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COMPARATIVE ANALYSIS OF AGRICULTURAL SUPPORT WITHIN THE MAJOR AGRICULTURAL TRADING NATIONS

STUDY

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PROVISIONAL VERSION

This document was requested by the European Parliament's Committee on Agriculture and Rural Development.

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Abstract:

Indicators of real support make it possible to compare policies across countries. EU farmers are more supported than their US colleagues, but EU support generates little distortion on world markets. US and Canada adjust support to protect farmers from adverse situations. Like the growing levels of support in Russia and China, these policies generate market distortions. Swiss support is directed towards the provision of public goods. In some countries such as Brazil, agricultural support targets innovation while most EU support has a focus on farm income.

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LIST OF ABBREVIATIONS

ACRE	Average Crop Revenue Election (US Program)
ACT	All Commodity Transfers
AES	Agri-Environmental Scheme
AMS	Aggregate Measure of Support
AWU	Annual Worker Unit
CAP	Common Agricultural Policy
CCP	Countercyclical Payments (USA)
CRP	Conservation Reserve Program
CSE	Consumer Support Estimate
CV	Compensating Variation
DRC	Domestic Resources Cost
EAFRD	European Agricultural Fund for Rural Development
EAGF	European Agricultural Guarantee Fund
ERDF	European Regional Development Fund
ERS	Economic Research Service (USDA)
EU	European Union
EV	Equivalent Variation
EQIP	Environmental Quality Incentives Program (USA)
FADN	Farm Accounting Data Network
FAO	Food and Agriculture Organisation
FCEA	Food, Conservation and Energy Act
FEAGA	See EAGF (French acronym)
FEADER	See EAFRD (French acronym)
GAEC	Good Agricultural and Environmental Conditions
GCT	Group Commodity Transfer
GDP	Gross Domestic Product
GNI	Gross National Income
GSSE	General Services Support Estimate
HNV	High Natural Value
LDP	Loan Deficiency Payment (USA)
LFA	Less Favoured Area
MFN	Most Favoured Nation
MPS	Market Price Support
MTRI	Mercantilistic Trade Restrictiveness Index
NAC	Nominal Assistance Coefficient
NPC	Nominal Protection Coefficient
NGO	Non Governmental Organisation
NMS	New Member States
OECD	Organisation for Economic Co-operation and Development
PPP	Purchasing Power Parity
OTDS	Overall Trade Distorting Support
OTP	Other Commodity Transfer
PSE	Producer Support Estimate (formerly Producer Subsidy Equivalent)
RICA	See FADN
R&D	Research and Development
SAPS	Single Area Payment Scheme
SCT	Single Commodity Transfer

SFP	Single Farm Payment
SPS	Single Payment Scheme
SMR	Statutory Management Requirement
TRI	Trade Restrictiveness Index
TSE	Total Support Estimate
UK	United Kingdom
UAA	Utilised Agricultural Area
URAA	Uruguay Round Agreement on Agriculture
US	United States (of America)
USDA	United States Department of Agriculture
VAT	Value Added Tax
WTO	World Trade Organization

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EXECUTIVE SUMMARY

Issues with agricultural support

Countries support their agriculture at many different levels, for different purposes and using a variety of instruments. Support to agriculture can take the form of budgetary transfers. These can be measured either through budgetary expenditures (national accounts) or through subsidies received by farmers (microeconomic sources). There are, however, many other non-budgetary ways to producers. Governments support prices using a variety of instruments, such as border protection, production quotas or public purchases. The resulting support adds implicit transfers from the consumer to those from taxpayers. Such transfers cannot be neglected, in particular because some of them involve considerable amounts of support, and because they affect third-countries through international trade and have an impact on foreign producers.

Agricultural support can also be more indirect, through subsidies that cover some of the farmers' costs (e.g. tax exemptions, subsidised interest rates), or through government supporting of general services (e.g. research, extension, health insurance). Policies can also generate additional demand for agricultural products and drive up prices. This is the case of food aid policies or policies that promote biofuels. The amounts can be considerable (e.g. the budget of the US "food stamps" programme).

Despite the difficult measurement of transfers by price support and indirect aid, the focus on budgetary transfers alone cannot lead to meaningful comparisons between countries, between products (some are supported by tariffs, guaranteed prices, not others), or even within a country. For example, the EU has gradually replaced support paid by the consumer by support paid by the taxpayer. While this led to a larger agricultural budget, it would be misleading to take this as an increase in the overall support.

Data limitations

International comparisons based on budget sources or microeconomic data cannot make data comparable without a considerable amount of resources. The accounting framework, what is included in the agricultural sector and the economic concepts underlying the accounting codes are often very different. The OECD Secretariat (Organisation for Economic Cooperation and Development) has compiled a dataset for 33 member states and selected emerging countries. Figures are submitted to an intensive checking by the national governments and, overall the OECD dataset is a valuable source, unsurpassed as far as comprehensiveness and reliability is concerned. Another source is the notifications on domestic support that World Trade Organization (WTO) member countries submit to the Secretariat. These data are seldom up to date and are not particularly reliable, given that similar measures are sometimes classified into different categories across countries. Nevertheless, the WTO data, and in particular its classification of support is useful for certain questions. Other data sources are more partial and less reliable.

The measurement of price support

Price support may take the form of a direct subsidy per unit of production, or a raise in market price caused by government intervention. The most satisfactory approaches to measure such transfers involve the use of global models to compare the actual situation of producers and the situation where this support would not exist. In such a case one can define theoretically sound indicators (e.g. variations in consumer surplus, equivalent or compensating variations) Or, if one looks at the effects on trade, indicators of trade restrictiveness. A limitation is that when generating the counterfactual situation with a model, the result is dependent on parameters and on assumptions that limit the practical scope of this theoretically satisfactory framework. Moreover, in the work of the international organizations mandated to measure support, comparisons over time and between countries must use simple indicators, in order to avoid confrontations of results obtained under a variety of models.

In practice, two approaches are widely used. The main indicator of support used by the WTO, the Aggregate Measure of Support (AMS) has serious economic limitations. The product-specific support uses the difference between administered prices and world reference prices of a fixed base period. It may be positive in the absence of actual support if a country has maintained a virtual support price higher than the fixed reference. The market price support for wheat in the EU, for example, has been positive even at times where the intervention price was half of the world price. This shows that the measure has little economic meaning. It is also possible to implement relatively minor policy changes to remove the support posts of several billion euros by simply changing the rules in the notification (e.g. milk in the US, fruit and vegetables in the EU).

The OECD approach is more related to market situation. Price support is measured as the difference between current domestic prices and current border prices, regardless of the origin of this difference, provided that there is actual government intervention. This measure has been subject to recurrent criticisms for 25 years. The use of a world price, which depends itself on support policies, is arguably a questionable reference. This criticism merely shows that OECD indicators such as the Producer Support Estimate (PSE) should be interpreted only as calculations in a static framework where the border price is an objective reality. The OECD PSE is also sensitive to the currency used for aggregation; the choice of the statistical series for some reference price is questionable; the classification of different supports does not provide an information that can be interpreted in terms of the distorting nature of the policy; and the need to distinguish a large variety of payments and indicators reflect the nature of farm support in each country has made it difficult to communicate on the results. In spite of these caveats the PSE methodology has many attractive features.

The methodology used in the report

Quality and completeness make the OECD dataset a key source of information, even though budgets and WTO notifications are also used in particular sections. The OECD data and indicators also make it possible to identify detailed categories of support that can be used to gauge the trade distorting nature of support in a given country or the efficiency of transfers. We use the OECD data, but a modified version of the OECD indicators, i.e. PSE, Total Support Estimates (TSE) and Nominal Protection Coefficient (NPC)

First, in order to account for the effects of changes in agricultural policy and the effects of exchange rates and inflation differentials between countries, support measures are calculated here in real terms. This requires the construction of a conversion rate for a base

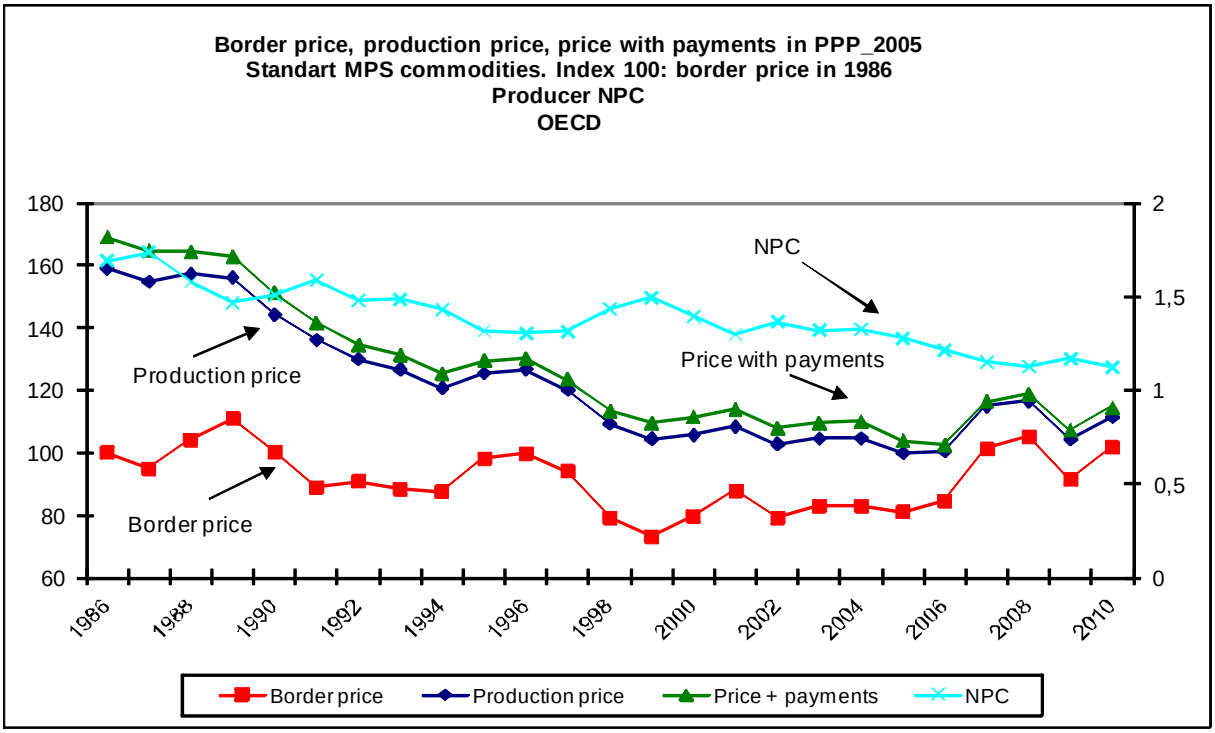
year (here 2005) and the use of a spatial price index, a Purchasing Power Parity (PPP). Both this base period PPP and a time series for deflators are used to aggregate the volume of support for OECD and the EU. When useful, a specific PPP based on a multilateral version of the Fisher index is used for a common set of agricultural products. This makes it possible to compare volumes in the spatial (cross-countries) dimension. Product specific deflators over time are applied to this base year to compare volumes of support both in time and space. This methodology leads to construct indexes for domestic prices and border prices. The results show how much of the apparent reduction in support is caused by an increase in world price or an appreciation of a currency during the recent period.

Second, the classification of payments is different from the OECD one. Here we classify the different forms of support in a way that illustrates the different economic impacts of the EU, the US and Swiss policies, for example. Finally, rather than using multiple indicators as does the OECD Secretariat, we use simple but easier to read criteria. In particular we focus on the ten major forms of transfers that represent most of the total payments.

Evolution of support in OECD countries and some emerging countries

Less reliance on price support. After the 1988 OECD Ministerial mandate and the 1994 WTO Marrakech Agreement, many developed countries reduced the most distorting forms of agricultural support, including price support. For the OECD as a whole, the ratio between domestic and border prices went down from 1.70 to 1.12 between 1986 and 2010 (Figure a). This reflects less reliance on a system of guaranteed prices. In the EU systems to support prices were ended for most commodities. The few remaining intervention prices have been lowered. Nevertheless, part of the convergence between world and domestic prices was caused by a recovery of world markets at the end of the period. This explains particularly the decline in support in countries such as the US and Canada, whose support instruments remain closely linked to market conditions and where support is not dismantled but is inactive due to high world prices. The situation is therefore different from that prevailing in the EU where price support was replaced by decoupled payments.

