are included in the PEM. Payments involving input constraints, such as the Environmental Quality Incentives Program, or policies whose payments are based on non-commodity criteria, such as the Conservation Reserve Program, are not included in the model. Policies of this type have complex impacts that cannot easily be analysed within PEM, and are of increasing importance in terms of the PSE (Figure 2.13, Panel D). Nonetheless, the main support polices of the US are included in the present analysis.

By converting the entire complex policy set to a single "MPS equivalent", a comparable indicator measured in dollar terms and with a straightforward interpretation is created. Anderson and Neary termed this the "tariff equivalence" of support. To highlight the objective with reference to which the index is defined, the term "Iso-income", "Iso-production" or "Iso-export" index will be used here – "iso" meaning "to hold constant". Beyond tracking the changes in level and composition of the PSE, these measures also take into account how support is distributed across commodities, capturing the often complex cross-effects of policies between markets. Generally, support that is more evenly distributed across commodities tends to be less distorting and more transfer efficient, but this rule of thumb can be affected by the particulars of market interactions, such as the feed market connecting crop and livestock producers, and the cross-elasticity of demand for commodities, to name only two.

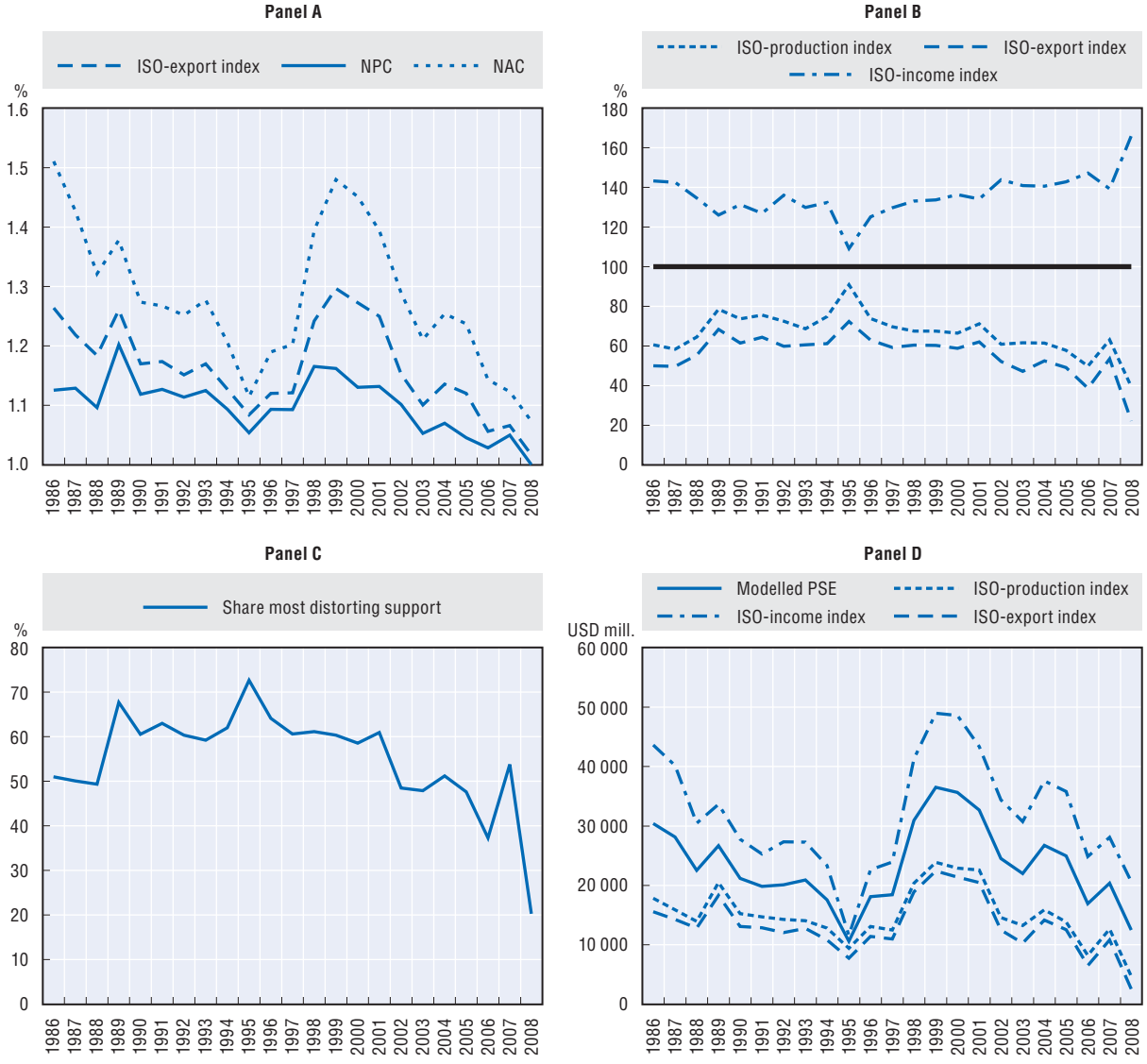
Two important indicators that derive from the PSE are the NPC and NAC (see Table 2.1). The NPC measures the amount of price protection offered by MPS, while the NAC measures the additional farm revenue provided by all forms of support. Unfortunately, the NPC can't indicate the amount of effective protection provided by any type of support other than MPS, and the NAC cannot tell what the impact of the increase in farm revenue may be. The iso-index approach is helpful in resolving this uncertainty by measuring the impact of all forms of support in terms of an equivalent amount of MPS. The iso-export index measures the effect of US support programmes on export value, demonstrating that the effect is greater than that implied by the NPC, but less than that of the NAC (which implicitly treats all support as equal to MPS) (Figure 2.13, Panel A).