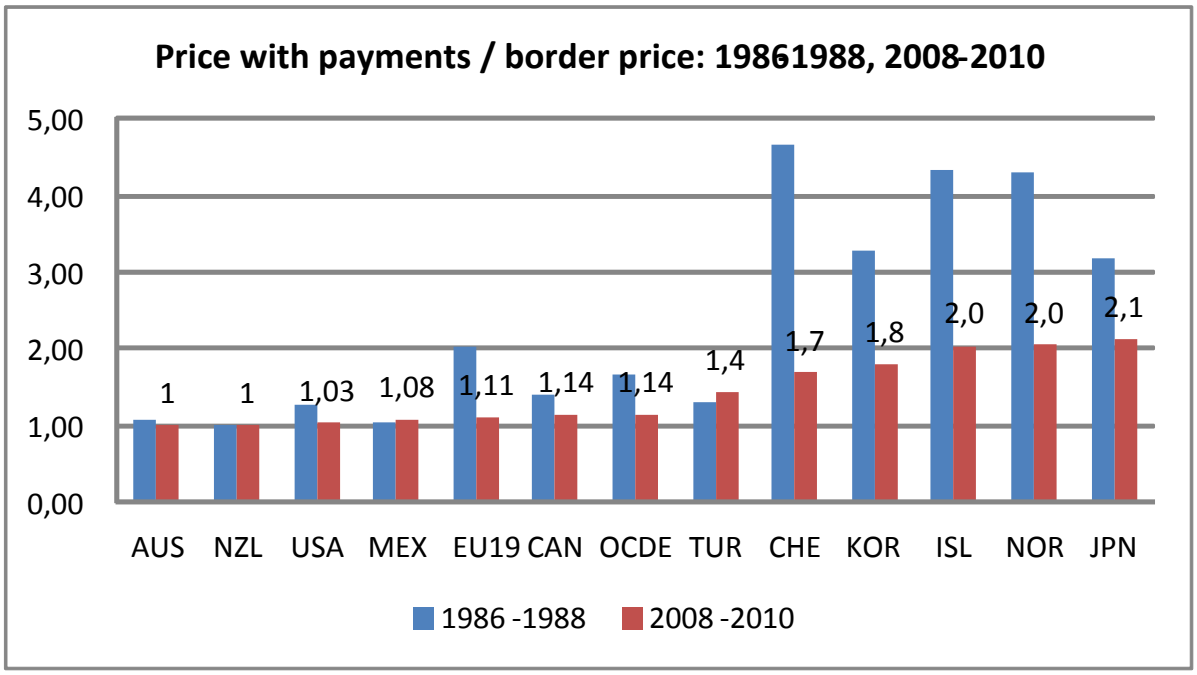
Figure a: Convergence between producer price and world price in OECD countries



Source: Authors using OECD data.

Between 1986 and 2010, aggregate prices fell by s almost 30% on average in the OECD but by 45% in the EU. Countries that relied most of price support experienced the largest decline in domestic prices (Figure b). The ratio between domestic and world price went down by half in Switzerland, Norway, Iceland, Korea and Japan, even though domestic prices remain roughly twice higher than world prices. In Australia and New Zealand, the agricultural sector was already liberalized at the beginning of the period. In Canada, the support to the dairy sector through guaranteed prices and a system of quotas is now an exception. In the EU at the end of the period the ratio between domestic and border prices is lower than the OECD average. The increase in world prices plays a role, but this is offset by the appreciation of the euro against the US dollar. Overall, the convergence reflects the successive reforms of the CAP which have progressively exposed farmers to world prices. Between 1990 and 2005, a consequence has been a sharp decline in farm income in those countries that had originally the highest level of price support. Higher prices helped reverse the decline in farm income after 2005, even though the consequences are contrasted between arable crops and livestock producers. Policy reforms contributed to the increase in world prices. But higher world price after 2005 were also caused by the increased demand from emerging countries, by lower world stocks, and by the diversion of considerable quantities of corn, sugar and rapeseed in the energy sector.

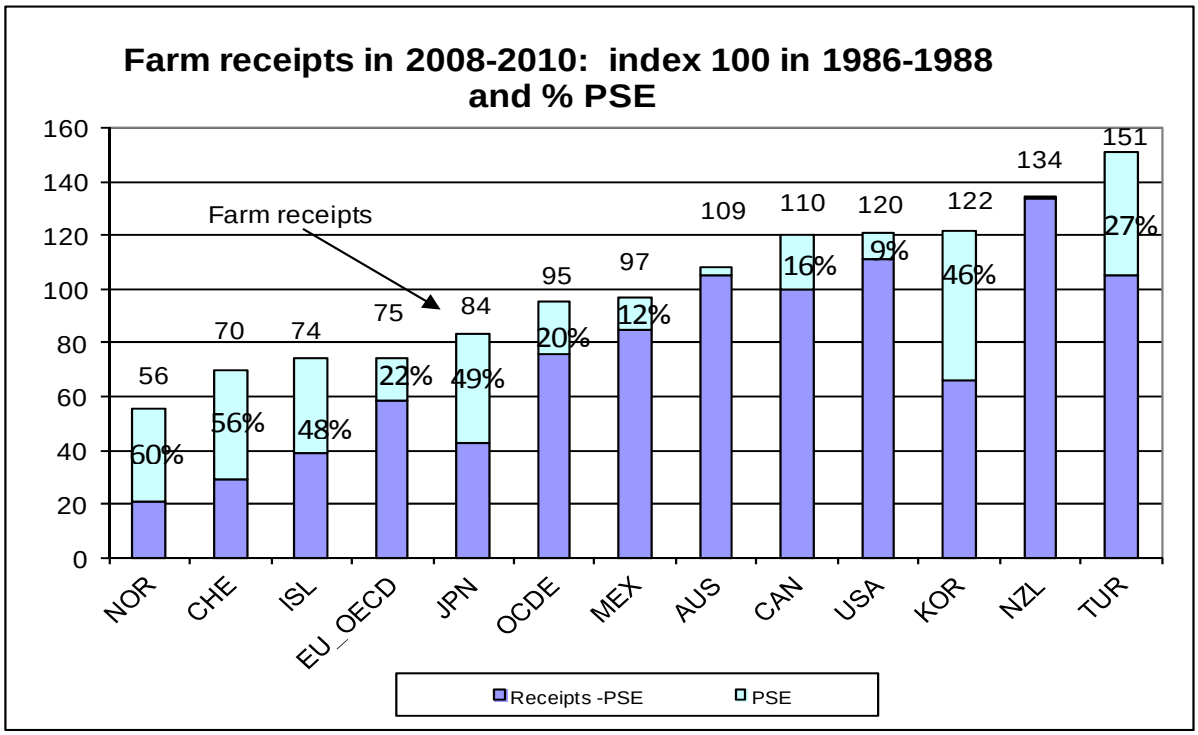
Figure b. Changes in the ratio between producer and border price, from 2006 to 2010



Source: Authors using OECD data. Note that the calculations for the EU are based on 19 Member States.

The evolution of direct producer support in developed economies. In real terms, product specific support has been divided by three and other payments have nearly doubled in the OECD as a whole between 1986 and 2010. The total PSE measures the sum of the different forms of public support enjoyed directly by an individual farmer. In real terms the PSE was cut in half between 1986 and 2010. Despite a growth in the volume of production, farm income fell at first, and then rose at the end of the period with higher world prices, at least in the arable crop sector. The PSE in percentage of total farm receipts went down from 35% to 19% over the period for the OECD as a whole. This trend can be observed in all OECD countries except Mexico and Turkey (Figure c). Korea, Iceland, Japan, Switzerland and Norway nevertheless maintain a level of individual producer support that represents more than half of the receipts of the sector. The EU has an evolution similar to the OECD average, with a share of the PSE that goes down from 40% to 22%.

Figure c. Changes in real farm receipts between 1986 and 2010 and composition of the receipts between support and market based receipts in 2008-10



Source: Authors using OECD data.

The case of emerging countries. Emerging countries (Brazil, Chile, China, Israel, Russia, Ukraine, South Africa, which are not OECD members, unlike Mexico and Turkey) have quite different characteristics from those of developed countries. Most of these countries experienced impressive growth of agricultural production: 5.3% per year for Brazil between 1995 and 2010, 2.4% for China. The performance of Russia (1%) and Ukraine (1.5%) is modest over the whole period, due to a fall in production in the 1990s and early 2000s, but both have high growth rates over the most recent years. These countries still target support to particular commodities. Brazil focuses on the development of export agriculture, and combines relatively low level of (product specific) support with large expenditure in research and infrastructure. China's focuses more on the development of the production of particular products facing a growing domestic demand.

The real measure of support shows that, in many of these countries, the agricultural sector has long enjoyed a relatively depreciated currency, which has protected farmers from foreign competition. Recently, their currencies have appreciated. One explanation of the monetary policy of China, which uses foreign exchange control and maintains a weak currency, is the risk for the large population of small farmers that would result from an appreciation of the Yuan.

Which are the countries that support their agricultural sector most?

International comparisons of support raise considerable difficulties due to exchange rates and inflation differentials. Nominal values in euro (Table a, column 1) converted with market exchange rates are particularly sensitive to currency fluctuations. The percentage PSE (i.e. the ratio between the PSE and total receipts including farm support) is a simple indicator that provides a good basis for comparisons, since it is rather insensitive to

exchange rates and inflation (Table a, column 5). Another indicator is the PSE in real value, here expressed in euro at the 2005 Purchasing Power Parity or PPP rate (column 3); in column (4) the real value of production (also expressed in euro at the 2005 PPP rate) is provided as a basis for comparisons, needed to acknowledge the size of countries.

Table a. PSE in nominal value, real value and percentage of farm receipts, 2010

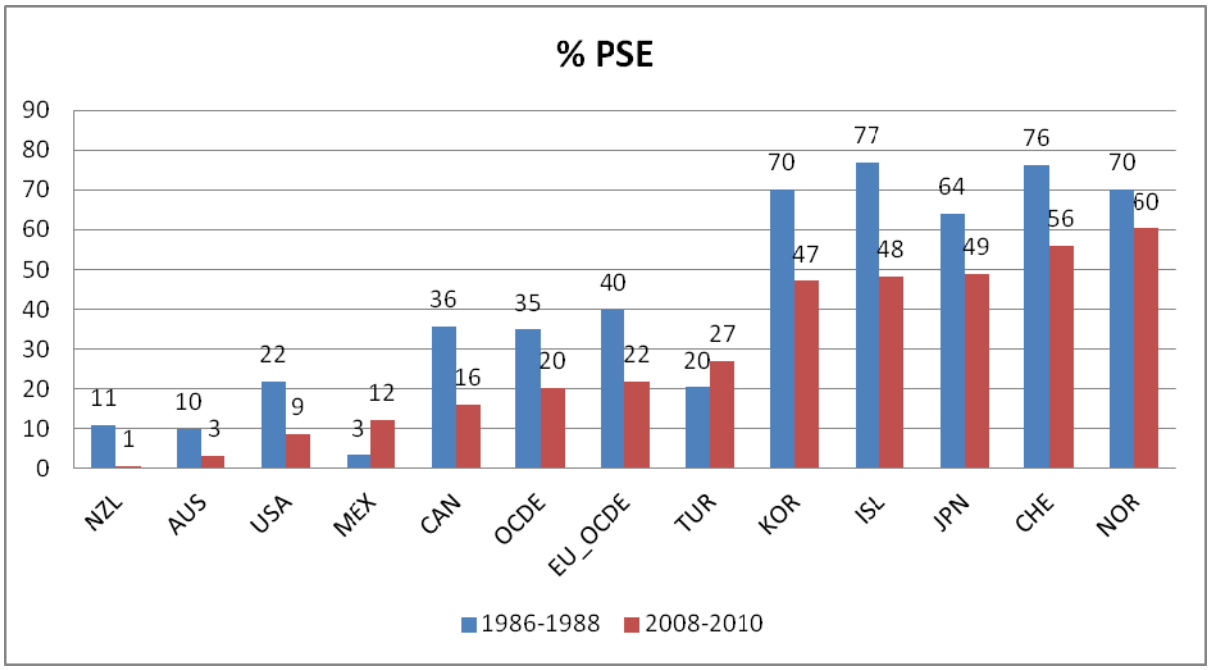
	PSE (NOMINAL) million euro 2010	PSE (REAL VALUE in 2005 PPP) million euro) 2010	FARM RECEIPTS (REAL VALUE in 2005 PPP) million euro	PSE, PERCENTAGE OF TOTAL RECEIPTS
NZL	57	51	9 277	1%
ZAF	300	443	20 039	2%
AUS	719	521	23 404	2%
CHL	228	289	9 820	3%
BRA	5 374	5 662	126 965	4%
UKR	1 298	2 943	53 646	5%
USA	19 292	19 569	278 094	7%
ISR	534	545	5 517	10%
MEX	4 695	7 182	59 467	12%
CHN	111 013	193 123	1 112 652	17%
CAN	5 611	4 810	27 164	18%
EU19	**71 712**	**67 218**	**341 307**	**20%**
EU27	**76 535**	**-**	**-**	**20%**
RUS	11 719	19 255	90 099	21%
TUR	16 715	23 091	82 775	28%
KOR	13 184	19 366	43 463	45%
ISL	90	84	188	45%
JPN	39 933	31 970	63 932	50%
CHE	4 071	2 555	4 745	54%
NOR	2 744	1 704	2 810	61%

Source: Authors using OECD data and PPPs from Eurostat and the World Bank. Note that these figures for 2010 are still preliminary and might be subject to significant revisions in the future.

The percentage PSE shows that EU farmers enjoy a higher level of public support than US farmers if we focus on direct subsidies (i.e. those received by individual farmers either through direct payments or through supported prices). The percentage PSE is 20%, i.e. twice the one in the US. It is also much higher than in New Zealand, Australia and Brazil. However, the level of support in the EU is rather similar to the one granted to Canadian, Chinese and Russian farmers.

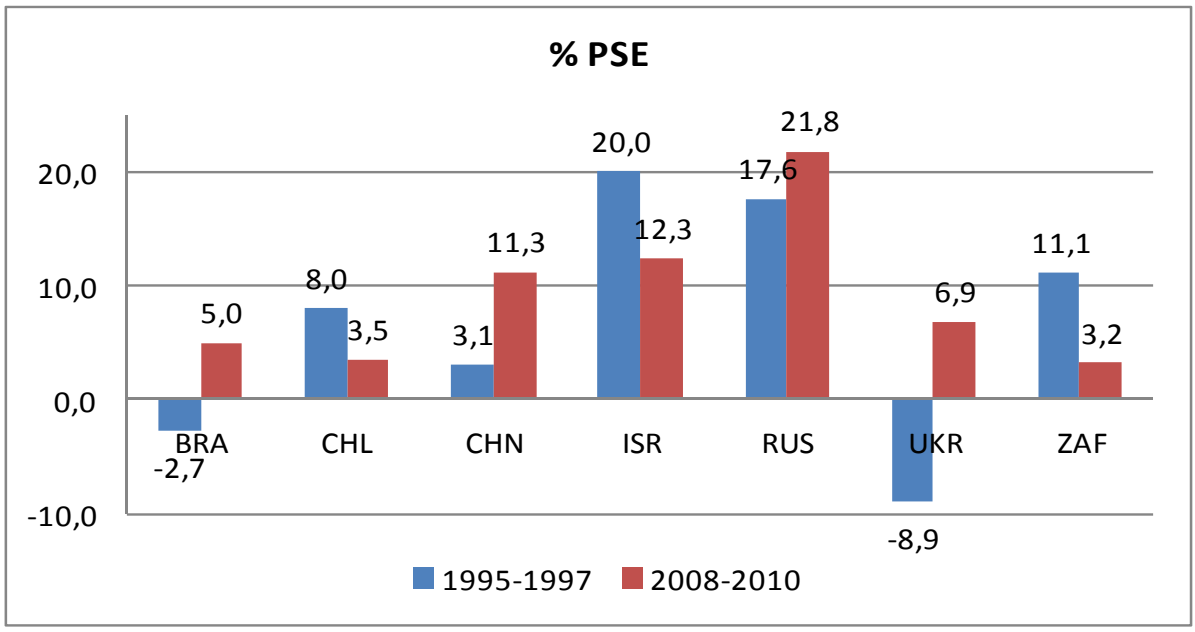
When expressed in real terms, i.e. in 2005 PPPs, the growth of support in emerging countries contrasts with the decline in developed economies (Figures d and e). In particular, the real support (PSE) granted to farmers in China doubled between 2007 and 2010, reaching a total approximately equal to that of all OECD countries. The undervaluation of the Chinese currency relative to its purchasing parity level plays a role in this result (so does the size of the country). An increase in real support is also visible in Brazil, although the final level as the percentage PSE remains much lower in total.

Figure d. Changes in the percentage PSE between 1986-88 and 2008-10, OECD countries



Source: Compiled using OECD data. EU_OECD refers to EU member states part of the OECD.

Figure e. Changes in the percentage PSE between 1986-88 and 2008-10, selected emerging countries



Source: OECD data.

Public support to the agricultural sector as a whole

In addition to the support enjoyed by each farmer individually (measured by the PSE), governments support the sectors through a set of instruments that benefits them collectively. These transfers are compiled under the item "General Services". This indicator should be taken with caution. It includes some transfers that do not only benefit farmers

(e.g. agricultural education may also train people eventually working in other sectors, research in biology that may be used mostly by the downstream food sector, etc.). It also includes transfers that benefit farmers indirectly (e.g. research, infrastructure, storage aid). In practice, including or not a measure is sometimes questionable. Subsidies to biofuels, for example are not counted as collective support, but food aid in the form of coupons is included, while both policies contribute to higher agricultural prices.

Table b. TSE in nominal value, in real value (2005 PPP) and as a percentage of farm receipts and GDP, 2010

	TSE IN MILLION EURO	VOLUME TSE, PPA 2005, MILLION EURO	TSE AS PERCENTAGE OF TOTAL RECEIPTS	TSE AS PERCENTAGE OF GDP
AUS	1 144	829	3.5%	0.1%
NZL	243	214	2%	0.2%
CHL	473	599	6%	0.3%
ZAF	639	942	5%	0.3%
ISR	671	684	12%	0.4%
BRA	7 644	8 054	6%	0.5%
CAN	7 957	6 822	25%	0.7%
E19	**82 596**	**78 808**	**23%**	**0.7%**
E27	**87 770**	**-**	**23%**	**0.7%**
MEX	5 636	8 620	14%	0.7%
USA	100 761	102 203	37%	0.9%
ISL	66	92	49%	1.0%
NOR	3 085	1 915	68%	1.0%
CHE	4 431	2 782	59%	1.1%
JPN	45 037	36 056	56%	1.1%
RUS	13 813	22 695	25%	1.4%
KOR	15 270	22 430	52%	2.0%
UKR	1 934	4 385	8%	2.0%
CHN	133 823	232 804	21%	3.0%
TUR	17 499	24 173	29%	3.1%

Source: Authors using OECD data and PPPs from Eurostat and the World Bank.

The addition of support granted by individual farmers (PSE) and those perceived collectively gives the indicator of the Total Support Estimate (TSE). Again it is possible to measure the TSE in a common unit using the current exchange rate (euro, column 1 in Table b). Here we use particularly the real TSE, calculated with the PPP 2005 (column 2), and the TSE expressed as a percentage of GDP (column 4).

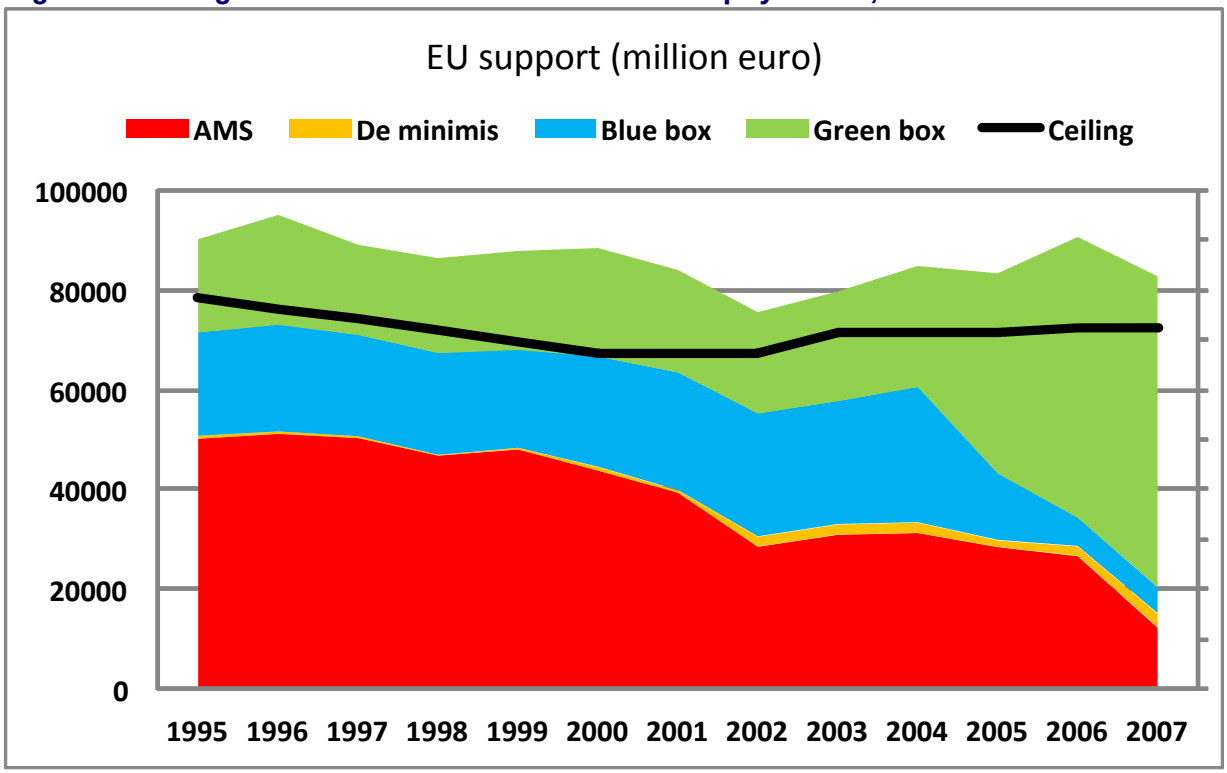
With a level of total support to agriculture that amounts to 0.7 of GDP, the EU is in the average of the sample. This level is similar to the one in Canada, but lower than in the US, Japan and much lower than in China. In the case of Brazil which provides a low level of support to individual farmers, general services include large public expenditure in infrastructure and research, a budget that has been growing considerably over the recent period. The amount of public investment in Chinese agriculture is also large, amounting to 3% of GDP if one combines individual and collective transfers.

Agricultural support and international commitments

EU support. Since 1992, the EU has reduced price support and payments linked to production. By doing so, the EU has reduced considerably the AMS notified to the WTO. It has also reduced payments under the Blue Box, a category that includes payments which maintain a link to production or inputs, but are conditional to supply control measures. It must be stressed that some relatively minor changes in the support mechanisms for fruit and vegetables have led to changes in the calculation of the AMS and have resulted in a large cut in the notification for 2007/2008. The EU also uses increasingly the *de minimis* clause that makes it possible to keep some support out of the AMS if this support represents less than a given percentage of the value of production. Overall in the most recent EU notification, the AMS was €12 billion which is much below the current maximum of €72 billion. The EU therefore has a significant degree of freedom in case it would "recouple" some payments to particular production (as currently discussed for the post 2013 CAP or already implemented under the Article 68 of Regulation 73/2009). Much of the existing leeway would disappear in case of a Doha Agreement, though.

Meanwhile, the EU has increased its support in the Green Box of €19 billion in 1995 to €62 billion in 2007, particularly as a result of decoupling (Figure f). The EU might therefore be above its AMS ceiling if the eligibility of these payments to the Green Box happened to be successfully challenged, an unlikely issue but that has recently been raised by Swinbank (2012) in the context of the European Commission proposal of October 2011.

Figure f. Changes in the EU AMS and Green Box payments, 1995-2007



Source: WTO notifications.

Other countries' AMS are also below their WTO ceiling. For some particular year, the US AMS has not exceeded the ceiling only because of an extensive use of the *de minimis*

clause. In the case of Canada, supports notification through insurance schemes in the Green Box is somewhat questionable, and without it the Canada would also be close to its AMS ceiling. Moreover, many emerging countries have not yet notified their domestic support to the WTO for the most recent years. The most recent notifications still refer to 2003 in some cases. Unofficial calculations by consultants suggest that some countries (e.g. India, Brazil, Thailand, Turkey) could be currently in a situation where they exceed the limits of their WTO commitments (DTB Associates, 2011).

A comparison of policy instruments

All support instruments do not have the same effects. The economic literature suggests that price support and per unit of output payments are the instruments that have the strongest impacts on third-country producers. In terms of market distortions, such policies are followed by payments linked to inputs, by production quotas, by payments based on historical references. Decoupled support has little impact on production. Payment for the cessation of production, for setting aside land or reducing the use of inputs may have a negative impact.

In the EU, most of the support measured by the PSE no longer requires production and only 16% of it is based on actual production. The EU has radically transformed its agricultural policy over time. The impact of the EU support on world markets is now limited.

In countries were the support measured by the PSE is very low, such as Australia, New Zealand, remaining payments tend to be granted on the basis of output or variable inputs. In the countries granting generous support to their agriculture, such as Norway, Switzerland, Japan, Korea, there has been a strong reduction of the most distorting forms of support over time. However, such distorting support still accounts for the bulk of the PSE (Japan, Korea) or for a large share of it (Switzerland, Norway) in these countries.

The case of emerging countries is very different from the EU one. There has been a rapid growth in agricultural support in China and Russia. In these countries, support reaches in 2010 levels comparable to those of the EU as a percentage of production and even more as a percentage of GDP (Table a and Table b). In addition, nearly two thirds of these supports (as measured by the PSE) are linked to current production and target particular commodities. There is no observable shift towards less decoupled support. China, in particular increasingly supports a set of products it considers important for its food security.

The examination of the composition of support also shows that subsidies or tax exemptions that lower energy prices for farmers are widespread and account for a significant share of the support. Finally, the effects of biofuel support policies are neither recorded in the OECD nor in the WTO indicators.[1] These policies now play an important role in the support prices for corn, sugar and oilseeds. Simulations on the EU using an econometric model suggest that they are equivalent to a policy of support for rapeseed production of over €1.5 billion in direct payments (Bureau et al 2010). These results are nevertheless sensitive to assumptions about oil prices. Farm support provided by biofuels is particularly difficult to quantify with simple indicators.

[1] Among the motivations, is that they have other objectives than supporting farm incomes; and that they result in an increase in world prices of feedstock and not just in the price in the country that implements the policy.