The iso-income index measures the amount of market price support required to achieve the same increase in farm income as that obtained by the policy set. As market price support is generally less transfer-efficient than other policies, more is required to achieve the same effect. The opposite is true for production and trade impacts of support, as MPS tends to be one of the most distorting forms of support. Calculating these indices as a percentage of the PSE provides an indication of the relative efficiency of the policy set at delivering increased farm income and its potential to distort markets. A value of 100% indicates no difference between MPS and the current policy set (highlighted in Figure 2.13, Panel B). For the iso-income index, the upward trend evident after 1995 is evidence of increasing transfer efficiency of the policy set. Reduced production and trade distortion is measured by the downward trend in the iso-production and iso-trade indices away from the 100% equality with MPS line, with the iso-trade index in 2008 showing trade-distorting effects roughly 20% that of an MPS-only policy.

The year 1995 stands out in the data, appearing as unusually market-distorting and transfer inefficient, but that year is in fact one of low budgetary payments. Deficiency payments decline strongly from 1994 to 1995, while PFC payments do not begin until 1996.

This leaves MPS in the dairy sector to form a relatively large share of overall support, making the overall policy set more "like" MPS (Figure 2.13, Panel C). When expressed as a percentage of the PSE, the iso-indicators show the impact of changes in the composition of support, but not its level. Overall, the PSE in 1995 was lower than in other years, but more of the support was in the form of MPS. Looking at the iso-index in level terms, the period of greatest support and market impacts is 1999, when the level of support surged due to higher loan deficiency payments and crop market loss assistance payments (Figure 2.13, Panel D).

Figure 2.13. **Iso-indices, 1986-2008**



Note: Modelled PSE refers to the portion of the PSE that is represented in the PEM model.