The Swiss, US and Canadian support: lessons for the CAP?

If we focus on the size of the transfers, in the EU, decoupled payments are the main form of support. Then, fuel subsidies, subsidies to investment, environmental payments and payments to less favoured areas are the main forms of support. Altogether these payments accounts for 70% of total support.

In the US, the support linked to market prices is low at the end of the period, and in particular for the year 2010. A striking difference with the EU is that the US policy relies heavily on a series of instruments to protect farm incomes against climatic hazards as well as unfavourable market conditions. In the EU, the level of support is higher (as measured by the percentage PSE) but the payments are more decoupled and closer to lump sum transfers. In Canada, support instruments also intend to protect farm incomes from fluctuations such that insurance systems play a greater role than in the EU, in particular.

In Switzerland, all payments are conditional on strict environmental constraints. The Swiss policy also aims at maintaining a certain level of production in the most difficult areas. The move towards decoupling was similar to the post 1992 CAP. The remaining support is higher than in the EU. The shift of support towards the provision of public goods went further than in the EU.

The comparison of EU support with the one in other countries can be useful in the current debates raised by the October 12, 2011 Commission proposal on the post 2013 CAP. One issue which is discussed is whether the EU support should be made more countercyclical, as it is the case in the US. Adjusting the EU payments downwards when market conditions are good and upwards when farm incomes are low would help smoothing farm income variations and make the current system more acceptable to the public opinion. However, this would have many unwanted effects: lack of compatibility of the structure of the EU budget; lack of rationale of replacing farmer's own smoothing of receipts over time by administrative procedures; blurring the signals of excess supply or excess demand to producers and thus potentially lead to market imbalances; prevent conditionality of payments to good practices; and need, de facto to shift back to product-specific payments.

The Commission's proposal also includes the development of risk management tools such as insurance The US and Canadian experience suggests that the management costs and leakages in this form of support limit the efficiency of transfers, i.e. the ratio of the amount benefiting farmers to the cost for taxpayers. A detailed analysis is beyond the scope of this report, but the cost efficiency of these measures compared to EU payments in uncertain.

The Commission's proposal to "green" CAP support by conditioning 30% of the direct payments to a series of constraints including an "ecological focus" area has raised many criticisms. In this area, the Swiss experience goes beyond what the Commission proposes for the post 2013 CAP. Several assessments suggest that Switzerland has managed to limit the erosion of biodiversity more efficiently than other European countries. More detailed analysis of the benefits and the economic costs involved are nevertheless necessary.

The Commission's proposal EU is increasing its budget on public agricultural R&D. The figures at stake suggest that the shift of EU expenditure away from farm income support to agricultural innovation is limited. Countries such as Brazil are going much further and faster in this direction.

Conclusion

Measuring support to agriculture is necessary to check the multilateral commitments of each member state. It is also useful to monitor policies and help policy coordination. However, methodologies are not completely satisfactory and data are not fully comparable. A review of indicators and sources of statistics shows the lack of economic relevance of the AMS used in the WTO and the questionable reliability of the WTO notifications for making international comparisons. Budget and microeconomic data do not allow unbiased comparisons either because they do not take into account the non-budgetary support component, which is often important in both cross sections and time series comparisons. The data collected by the OECD is of higher quality and is the main source of this report. We use modified versions of some of the OECD indicators. The modifications involve mainly expressing these indicators in real values, requiring the construction of purchasing power parities, so as to distinguish the changes in policies from the effects of exchange rate fluctuations and inflation; a classification of the instruments more in line with the economic impact of different instruments; and a simplification in the presentation of the results.

The EU has carried out reforms that have made farm support more efficient in the sense that more of the transfers from taxpayers and consumers now reach the farmers' pockets. Leakages were larger with former policies such as price support and export subsidies. The EU support now generates less distortion in world markets. The EU also has a large degree of freedom regarding its international commitments, which focus on coupled and trade distorting forms of support. Regarding the levels of support, the PSE relative to production shows that the EU is in the average OECD countries, at levels close to Russia, China and of Canada. It is still double of the support in the US on the basis of the percentage PSE.

In many other OECD countries, the evolution of farm support has followed a rather similar path to the EU one. Switzerland went further in shifting support towards the provision of public goods. Compared to the EU, the US and to some extent Canada, have maintained instruments that protect producers from market fluctuations. The US support is lower than the EU one, but part of the difference is explained by the current high level of world prices. Indeed, the US support relies more on countercyclical instruments than the EU. These instruments are not dismantled, they are simply inactive. This is an important difference with the EU support, which now relies on instruments generating little market distortion.

Agricultural support in emerging countries has not evolved in the same way as in developed countries. In Russia and China, there has been a strong growth in the volume of support (in particular in China). Both countries support their agriculture in proportions that are similar to the EU one, and higher if one accounts for the public support to general services. In addition, agricultural policies rely primarily on coupled support in these countries. While most OECD countries, and in particular the EU, have played by the rules regarding the WTO discipline, it is possible that in some emerging countries, which lag behind in their reporting, the level of distorting support measured by the AMS is now beyond their international commitments, but delays in the notifications do not allow to conclude. The analysis of the general services shows that emerging countries such as Brazil and China invest heavily in research. The progression of the R&D expenditure in these countries dwarfs the efforts of the EU to increased public research budgets. As a general picture, the EU supports farm income; the US and Canada focus more on sheltering producers from adverse situations; and emerging countries focus on research, innovation and infrastructure, investing for a longer term future.

1. INTRODUCTION

KEY FINDINGS

- There are several motivations for measuring support, including monitoring policies, verifying international commitments and bringing transparency on policies to lawmakers
- There are many farm support policies. Not all of them involve fiscal transfers. **Methods that focus only on budgetary transfers miss a large part of the story** Assessing price support raises methodological problems, but it is necessary for meaningful comparisons in time as well across countries.
- Measures should be kept **simple** but be consistent with sound theoretical indicators
- No indicator is perfect. Among the multiple indicators used in the literature, two have a particular importance in the policy debate, the OECD **Producer Support Estimate** and the WTO **Aggregate Measure of Support**.

1.1. Measuring agricultural support

1.1.1. The need for measures of agricultural support

Agricultural support is widespread in major trading nations. Many developed economies provide considerable support to their farmers and the level of farm support is growing in emerging economies. Agricultural support can be provided through different instruments (subsidies, tax exemptions, supported prices, etc.), and can be funded by different stakeholders (taxpayers, consumers, foreigners, etc.). This makes the assessment of agricultural support difficult and controversial.

Measuring the costs of domestic support accurately if one wants to compare it to the social benefits brought about by the policy. In a democracy like the European Union (EU), transparency is essential for justifying the allocation of public funds by lawmakers. Therefore, it is surprising that the cost of the Common Agricultural Policy is still subject to very different estimates.[2] This is an illustration of the need for both comprehensive and accurate measures of agricultural support.

Identifying the gainers and losers of public intervention is also a motivation for measures for farm support. The EU budget is limited and only a precise measure of the costs and benefits of policies will make it possible to distinguish those policies that match the general interest and those that have been implemented under the pressure of lobbies and vested interests. The need for comprehensive measures is emphasized by the fact that, often, those whose welfare is negatively affected by farm policies are rather diffuse, unorganized groups (e.g. consumers, biofuel users, new entrants in the sector, etc.).

[2] A variety of estimates circulate on the cost of farm support provided by the CAP. The lower bound estimates only accounts for budgetary expenditures, i.e. mostly direct payments to farmers. Other also measure the costs experienced by consumers through supported prices and tariffs or by restrictions on the use of particular products (e.g. sweeteners in the food and drink industry). Some estimates also include the costs paid by taxpayers for administering the policy and the costs experienced by farmers themselves who must go through time consuming procedures. Estimates range from €350 per European household and year to the extreme figures put forward by anti-European think tanks and Euro sceptics groups: even though the methodology is questionable, costs exceeding €1200 per household and per year are put forward, see for example Batten 2007, Rotherham 2008.

Making international comparisons of support is also a major interest. For example, Members of the Organisation of Co-operation and Development Organisation (OECD) have officially mandated the OECD Secretariat to monitor farm support since the early 1980s. The 1998 OECD Ministerial declaration stresses the need for transparency on costs, benefits and beneficiaries. Information and transparency of agricultural supports is seen as necessary for coordinated reforms that ensure mutual benefits (e.g. exploiting mutual advantages, moving to cooperative equilibria, avoiding beggar-thy-neighbour policies).

Assessing whether countries meet their international commitments. Because certain forms of agricultural support generate negative externalities for other countries, by affecting the price they sell their products, or by creating distortions of competition, some 153 countries Members of the World Trade Organization (WTO) have agreed on a common discipline since the 1994 Marrakesh Agreement. Measuring farm support is necessary to ensure that commitments are respected. This is particularly the case when farm support has been growing in several emerging countries, which are now suspected of providing trade distorting farm support above their WTO commitments (e.g. India, Brazil, Thailand and Turkey, see DTB Associates, 2011). An appropriate methodology is particularly important, since the international discipline under the WTO can lead to sanctions.

1.1.2. Limitations of measures of agricultural support

One difficulty is that the economic impacts of different forms of support are very different. For example, an export subsidy and a payment to help farmers to set-aside land do not have the same impact on production, prices or welfare. A challenge is to find a meaningful way to consider, and possibly aggregate these effects.

Comparing the level of support between countries whose geographic size or whose farm population differs considerably can also be misleading. The same instrument can have different effects when implemented in two countries. For example, support may capitalize in land rents in countries where this resource is scarce and where there is a highly liquid land rental market, while it will not be the case in other situations. A decoupled payment can have different effects on output depending on the farmers' risk aversion.

It is possible that some forms of support reduce deadweight losses, for example if they limited price variability or help avoiding crises. In that case, the support should not be gauged against a fictitious Walrasian equilibrium in a pure economy but against a situation where there are already some inefficiencies, such as price fluctuations without contingent markets. This can also be the case in the presence of other forms of market inefficiencies (e.g. agricultural support that provides information on product quality; that limits risk aversion; that reduces environmental externalities, etc.). Measuring and comparing the level of support must therefore account for the fact that the economic environment does not correspond to the first best equilibrium against which "distortions" are often evaluated.

1.2. The types of policy instruments used to support agriculture

The main types of policy instruments that are used to support agriculture are the following.

1.2.1. Price support

Public purchases and intervention prices have long been a central feature of the Common Agricultural Policy (CAP). They are now still used several Asian countries in spite of the

recent abolition of administered price for a number of commodities (administered prices persist for pig meat, beef in Japan, for example). Even though it takes less direct form, sugar purchases by the government in the United States (hereafter US) also fall in this category.

Target prices are still used in the US policy. The difference between such target prices and market prices (or minimum prices such as the US "loan rates") used to be matched by deficiency payments, or Payment In Kind certificates.

Safety nets, which include a variety of measures such as aid to private storage, possibly public purchases and if necessary surplus disposal through export subsidies or domestic consumption subsidies, are still a feature of the CAP.

Reference prices are usually linked to public purchase (Japan), import thresholds (EU fruits), or compensatory payments (US marketing orders). Some countries also implement price bands, i.e. a combination of minimum and maximum prices (Chile[3]).

1.2.2. Production control

Production quotas regulate marketed quantity of a commodity. They can take the form of an individual quota, as it is the case for dairy in some EU countries or a collective quota (EU sugar, animal productions in Eastern Canada). **Collective ceilings** are also a form of production control. In the EU they used to take the form of a maximum guaranteed quantity for cereals in the late 1980s, resulting in price decrease when the overall harvest exceeded a particular quantity.

Government sponsored cartels have traditionally be used in the US, for tobacco and peanuts. State monopolies have also helped support producers (Canada). While there is no direct government intervention, some private cartels can be encouraged by government's lack of competition policy, resulting in high level of support and international discrimination (New-Zealand dairy production is an example). Even though the main objective is to inform consumers and avoid adverse selection problems, some denominations of origins and labels can also act as a form of cartelization by restricting entry to a market segment (EU, Japan, and Korea). The US Country Of Origin Label indirectly plays such a role.

Diversion programs. Compulsory land diversion programs have historically led to set aside a considerable part of US arable land in the 1980s. They have been a condition for direct payments in the EU until the 2008 CAP reform. Paid (voluntary) land diversion programs exist in many countries.

1.2.3. Payments to producers

Output related payments (coupled payments) to producers have long been common element in US farm programs, where they tend to have been combined with other forms of support (countercyclical payments, insurance payments, direct payments, etc.). Direct aid for olive oil producers were also a form of output based payment in the EU. Some of the payments per livestock producers can be capped, on the basis of a maximum number of eligible animals for example (Switzerland).

3 The Chilean price band for wheat was found inconsistent with WTO obligations by the Appellate Body in 2007.

Input related payments are widespread in developing countries (subsidies to fertilizers for example). In the EU and the US, this includes tax exemptions for investments or on fuels. In emerging countries they often include subsidized interest rates or capital grants.

Payments per hectare of particular crops were widespread in the EU, but still exist in other countries (Norway, Turkey, US)

Countercyclical payments are used in several countries, including the US, Japan, Korea, Norway). They adjust the level of direct payments to market conditions.

Decoupled payments are now the main form of support in the EU. They are decoupled in the sense that they have no or minimal effect on production and input use. **Payments with production ceilings** are payments that are, for example, paid per head of cattle up to a certain number. Such payments are provided to Swiss farmers, and to EU farmers in areas with natural handicap.

Specific environmental payments (conservation measures, such as Environmental Quality Incentive Programs in the US; Agri-environmental Schemes in the EU) are considered as decoupled, but represent a substantial percentage of farmers' incomes in some regions. Ecological compensation is a particular form of environmental payments (Switzerland). **Animal welfare payments** are not always decoupled from production (Switzerland) but are presented as a compensation for extra production costs compared to standard practices.

Farm incomes can be supported through rather indirect schemes such as **renewable energy subsidies** (solar panels, biogas production) or climate change related payments. These payments are usually not considered as farm support but in some countries they can provide a significant income with indirect spillovers on the capacity to invest in agriculture and to face price and output fluctuations (Germany). This is also the case for **payments for improving technology and capital** (e.g. water in Mexico, infrastructures or livestock buildings in some EU member states).

1.2.4. Demand based instruments

Consumer subsidies lead to a higher demand and therefore tend to raise prices. In the EU, payments to users of oilseeds have also provided a form of coupled support in the 1980s. Food stamps are by far the largest budgetary component in the US farm policy. Even though the issue of whether they should be classified as a farm support instrument is controversial, there is little doubt that such a considerable amount of subsidies has some significant effect on domestic agricultural price and act as a support for farmers. Subsidies so as to incorporate agricultural products in non-food production or in animal feed (e.g. casein, milk powder in the EU) are much more limited but also contribute to price support.

Subsidies to biofuels and mandatory incorporation in transport fuel have a considerable (albeit not very well identified) effect on feedstock prices. Even though it is not officially considered as a farm support instrument by the international organisations that monitor agricultural support, it is now a major component of the agricultural policy in the US, Brazil and the EU.

1.2.5. Trade-related instruments

Tariffs isolate the domestic market, shelter it from imports or simply make imports more expensive for domestic consumers. This often contributes to higher prices (e.g. beef in the EU, Switzerland, Norway; sugar in the US; rice in Japan, Korea; dairy products in Canada).

Import quotas act the same way. Like specific tariffs, they can lead to protect particular product qualities -the lower value products- more than others. Tariff quotas are widespread (EU, US, Japan).

Export subsidies are now much less common than they used to be. The EU export refunds used to be a key component in the intervention system. The US Bonus Incentive Export Program and Export Enhancement Program also led to support US farmers. Foreign food aid, subsidised and guaranteed export credits are still widely used by the US as a way to promote exports, and therefore support prices.

Currency manipulation, through exchange rates control, is sometimes seen as a way to subsidize exports, even though it is not recognized as a trade measure by the international organizations monitoring support and subsidies (China).

Export taxes or restrictions can also be a form of producer support, at least for livestock producers, in the sense that they are sometimes used to lower somewhat artificially the price of feedstuffs (e.g. Argentina, occasionally Russia, India, Thailand and exceptionally the EU such as in 1996 have taxed or restricted exports of cereals in the past). On the contrary, this is a form of producer taxation for the producers of feedstock that is subject to the measure.

1.2.6. Other forms of support

Insurance and disaster payments involve considerable amounts of taxpayers' money in countries such as the US. They are now a major farm policy instrument. Several Canadian programs also use public funds for income variability compensation, for productions losses, and for gross margins variations. Even countries such as Australia have drought related assistance programs. Most countries also support farmers in the case of outbreaks of animal diseases or natural disasters.

Subsidies to research and development only have an indirect impact on farmers' income. The fact that in some countries such programs are funded by agricultural producers and by taxpayers in others nevertheless creates differences in global support across countries. This is also the case of other services whose funding varies across countries (certification, sanitary programs, waste and dead animals disposal, etc.).

Payments to young farmers can be seen as a form of income support affecting production (some EU Member states), while compensation for early retirement target beneficiaries that are leaving the sectors, showing the dangers of aggregating various forms of support.

1.3. The indicators most commonly used

Agricultural support is monitored by international organisations. National governments also compute indicators. Most of them are quite *ad hoc* indicators, designed to be computed with simple and easily available data. Sophisticated indicators, which require much more

data and information and often an economic model, can hardly be a basis for international comparisons and negotiations, but they can offer a reference that simpler measures should approximate. Conceptual indicators derived from consistent economic theory are also useful benchmarks against which ad hoc indicators can be gauged.

1.3.1. Conceptual benchmarks

Producer surplus and consumer surplus are key components of welfare analysis. Their changes provide accurate measure of the changes in the utility of agents, expressed in a monetary unit. In the case of a complex policy, that combines taxes, subsidies, quotas, etc., the producer surplus remains a central measure for synthesising the various effects on producers' welfare. To some extent, the measures that rely on the comparison of the current policy with a counterfactual scenario (e.g. production valued at world prices) are approximations of producer surplus. **Compensating variation** (CV) and **Equivalent variation** (EV) are the most and theoretically satisfactory for measuring the consequence of a policy on economic agents.[4] Estimates of these measures requires knowing the demand function (more specifically the compensated or Hicksian demand in the case of CV and EV).

A robust measure to quantify the economic costs of associated price distortions is the simple "**Harberger triangle**". This straightforward exercise has numerous applications. It is also fully consistent with welfare measurement under very general assumptions, and it has been demonstrated that this simple approach had originally unsuspected theoretical properties to analyze actual distortions in the economy, including those arising from government intervention, monopoly, trade barriers, and taxation (Harberger 1964; Hines 1999).

TRI and MTRI. If one focuses on externalities that agricultural policies induce on third countries, the most satisfactory indicators from a theoretical standpoint are undoubtly the **Trade Restrictiveness Index** (TRI) and the **Mercantilistic Trade Restrictiveness Index** (MTRI). The TRI is defined as a single indicator (i.e. the uniform tariff or uniform price change) that yields the same income as a support policy, i.e. a policy that includes a differentiated tariff structure, quotas, non tariff trade barriers but also domestic support accounting from general equilibrium transfers (Anderson and Neary 1996; Anderson, Bannister and Neary 1995). The MTRI is defined as the uniform tariff or uniform price change that maintains the same volume of trade as a given set of policy instruments (Anderson and Neary 2003). The TRI and MTRI are cumbersome to estimate. This requires a set of elasticities and simplifying assumptions (e.g. Bureau et al, 2000) or a complete general equilibrium model. However, because they are more satisfactory than other ad hoc indicators from a conceptual point of view, the TRI and MTRI are useful benchmarks.

1.3.2. Empirical modelling

Conceptually, estimating EV or CV or indicators such as the TRI and MTRI with a complete general equilibrium model of the economy is probably the sounder way to measure the benefits of a policy and its impacts. Simulations of the impact of agricultural support using a computable general equilibrium model can provide an in-depth assessment of the economic impact of agricultural support. One advantage is that the reference can be a

[4] When public intervention modifies several prices, consumer surplus is not always well defined due to integrability conditions (the multiple Marshallian demand system cannot always be integrated). Working on compensated demand solves these problems. The choice of a reference utility leads to either the compensating or the equivalent variations.

counterfactual scenario, so that the comparison takes into account many interactions, i.e. by measuring the impact relative to what the structure of the economy would be without support. However, the complexity of such an effort, data limitations and the need to use rather simple functional forms in such models for computational problems, prevent an utilisation for regular monitoring and international comparisons. Partial equilibrium models reduce the need for data, and make it possible to use more general and flexible representations of technology and preferences, but are hardly be more adapted to an annual, international measure of support.

1.3.3. OECD indicators

The **Producer Support Estimate** or **PSE**, calculated by the OECD is defined as the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, arising from policy measures that support agriculture, regardless of their nature, objectives and impacts on farm production or income. It is noteworthy that the PSE includes for example payments that do not support agricultural production (some of them could even reduce it, such as land diversion payments). The PSE can be expressed as a percentage of gross farm receipts so as to facilitate international comparisons. It can be expressed on a per hectare or per working unit basis.

The **Producer Single Commodity Transfer** or SCT is the monetary value of gross transfers to producers arising from policies linked to the production of a single commodity such that the producer must produce the designated commodity in order to receive the payment. Producer SCT is also calculated by commodity, and is also expressed as a share of gross farm receipts for the specific commodity. The Consumer SCT is the monetary value of gross transfers from consumers arising from policies linked to the production of a single commodity.

The Consumer Support Estimate (CSE) is the annual monetary value of gross transfers from or to consumers of agricultural commodities, arising from policy measures that support agriculture. A negative CSE measures the burden, as an implicit tax, on consumers through market price support (higher) prices than more than offsets consumer subsidies that lower prices to consumers. In order to facilitate comparisons across commodities the CSE is also expressed as a share of consumption expenditure on agricultural commodities (at the farm gate level) by the OECD.

The Total Support Estimate or TSE is also calculated by the OECD. It represents the annual monetary value of all gross transfers that support agriculture, net of the associated budgetary receipts, regardless of their objectives and impacts. In particular the TSE includes the component defined as **General Services Support Estimates** (GSSE), which is the monetary value of gross transfers to general services provided to agricultural producers collectively (e.g. research, training, inspection, marketing and promotion). These measures include budgetary expenditures that only indirectly support farmers' incomes.

1.3.4. WTO indicators

Aggregate Measures of Support or **AMS**. The indicators computed by the WTO are, from a policy standpoint, the most important in the sense that they are tight to binding commitments, and can trigger disciplinary measures under the Dispute Settlement Body discipline. A key indicator is the WTO AMS, which is the one on which maximum support commitments are based on. It intends to measure "distorting" support that generates externalities for other WTO members, in general through market prices. This is the reason

while measures that have no or little impact on production and input use are excluded. Those measures whose effect is ambiguous (e.g. because a price components supports production which is nevertheless limited by a quantitative ceiling or an input restriction) are also excluded (and classified as "Blue box"). It is noteworthy that there are different types of AMS, one "Total" and "Product specific", "Non product specific" which correspond to a rather complicated set of disciplines under the WTO agreements. The classification of payments under these items is also quite complex (some insurance subsidies can be product specific, other not, for example). Some support coupled to production, can be excluded from the calculation of the AMS under the "de minimis" clause.

Non binding WTO measures of support. Under WTO obligations of notifying support, some other indicators are also calculated. This is the case of the "Measures exempt from the reduction commitment" both under the "Green box" and the "Exempt Direct Payments" or "Direct Payments under Production-Limiting Programmes" (or "Blue box"). In both cases, the support that is monitored is not subject to binding WTO constraints. Some of the measures included in the "Green box" nevertheless involve considerable transfers (e.g. US food stamps programs, EU single farm payments) and could have a significant impact on markets and eventually, farm incomes.

The WTO **Overall Trade Distorting Support** or OTDS is also a concept developed under the WTO, whose principle has been agreed upon in 2004, but which will become truly binding in only in the case of a Doha Agreement. Several types of support are considered as affecting other countries in some way, even though they are not formally included in the AMS. This is the case of coupled support conditioned to production limiting programmes (Blue box support) and of coupled support notified under de minimis provisions. The OTDS intends to impose a global ceiling on all these measures.

1.3.5. Indicators of the gap between domestic and world prices

The Nominal Protection Coefficient (NPC) is a simple indicator of price distortion, equal to the ratio of the domestic price of a commodity to its border price, in general using the official exchange rate. It makes possible to compare protection across commodities, countries and over time. Aggregation over a set of commodities can use production, consumption or even trade weights. If the official exchange rate is not at equilibrium, the border price should be adjusted to remove this distortion. This leads to **Real Protection Coefficient**, often using Purchasing Power Parities as exchange rates. When government intervention and trade measures affect inputs as well as output (e.g. tariffs on feedstuffs, subsidies to fertilizers), effective protection measure the ratio of the value added on primary factors in the protection of a particular good, measured at domestic price and the value added measured at border price. This leads to Nominal **Effective Protection Coefficients**, or Real Effective Protection Coefficients. Here too, various aggregation techniques can be used, from simple input/output coefficients to calculate the value added, to superlative numbers relying on implicit flexible aggregator functions (Bureau and Kalaitzandonakes 1995).

The Nominal Assistance Coefficient (NAC calculated by the OECD) for producers is the ratio between the value of gross farm receipts including support and gross farm receipts valued at border prices (all valued at farm gate). It gives an image of the rate of price support arising from administered prices, quotas, or trade measures, using the structure of domestic production as weights. There are other forms of Nominal Rates of Assistance. One common characteristic is that they are more extensive than the NPC, in terms of its policy coverage, since they take account of all policies which raise prices received by domestic

producers. Effective rates can also be defined. The **Effective Subsisdy Coefficent** accounts for situations where subsidies given to primary factors are used in the production of a particular crop (e.g. .tax breaks on land, buildings, credit subsidies, etc.). Like in the Nominal Effective Protection Coefficient, the denominator is a value added at reference prices, while the numerator is a value added at observed prices minus the differential subsidies on primary factors per unit of output.