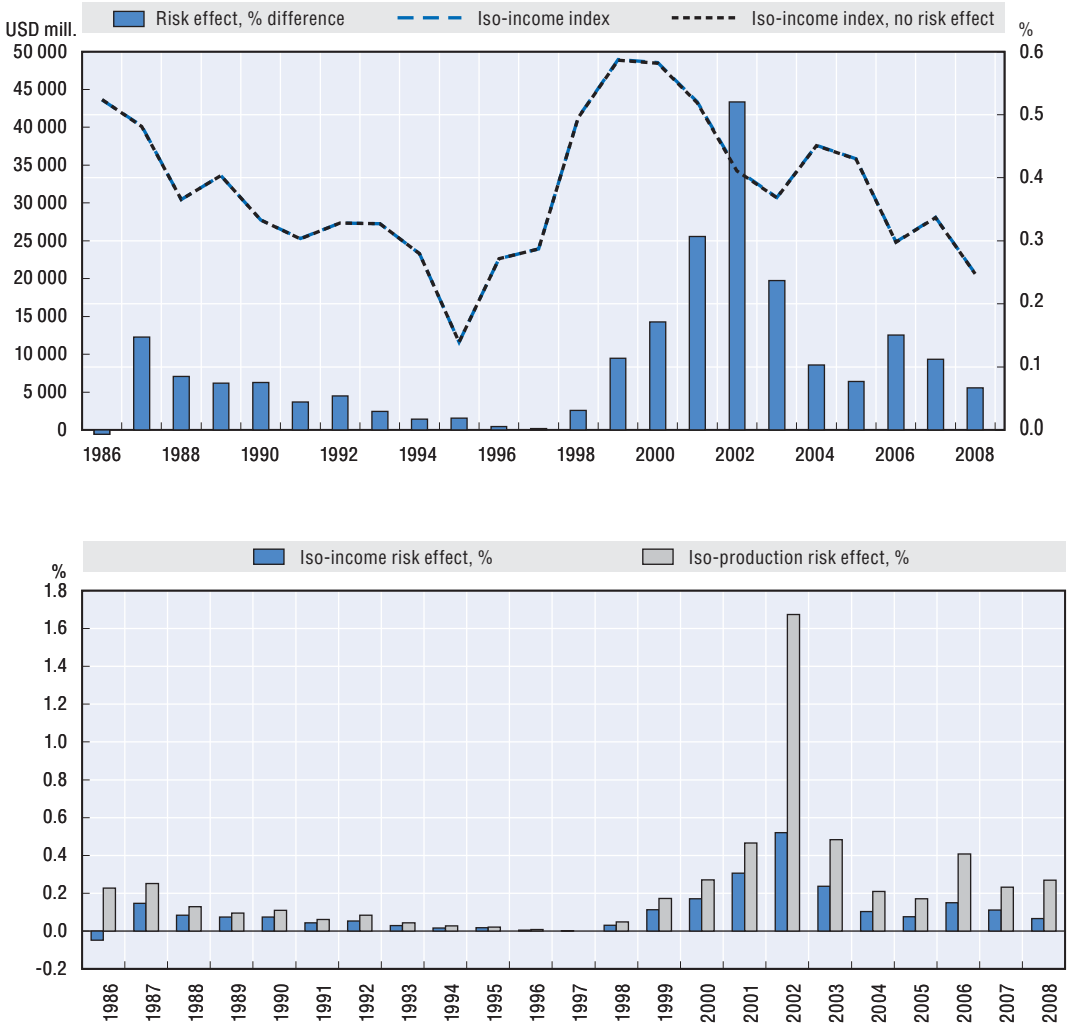
Source: OECD, *Policy Evaluation Model*.

The iso-production index shows that the distortiveness of support in the United States increased into the mid-1990s and declined steadily thereafter. The increasing importance of Category E payments (which do not require production) is driving this movement towards lower overall production distortion. However, this trend is small compared with

the decline in the overall level of support, which has resulted from higher prices reducing both MPS and those budgetary payments contingent on prices. The model treats the risk-reducing effects of the loan rate and Counter-cyclical Payments (CCP) as increasing the incentive price for the producer, which contributes to marginally higher values of the index in years where prices are low and these policies have the maximum impact. 2002 is a particular example of this effect, though the effect remains modest, at around 5% of the total impact (Figure 2.14, lower pane).