The Domestic Resource Costs or DRC is used (in particular by the World Bank) in agricultural policy assessments. It is the ratio of the cost in domestic resources and nontraded input (in general valued at a shadow price) of producing the commodity domestically to the net foreign exchange earned or saved by producing the good domestically. It provides a measure of efficiency with which the corresponding commodity is produced, with implications for the level of incentives offered to producers. More than measuring agricultural support per se, it provides information on the efficiency of supporting the production of a particular commodity as opposed to importing it. The idea is that the opportunity cost of domestic production relative to the value added it creates in foreign currency provides a benchmark against which support to local production can be evaluated.

1.3.6. Indicators of support dispersion

The impact of government intervention can often be decomposed in two moments, the generalized mean of the intervention and the variance (Anderson and Neary 2003). This suggests that not only the level of agricultural support matters, but also its dispersion. Aside of conceptual issues, for practical and political reasons, the dispersion of support, and its variability across stakeholders are an important component of the measurement of agricultural support. It is therefore useful to complement the measure of aggregates by indicators of dispersion. Among the easily implementable methods, the classical Lorenz curves, **Gini indexes** provide useful information. Simple but robust measures such as extreme deciles or quintiles ratios turn out to be consistent with rather general assumption on the underlying social welfare functions (Piketty 1997). The more sophisticated **Theil indexes** allow for a decomposition of the sources of dispersion (Theil 1967, Bourguignon 1979, Bourguignon and Morrison 1985; see also Butault and Lerouvillois 1999 for an application to agriculture).

1.4. Political issues associated with these systems of comparison

Because of the variety of public interventions in agriculture and their complex effects on production, trade and welfare, any attempt to measure and compare them with simple indicators inevitably raises debates. The above-mentioned, non exhaustive, list of indicators illustrates the complexity of this task. Indeed each indicator relies on different underlying assumptions and focuses on a particular aspect of agricultural support. This raises particular issues in the context of international negotiations and in the monitoring of agricultural policies by international organisations.

Measures that report on the effects of agricultural policies, e.g. welfare measures, or the change in farm income or employment, require a model describing supply and demand response. Building such a model involves specifying functional forms with estimated coefficients. Every signatory of an international agreement that requires estimating agricultural support could easily come up with a model of its own, with each country predicting a different effect. Moreover, as even two models predicting exactly the same

change in prices and quantities might still adopt a different welfare measure and hence find different gains, negotiators would after settling on a single prediction still have to agree on a welfare criterion (e.g. equivalent versus compensating variations), unleashing tedious discussions as the stakes will differ. For that reason, simple indicators that do not rely on a counterfactual situation simulated by sophisticated models have been adopted by international organisations. Two measures are particularly important in international fora. The first one is the OECD PSE, which is computed annually under the monitoring of agricultural policies that follows repeated ministerial mandates for the OECD Secretariat to contribute to transparency of agricultural support. Even though the PSEs are not constraining for policymaking, they expose the degree of support to agriculture to public attention and their calculation is therefore a sensitive issue. The second measure is the WTO AMS, which is part of the official commitments of WTO members. It therefore has a role in a binding procedure, and can be used in settling disputes in an official procedure.

Both the OECD and WTO measures have the major practical advantage of being statistical measures. To adopt them as a common framework, countries only have to settle on its definition, and agree on a set of policies to be considered and on the data that should be used. On the other hand, these indicators have numerous stressed by many authors, which will be discussed in section 2.3.3. and section 2.3.4. They also suffer from practical problems, in particular regarding the choice of reference prices. The OECD methodology has experienced some changes over time and has been scrutinized by numerous committees and experts so as to provide a faithful image of agricultural support in its various dimensions. The WTO methodology is less sophisticated, and show little connection with economic reality. It is mostly designed to monitor changes in trade distorting support using a fixed methodology. In section 2 we will show that while the PSE measure suffers from drawbacks, the OECD PSE database provides a unique source of information that is unsurpassed in terms of reliability. The flaws of the WTO methodology as well as the dataset are too important for the AMS to be a satisfactory indicator of support. On the other hand, for policy oriented comparison, the classification of the different instruments in the WTO methodology is perhaps more useful than the OECD one.

2. METHODOLOGY FOR COMPARISON

KEY FINDINGS

- Indicators of farm support must be theoretically sound but be **kept simple**, ruling out model based approaches.
- Because the **OECD PSE dataset is comprehensive** and subject to thorough quality control, we rely on OECD sources. The WTO approach is also used for defining indicators that reflect more the different nature of the farm support programmes. Other approaches, such as budget based methods do not provide a sound basis for international comparisons.
- The **OECD and WTO methodology respond to different objectives**. Measuring the overall level of support in the first case, while distinguishing trade distorting from less trade distorting support in the latter.
- The PSE methodology has some caveats, in particular regarding the sensitivity to the currency used in the calculation; we develop a method based on time series country specific deflators and spatial price indexes, the **Purchasing Power Parities**.
- The method used to measure **agricultural support in real terms**, relies on a multilateral version of the Fisher index, the EKS approach. This makes it possible to identify changes in support caused by currency fluctuation and exogenous world price fluctuations.

2.1. Identifying the goals of agricultural support

A measure of agricultural support should account for the effect of a variety of policy instruments; it should reflect the ability of the support policy to reach its objectives; and inform about the externalities of support. This calls for setting benchmarks against which the various indicators can be assessed. In particular, for indicators of farm support to reflect how effective and/or how distorting this support is, it is necessary to clarify the objectives of farm support.

2.1.1. Non market objectives

Historically, one of the objectives of farm support has often been the fear of food insecurity, of embargoes, or distrust in the ability of international markets to ensure supply in all situations. Sourcing supply in several regions affected differently by natural conditions and wars was perhaps a better way to ensure food security than self reliance. However, the recent price spikes and the difficulty for several major importing countries to find rice and wheat in the world market during several months in 2008 have brought a new legitimacy for supporting domestic food production. The 2008 World Development Report stressed that food insecurity in poorest countries has often been caused by negative rates of support on agriculture as well as the lack of public investment in the sector.

2.1.2. Market failures

Public goods and externalities. As it is the case for other forms of public intervention, agricultural support can be motivated by the need to address some particular market

failures. Supporting the provision of public goods, which are likely to be supplied in a sub-optimal quantity if left to market forces is one of them (Henry 1984). Because agriculture – or at least particular forms of agriculture- produces public goods, as identified by TWG3 (2011), this form of support can be seen as a way to generate a more socially optimal outcome for the society. Such considerations have been implicit in the Commission's objectives of promoting rural development objectives since the 1990s. The presence of *positive externalities* in agriculture is also a compelling motivation for supporting particular types of agriculture. It is noteworthy that the cost of negative externalities is considerable in agriculture (estimates of the social cost of nitrogen pollution from agriculture range from €70 billion to €320 billion per year in the EU, see Sutton et al, 2011a, 2011b). Following this principle should also lead to negative supports for particular forms of agriculture.

Imperfect competition and information. The presence of imperfect competition is, in theory, a motivation for government intervention. The need to counterbalance excessive market power in the downstream sector was the motivation of some EU subsidies, in particular those to producers organisations. Competition is clearly imperfect in the input industry (seeds, chemicals, fertilizers). One could however argue that imperfect competition is seldom a compelling case for supporting agriculture.[5] The presence of imperfect information can be the source of market failures. Some payments (e.g. in pillar 2) can help solving quality differentiation problems, or support the proper identification of products by consumers (e.g. organic products).

In cases where government intervention addresses market failures, agricultural support may increase global welfare for a particular country. This motivates distinguishing such support from other forms of support generating deadweight losses.

2.1.3. Political economy

Economists have shown that agricultural policies implicitly translated into different degrees of preferences for each stakeholder. Tyers (1991) demonstrated for example that the CAP acted as if the society expressed a preference for particular producers (dairy, cereals) compared to others, and even more compared to consumers. The latter were given a very low weight in a function representing collective preferences. This does not mean that all support is explained by lobbying considerations. The high implicit preference for dairy and grain farmers could alternatively be motivated by market conditions such as a willingness to stabilize fluctuating grain prices or to support particularly low incomes in milk production. However, there is evidence that the lobbying power of producers is reflected in the level of agricultural support.

Political economy provides rational explanations for such an outcome of the policy process. For example, the changes in the structure of the economy (e.g. the declining share of food in consumer expenditure; the declining share of agriculture in employment and in national product) modify the political costs and benefits of agricultural support, and thus the political incentives to support the sector. In the EU, such changes resulted in farmers turning to government support either because returns to investment in lobbying became larger than in market activities, or because of the returns in terms of votes that politicians expected now exceeded costs (Swinnen 2010). International comparisons show that the positive correlation between GDP per capita and support to farmers, as well as the negative relationship between the share of farmers in employment are explained by both the political

[5] A first best optimum is in general to solve the imperfect competition problem in the upstream or downstream sector, by restoring competition or regulating actors so that they act in a socially optimal way.

organization argument (i.e. Olson's idea that the decline in agricultural employment made political organization of farmers less costly and therefore farmers' lobbying more effective) and by the reduced cost of redistribution argument. More recent political economy work, building on the "protection for sale" model, explain support that go to agriculture where there is some entry costs and where lobbying more easily translates into rents than in industries with easy entry (Baldwin and Robert-Nicoud 2007). However, even political economy explains agricultural support and shows the political rational of it, it does not justify it. Monitoring of agricultural support is particularly necessary for shifting from rent seeking behaviour and non cooperative equilibria to cooperative solutions that maximize collective welfare.

2.2. What is asked from a measure of agricultural support?

2.2.1. Desirable properties

A measure encompassing various forms of farm support. There are many forms of intervention that results in support to agriculture. They differ on the sources of funding. Indeed, some domestic support to producers, for example, can be funded directly by taxpayers. It can also be funded by domestic consumers, if there is a government intervention that leads to support market prices (e.g. tariffs, public purchases, export subsidies, quotas, etc.). Some of the support can also be funded by foreigners, for example in the case where a tariff is imposed by a large importer leading to a lower price of the importable and improving both the terms of trade and the tariff revenues of the importing country.

A measure should therefore include all sources of support. This rules out using only data on subsidies received by farmers since they will not include those transfers that are funded by the consumer. This also rules out using only data on public expenditure devoted to agriculture.

Ability to gauge the effectiveness of policy instruments. The costs associated with different policies may vary a lot, for the same amount of transfer to producers (see Table 1). It can be useful for an indicator of agricultural support to reflect such information. This calls for deriving a measure of support from consistent theory (e.g. surplus, or welfare measures such as compensating/equivalent variations).

Table 1. Indicative impact of support instruments on transfer efficiency and trade distortions

AGRICULTURAL SUPPORT INSTRUMENT	INDICATIVE TRANSFER EFFICIENCY COEFFICIENT	INDICATIVE TRADE DISTORTION COEFFICIENT
Support to variable inputs	0.19	0.89
Market price support	0.31	0.81
Coupled direct payment	0.32	0.72
Income support	0.47	0.40
Per hectare payment	0.47	0.16
Decoupled payment (historical basis)	0.50	0.00

Source: adapted from Dewbre and Short (2002). Transfer efficiency refers to the share of the public expenditure that benefits farmers. Trade distortion refers to the impact on third countries producers. The indicative trade distortion coefficient is the ratio between variation in exports induced by support and variation in support.

Ability to assess the trade distorting nature of support. One objective of comparing agricultural support is possibly to ensure coordination towards a cooperative equilibrium, through a common discipline to reduce negative externalities on other countries. For that purpose, the methodology used to measure support needs to distinguish those types of support that generate effects on third countries and those that do not. Clearly, not all policies are equal in this area (see Table 1). This calls for indicators of support that distinguish several categories of measures, bearing the risk of complexity.

An implementable measure. The practical implementability and the reliance of available data are important in constructing measures of agricultural support, in particular for measures that intend to be used for international comparisons. Discrepancies between countries go beyond a problem of statistics as agriculture sometimes refers to different concepts (e.g. wine is an agricultural product in Europe, while it is considered as an industrial output in other countries where grapes are sold to wineries).

International comparability requires the indicators to rely on easily available data, and therefore to be very simple. This rules out some of the indicators listed above, for example the Domestic Resources Cost, which is highly demanding on data (non traded inputs need to be factored out, technical coefficients are necessary as well as shadow exchange rates).

A measure on which it is easy to communicate. A frequent problem in the media is for example the erroneous interpretation of measures of support. An example is the widely used PSE, a measure of transfers to the farm sectors that includes production limiting payments or "virtuous" green payments, which is often used as a measure of distorting support, sometimes even a measure of protection (see Appendix 2.1. for the list of categories that the OECD distinguishes for the PSE indicator only).

Overall, a methodology for measuring agricultural support should:

- Be able to encompass different forms of support. This calls for measures based on benchmarks approximating the situation without support (e.g. a set of undistorted prices). This is clearly a problem but other measures are unable to make meaningful comparisons when policies differ significantly;
- Be consistent with microeconomic theory so as not to run into paradoxes for example when multiple prices vary in an opposite way;
- Be simple, and parsimonious in data, so as to be used in international fora. This implies that they do not rely on modelling results and even on elasticities;
- Distinguish different categories of support, so as to reflect the degree of efficiency of transfers, and to reflect the trade distorting nature of the different forms of support.
- Be easily understandable and have a clear interpretation.

Conciliating these different requirements is a challenge. An examination of the problems raised by the most common measures of support may provide some elements for defining a methodology.

2.3. The pros and cons of the main measures of farm support

2.3.1. Budget expenditure

For policy makers and in particular the Members of the European Parliament, decisions regarding agricultural support have a very practical aspect, i.e. the amount of the

agricultural budget and the allocation of budgetary resources between the various forms of support. An analysis of the EU expenditure is particularly useful to assess agricultural support from the point of view of the taxpayers. The drawbacks of this approach are obvious. First, agricultural budgets include expenditure that does not benefit farmers much. This can be because budgets do not target farmers but another community (e.g. processors of agricultural products). Or because a large proportion of the payments can be "lost" in higher production costs (subsidies to products that have no comparative advantage), an increase in rents (subsidies when there is one essential factor with an inelastic supply), or because these payments end up benefiting foreigners (e.g. export subsidies that cost the taxpayer but mostly benefit foreign consumers). That is, this approach focuses on the costs but give a poor image of the amount of money that farmers actually enjoy. Second, the budget approach is cost based but it only partially takes into account costs for consumers, if there is, for example some price support.[6]

2.3.2. Subsidies received by farmers

Information on the payments received by farmers is the most direct way to assess how the transfers benefit producers. The information can be found in two sources, the economic accounts and farm level data.

Economic accounts. Subsidies paid to farmers are reflected in the macroeconomic accounts of agriculture. In the EU this approach is particularly useful, since these accounts combine the subsidies that are funded by both the EU and the Member states budget. Data from the economic accounts also make it possible to put in perspective agricultural support and agricultural income and to assess how dependent farmers are from subsidies.

Within the EU, Eurostat makes these macroeconomic accounts consistent and comparable. At the international level, the fact that a number of countries follow United Nations accounting standards also allow for some comparisons. However, national economic accounts do not follow the same methodology across countries, when one needs to go into details such as agricultural subsidies (for example, the treatment of forestry differs between countries). Even for a given country, long term comparisons are difficult, due to changes in the classification. This is a particular problem with the EU national accounts for agriculture (for example the introduction of subsidies in "basic prices" used in the EU system of national accounts has generated problems of consistency of comparisons both over time and across countries).

Microeconomic sources provide an even more direct way to measure the payments received by farmers. EU Member States have the obligation to gather microeconomic data, which also provide information on the actual payments received by farmers. At the EU level, a centralized dataset gathers information on farm business accounts, the Farm Accounting Data Network also known as RICA or FADN. This source makes it possible to put in perspective the amount of subsidies received and some characteristics of the farms, including farm size, technico-economic orientation, etc. (EP, 2010).

Approaches based on microeconomic sources nevertheless face limitations. First, like all payment based measures, they do not account for agricultural support in market prices. Information contained in the various microeconomic sources (e.g. farm business associations) is also very different across countries. International comparisons on a large

[6] Momagri (2011) proposed a set of "Indicateurs de soutiens globaux à la production agricole" in the EU and the United States. Arguing that there is no satisfactory measure of a reference price for measuring price support, they consider only budgetary expenditure.

sample of countries are practically impossible due to different accounting conventions. In the EU, FADN data are harmonized and comparable across Member States. Long time series comparisons are nevertheless difficult. There is a considerable turnover in the sample of the FADN and a problem of representativity of this sample in some Member States. Finally, access to these data is particularly difficult due to restrictions linked to confidentiality protection.

2.3.3. Producer Support Estimates

30 years of improvement in the methodology. The monitoring of agricultural policies and the construction of indicators of agricultural support were mandated by OECD Ministers. The main purpose of the OECD methodology is to monitor and evaluate developments in agricultural policy, to establish a common base for policy dialogue among countries, and to provide economic data to assess the effectiveness and efficiency of policies (OECD 2011a)

The Secretariat has calculated indicators for OECD and an increasing number of non-OECD countries. The OECD indicators refer to a particular conception of "support", which is understood as gross transfers to agriculture from consumers and taxpayers, arising from government policies supporting agriculture (see Appendix 2.1). In addition to budgetary expenditures, support includes estimated transfers which do not require actual monetary disbursements (e.g. credit concessions). It is important to understand that the OECD indicators measure policy transfers, not production or trade effects. In particular, they are of little help for distinguishing policy intervention that are designed to respond to market failures and those that are designed to provide rents to producers.

Methodological issues have been discussed since the early 1980s when the Secretariat started to calculate Producer Subsidy Equivalents (the predecessor of the current Producer Support Estimate).[7] Many of the recent criticisms made to the OECD methodology have actually been raised some 20 years ago. In many cases, possible solutions were debated within the proper committees. Some have been implemented, which has led to a major change in the methodology in the late 1980s.[8]

The OECD indicators. The PSE includes two components. The first one is the transfer directly linked to a particular output, either through a product specific direct payment or market price support. The second one is the non-product specific transfers. The OECD classification distinguishes various categories of transfers, those that subsidized inputs, that depend on the number of hectares or animal heads, on current income, on historical references, those granted under the condition that production takes place, those that do not require production (see Annex 2.2). This classification attempts to reflect the decoupled

[7] The Producer Subsidy Equivalent was initially defined as the payment that would be required to compensate farmers for the loss of income resulting from the removal of a given policy measure (OECD, 1987). They followed the pioneering works of Corden (1971) and Josling (1973).

[8] In particular the PSE was redefined in 1990 as the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, measured at the farm-gate level, arising from policy measures that support agriculture, regardless of their nature, objectives or impact on farm production or income. In 1999 Producer Support Estimates replaced the Producer Subsidy Equivalent. Support granted through general services, which were included in the PSE, were taken out in a separate category, the GSSE. In 2007, changes in the methodology led to new classifications, and to replace the single commodity PSEs by categories such as Single Commodity Transfers, Group Commodity Transfers, All Commodity Transfers which are more in line with the reforms that OECD countries adopted in the late 1990s and the 2000s. A history of the PSE methodology can be found in Cahill and Legg (1989). The conventions and methods used have been frequently updated, and are fairly transparent, being published on the internet (OECD 2011a). See also OECD (2009) and Jones (2010).

nature of the support, as well as the support that is conditional to restructuring production or withdrawing resources from agriculture.

In addition to the PSE, which measures support received by individual farmers, OECD indicators include the CSE an estimate of the support (often negative) to the users of the agricultural products , and the TSE, offering an estimate of total support to the agricultural sector (see a definition of the indicators calculated by the OECD in Appendix 2.1.). The TSE is constructed by adding to the PSE the general expenses related to the agricultural sector and the amount of transfers from taxpayers to consumers implied in food aid and assistance to the disposal of agricultural production. These indicators monitor and aggregate transfers between consumers, taxpayers and producers (see section 1.3.3). Evaluations are made in a static framework, considering that domestic supply and demand as well as world prices are exogenous. The advantage of this crude simplification is that no data is needed regarding behavioural parameters such as elasticities.

The issue of market price support. A major advantage of the PSE measurement is that it accounts for the support that is paid by consumer through higher guaranteed prices. This is clearly an approach preferable to using only budgetary data. The way the OECD estimates price support, however, relies on particular assumptions. In order to keep the indicator robust, and avoid using econometric models, the benchmark that is used for the counterfactual scenario (i.e. without government intervention on prices) is the world price. Market Price Support (MPS) is therefore constructed as the quantity produced times the difference between producer price and border price. Adjustment is made for transport costs so as to make prices comparable. Double counting is avoided when measures supporting domestic prices also have some budgetary costs (e.g. storage costs, subsidized exports). Focusing on the impact on prices rather than on the budget cost is consistent with economic theory.[9]

The PSE methodology makes it possible to account for different forms of support, including the one provided by production quotas and guaranteed prices, for example. However, in practice, there has been much controversy regarding the use of world prices as references.[10]

Many of the criticisms to the estimation of MPS by the OECD are somewhat misplaced if one consider the stated objective of the PSE. The PSE does not intend to measure a welfare variation. The objective is to measure transfers between agents in a static framework, and it is clearly stated that this measure is *ceteris paribus*, i.e. without attempting to take into account changes in supply and demand induced by farm support policies (Tangermann, 2003). Indeed, any attempt to do so with a simple indicator would be hopeless, unless one uses a full blown model that would make it possible to compare the current situation to a counterfactual one without support, accounting for general equilibrium effects (e.g. distribution of tariff revenues, terms of trade, macroeconomic linkages, etc.). It would also be necessary to consider the positive and negative externalities in the economy that are regulated by government intervention. For this reason the OECD methodology can be seen as a good compromise between theoretical consistency and implementability, provided that one keeps in mind its limited objective. It nevertheless has some caveats that we will attempt to solve by using a modified version of the PSE, in particular regarding its sensitivity to currency variations and inflation.

[9] It is noteworthy that the costs of public storage are included in others indicator of general services (GSSE), that tariffs revenues are also accounted for (in the TSE).

[10] Vernières 1984; Byerlee and Morris 1993; Buckwell 1997; Doyon et al. 2002; Momagri 2011 are only a few of the many possible references critical on the use of world prices.

***Caveats of the PSE measures*.** Many authors, and the Member States delegations, have expressed criticisms on several aspects of the PSE approaches. Among the references, one could quote McClatchy (1987), Peters (1989); Byerlee and Morris (1993), Masters (1993), Mervoyer et al (2001), Doyon et al (2002); Haniotis and Bascou (2003), Oskam and Meester (2006), Gohin (2006); Tangermann (2008), etc. While some of these criticisms have been addressed and the methodology has been changed, some valid criticisms persist.

The OECD Secretariat stresses the consistency of the PSE with underlying economic theory. It is true that the Market Price Support component of the PSE has a welfare-theoretic basis, since it measures the monetary value of the pre-reform aggregate distortion resulting from agricultural policy. However, by summing all the monetary values of a variety of subsidies without any weights, the PSE adopts a questionable metric. In taking the sum of direct transfers and price support, the PSE measure totals over two very different categories. The indicator therefore sums terms that have very different welfare effects.

Inevitably, there is a grey area on which policies should be included in the measurement of agricultural support. For example, subsidies and tax rebates for biofuel users have amounted to several billion dollars worldwide, and they lead to higher agricultural prices (Steenblink 2007). The US food stamps and other nutrition programs exceed US$50 billion annually, also driving up agricultural prices (EP, 2007). Neither of them is included in the calculation of the PSE.[11] There are good reasons for that. The PSE is supposed to measure the impact on producers in one country of the actions of their own government. Because biofuel subsidies and mandates lead to a higher world price, by construction this does not translate into a higher PSE. Indeed, an increase in the demand for feedstock caused by a domestic food aid program, a biofuel mandate, or a restriction on production (set aside, conservation reserve, etc.) also have benefits for other producers. The convention of excluding biofuel policies from the PSE calculation is defendable, as explained by Josling et al (2010). However, because of the level of the transfers, and the role played by both food aid and biofuel programs to support agricultural markets, the PSE ignores a potentially large form of agricultural support.

The MPS is calculated on a list of products that is country specific the support is extrapolated to other products. In the case of the EU, it tends to overestimate the actual support given that the residual products include mainly products that benefit from little support, such as fruits and vegetables. In order to solve this problem, the OECD Secretariat has expanded the list of products for which MPS is calculated, which has reduced the bias, but it has not fully disappeared. In the EU, almost a fifth of the commodity specific transfers are based on estimates for non PSE commodities.

For some commodities, the reference prices used in the PSE calculation are questionable. Because fluid milk is not traded internationally, this has long been a problem for dairy products. The current calculation of the market price support for milk relies on the price differential observed for tradable products, i.e. butter, skimmed milk powder and cheese. This price differential is adjusted to generate a virtual reference price for milk. The methodology is transparent and has been discussed extensively within OECD committees but overall, it calls for a number of parameters whose reliability is uncertain.[12]. This is

[11] The US food aid progamme is included in the GSSE and food aid programs that associated with measures that support agriculture, e.g. distribution of government stocks acquired in the context of market interventions, are included in the CSE.

[12] The convention of taking a fluid milk price in a reference country with no support policy was abandoned in 2004. Indeed, in all countries that are large enough to it seems impossible to find a country where there is neither significant government support nor monopoly or monopsony power that distorts prices (e.g. New

particularly the case for milk, where processing margins, transportation costs and quality differences need to be approximated to calculate the reference price at the farm gate level. It is also the case for beef (quality differences, transportation costs, handling margins, etc.).

On the practical side, it is unclear how the OECD Secretariat has been able to obtain information on all agricultural support. Support granted at the regional level (e.g. Italian, Canadian, Chinese provinces, US or Brazilian states, etc.) are not always communicated by the central government. For some services, the reporting is left to Member states, which may exclude some particular measures on a rather arbitrary basis.