The set of policies in the earlier study period, from 1986 to the early 1990s, were nearly as transfer efficient as those in later years, even though, as the iso-production index shows, they were slightly more distorting. The deficiency payments made on the basis of land were very transfer efficient, as they directed payments to farmer-owned inputs (land) in a way that made land more attractive to producers than purchased inputs. The relative expansion in land use shifted the input mix towards farm-owned inputs (which deliver welfare to the producer) and away from purchased inputs.

Figure 2.14. **Risk effects of programmes and Iso-income index, 1986-2008**



Source: OECD, *Policy Evaluation Model*.

The iso-export index generally tracks the iso-production index, while remaining below it in value (Figure 2.13, Panel B). Overall, the difference between the iso-production and iso-export indices has to do with the impact of policies on consumption, as exports are essentially the excess of production over consumption. It is expected that the iso-export index will be lower in absolute value than the iso-production index as MPS has a strong impact on consumer behaviour relative to other policies, and so will have a larger impact on exports than production. The downward trend in the later part of the period is more pronounced in the iso-export index, although the difference is not dramatic.

Overall, the results indicate measured progress in improving the transfer efficiency and reducing the market distortions provoked by agricultural policy, after 1995. Over the entire time period the improvement has been modest. Part of the explanation for this is the already-high level of transfer efficiency, which limits the potential for further gains. The iso-income index, which was 140% in 1986-88, averaged 151% of the PSE in 2007-09, indicating that support is already 50% more efficient at transferring income to producers than market price support. Relatively more progress has been made on reducing the production-distorting effects of policies, especially with respect to exports. The average value of the iso-export index as a percentage of the PSE was 52% in 1986-88, but by 2006-08 this was reduced to 35%, a decline of 14 percentage points to 65% of the 1986-88 value. There remains room for improvement in the area of reducing production distortions; in particular by reducing MPS, which continues to form a large share of the PSE.

Risk effects

Several US policies are designed to have a counter-cyclical effect related to commodity prices. The OECD's PEM takes this into account for the two most significant policies: the set of marketing loan policies taken together, will be termed the "loan rate", and the counter-cyclical payments introduced in the 2002 Farm Bill.[3] These policies, by altering the risk profile of farm production, offer additional benefits to risk-averse farmers. This effect is modelled using a price premium, as discussed in OECD (2002) and Hennessey (1998).[4] More detail on the application of this approach in PEM can be found in Annex D.

The iso-income index, including the risk effects of the loan rate and counter-cyclical payment, exceeds the index excluding risk effects by an amount that varies but is typically less than 0.5% of the value of the index (Figure 2.14, upper pane). The risk effects of these programmes as estimated in the model depend heavily on the assumption of the farmers' degree of risk aversion. Here it was assumed that farmers have a risk premium of 1%, indicating a small degree of risk aversion.[5] The effect of the addition of the CCP can be seen in the higher impact of risk reduction after 2002. Commodity prices were low in 2002, and the greatest impact of risk-reduction occurred in that year, which had a 1.7% higher iso-production index relative to the situation where risk impacts are not included in the model: the iso-income index for 2002 was 0.5% higher.

Notes

1. PNPC is the ratio between the average price received by producers (at the farmgate), including payments per tonne of current output and the border price (at the farmgate).
2. For example, some studies find that capitalising government payments has increased farmland values by 15 to 25% in recent years and that government payments have increased crop production between 1% and 6% over time (USDA, 2001; Oltmer and Florax, 2001; OECD, 2008b).

3. Analysis of the impacts of US agricultural support policies on the risks faced by farmers – and therefore on production, income and trade – may vary under alternative assumptions.
4. Briefly stated, the model presumes a risk-averse utility function of the mean-variance type, where policies may affect the variance of revenue through their negative co-variance with prices. This, in turn, impacts the risk premium demanded by producers to accept uncertain prices. Specifically, reducing the net variability of prices is equivalent to a higher price according to a risk-aversion parameter.
5. Consider a bet determined on the tossing of a coin, where one wins X when the toss is heads, and loses X when the toss is tails. The risk premium is the amount an individual would pay to avoid having to participate in the coin toss, expressed as a percentage of X.