The sensitivity of the PSE to external factors. A classical criticism to the PSE measure is it depends on prices that are affected by exogenous factors. Variations over time in the PSE reflect not only changes in policy settings but also changing world market conditions and exchange rates. This has long been a subject of discomfort for the Member States delegates to the OECD and has triggered an intense debate over the years to find solutions to this issue. Sensitivity of the PSEs to exchange rates and world price fluctuations has led delegations to the WTO to adopt fixed references for both world prices and exchange rates in the AMS, the measure adopted in multilateral negotiations. This turned out to be a poor decision as explained below. Regarding variations in world prices, it can be argued that they are partially endogenous to policies, at least for large countries. The sensitivity of the PSE to exogenous exchange rate variations, especially for countries whose currency depends heavily on a single export (e.g. Chile with copper) is nevertheless an issue. This motivates the choice, for the methodology adopted in this report, to define an alternative version of the PSE, relying on purchasing power standards for international comparisons.

A complex measure. The OECD approach includes a detailed classification of the farm support by types of measures. This is consistent with the need to distinguish between farm support that is efficiently transferred to producers and the support provided by less effective policies. However, the OECD classification considers the way the measures are implemented rather than the objective of the support. As a result, for example, the Secretariat the EU payments that resulted from the 1992 reform, the support to areas with natural handicap, and most of the environmental payments in the same category, even though their objective, but also the production and consumption incentives they generate, differ significantly. In particular, environmental payments and payments for reducing risk are not well isolated from other, often more distorting, payments (Jones, 2010). The methodology does not allow for a direct and detailed comparison of differences in specific programs across countries, such as agricultural conservation (Johnson et al 2010). More specific program breakouts within the overall portfolio of agricultural conservation, forestry, and rural development programs are not available. While the task is conceptually difficult, the OECD classification provides some information through a tag on whether the payment is linked to mandatory constraints or voluntary contracts.

Finally, a problem with the OECD methodology is that once data are converted to a common currency value for comparison purposes, not only these annual data but also the comparisons themselves are affected by fluctuations in foreign exchange rates, As a result, the message conveyed varies significantly depending on the conversion unit.

Zealand). It is noteworthy that, in the 1990s, the US Department of Agriculture calculated its own PSEs and, at the time, chose to rely on a combination of the international price of milkpowder and butter. This approach was found to rely too much on markets that were heavily distorted by export subsidies and was not endorsed by the OECD Secretariat. Because the PSEs using the new methodology were extrapolated back to 1986, they also rely on world prices for milkpowder and butter that were heavily distorted by export subsidies (subsidised EU exports of milkpowder accounted for more than two thirds of the world market in the 1980s).

2.3.4. The Aggregate Measure of Support

The WTO indicators. The conception underlying the WTO measures of support is different from the OECD one. The purpose here is to focus on agricultural support that generates externalities for third countries. Hence, the classification distinguishes policies according to their effect on world markets and trade.

The 1994 Marrakesh Agreement and the 2004 Framework Agreement resulted in decisions that lead to distinguish several categories of agricultural (domestic) support. Agricultural support through measures that generate no or minimal trade distortions are classified in a category often unofficially called **Green Box.** It includes programs that are funded by public money, but do not target specific productions. If they result in farm income support, these programs must not refer to current production levels or prices. Currently, the measures included in the Green Box are mostly decoupled payments, programs that intend to protect the environment or, to foster innovation, regional development transfers, some insurance payments provided that they are decoupled enough from production, and some programs that support food consumption. The **Amber Box** includes measures that are supposed to have distorting effects on production and trade. It includes programs that are contingent on participation in agricultural production, such as price support or subsidies directly linked to current output or inputs used. Examples are US price supports for dairy and sugar, US loan deficiency payments or marketing loans for grain, oilseed, and cotton producers, and EU intervention purchases of farm products at administratively maintained prices. Such payments are considered market-distorting and are subject to WTO reduction commitments. The payments included in this category are used to construct the AMS. The **Blue Box** is an intermediate category which includes some forms of support linked to production if they were conditional to a quantitative ceiling. Agricultural support under the Blue Box was excluded from compulsory reduction commitments in the Uruguay Round.

In the WTO discipline on agricultural support, *de minimis* exemptions pertain to "small" levels of domestic support that are deemed unlikely to distort trade to be excluded from the AMS calculation.[13] Because some countries can use the de minimis clause for excluding large level of payments from international discipline (not counting them in their current AMS), and that the Blue Box could lead to exempt some rather distorting support from this discipline, in 2004, WTO Members decided to impose a level on the **OTDS**, which combines the Amber Box, the *de minimis* payments and the Blue Box.

The WTO data for notifications data provide a comprehensive accounting of farm programs, grouped together by major categories, and originally were reported by each country in its local currency. Like the OECD methodology, the WTO manages to reflect the monetary value of domestic agricultural support, even for those programs that do not receive annual budgetary outlays but are instead covered through other support mechanisms, such as government purchases and marketing quotas and import barriers.

The AMS/OTDS methodology relies on a classification of support that is particularly relevant for international comparisons, if one focuses on the support that is trade distorting, while the OECD concept tends to aggregate measures that have different impact on production and trade in the same category. The AMS methodology nevertheless suffers from a variety of caveats.

[13] *De minimis* payments include commodity specific support (i.e., support that applies to a specific product such as wheat, sugar, etc.) and non-product-specific support. If total non product specific subsidies are below 5% (10% for developing countries) of the value of a developed country's total agricultural production, then they do not have to be included in the AMS calculation.

Caveats of WTO measures. A major limitation of the WTO notification data is the substantial delay in reporting. For some WTO members, in particular those that are suspected to have increased significantly their support to agriculture up to the point where they could be in violation of their multilateral commitments notifications are currently several years late.

Another problem with the AMS is that the classification of policy measures in the various "boxes" is left to each WTO member. The WTO Secretariat does some checking and the notifications are discussed with other WTO Members, but in practice, notifications are seldom challenged. The available AMS data show differences that make international comparisons difficult. In particular, there are differences in accounting for farm programs between the US and the EU, both because of differences in policies and differences in reporting.[14] Some of the payments seem to be declared in the Green Box, while it would be conceivable that they be included in the AMS. Some payments notified as "Green Box" have been questioned because of their indirect effect on output through the risk reduction and the wealth effect (ICTSD 2009; Gohin 2006).

The *de minimis* clause also makes it possible to exclude rather considerable amounts of distorting payments from the AMS, which makes this indicator rather dubious. This is particularly a problem since the different countries use this clause unevenly (historically it has mostly been used by the US). The level of support sheltered under the de minimis varies over time and across products for the same country. The *de minimis* ceiling also varies over time, and so does the support that can be taken out of the AMS (higher prices result in a higher *de minimis* threshold, the latter being a function of the value of production.

The AMS is hardly appropriate for assessing historical trends because internal shifts among categories between reporting periods. For example the US notification has classified Conservation Reserve Program (CRP), as an "environmental payment," whereas previously it was classified under "resource retirement programs." (Johnson et al 2011). Even more a problem is the differences across countries and over time in the conventions used to calculate the market price support component of the AMS. For dairy products the rules adopted for the calculation of the AMS differs across countries. By changing the calculation mode, the United States managed to lower the US dairy AMS by a large amount more because of new modes of calculation than an actual change in the level of support (perhaps US$2 billion see EP 2008). In a rather similar way, the EU AMS for fruits and vegetables has gone down considerably between 2006 and 2008, mostly because of changes in the calculation of the market price support (Matthews 2011).[15]

Rather than using actual world market prices, the averages of 1986-1988 world prices are used to compute the market price support. It turned out to be a major caveat. When world prices were at very high level such as in 2007 the EU AMS included a significant amount of market price support for wheat, resulting from the difference between the intervention price (€101 per tonne) and a reference price (€86 per tonne). Given that intervention for wheat has not been activated for almost 10 years in the EU, that the intervention price has been irrelevant and EU producers have traded their wheat on the world market without

[14] For example, the United States "green box" payments differ from the EU's in that the US includes food stamps, and other domestic food and child nutrition programs.

[15] Following the 2008 Farm bill that shifted support to processed products, that the US AMS for dairy is calculated only on the share of production that goes to the processed products. In the case of the EU AMS, prior to 2007, the EU entry prices were used in the calculation of market price support. After 2007, the measure was constructed starting from the budgetary costs of intervention. The change was motivated by the fact that entry price could be lower than world prices, while they still led to a positive AMS.

export subsidies, the AMS obviously lost any connection with the actual level of market price support. As Butault and Bureau (2006) point out, the AMS is perhaps useful as a basis of negotiations in the Doha Round but from an economic standpoint it has become a rather irrelevant indicator for measuring actual support.

2.4. How measures differ? The case of the EU

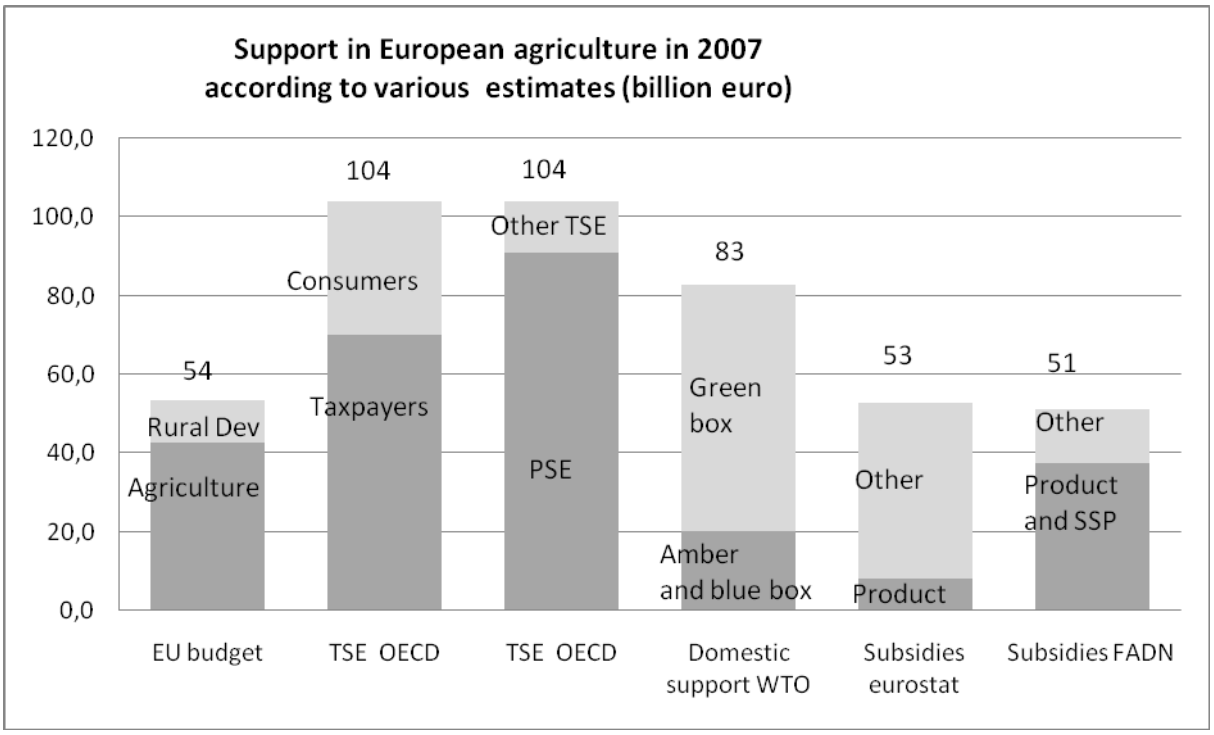
Here we illustrate the different image of agricultural support that is given by the various indicators presented in the previous sections in the case of the EU. If we consider the EU, Figure 1 shows that the different approaches offer a rather variable picture of agricultural support, depending on the methodology and the data source.

The product specific AMS has, historically, been lower than the corresponding product specific PSE. The situation is nevertheless different in the last period. For example, the PSE methodology takes into account the fact that intervention prices for wheat have repeatedly been lower than the world price, while the methodology used in the AMS leads to conclude to a positive market price support for wheat, because of the fixed reference. The two indicators are consistent for some payments, namely direct payments (the decoupled ones as well as those notified under the Blue Box). They differ regarding green and rural development payments. The gap between the WTO total domestic support and the OECD TSE is particularly large, reaching €20 billion for the EU in 2007.

The OECD data are more accurate than the WTO one regarding domestic policies. Some forms of support seem to be ignored in the WTO approach: for example, the OECD estimate that tax exemptions on fuels used by farmers amount to a €2.7 billion subsidy in the EU, while this tax exemption does not seem to be notified to the WTO. A comparison of the OECD and WTO approach carried out recently for the US shows that a large discrepancy can be observed between the WTO and OECD measures of total support. If one adds the OTDS figures and the Green Box ones (WTO methodology), the total has been lower than the OECD TSE estimate over the recent period, even though the gap does not stay the constant over time (Effland 2011).

Agricultural support in the EU in 2007 is measured with the OECD (Table 2) and the WTO methodology (Table 3). The EU agricultural budget amounted to €54billion, including €43 billion for agricultural policy (markets and incomes) and €11 billion for rural development. The Total Support Estimate (TSE) amounted to €104 billion, including €70 billion corresponding to budgetary expenditure and €34 corresponding to transfers from consumers. The total agricultural support notified to the WTO amounted to €83 billion (including €15 in the Amber Box, €5in the Blue Box, and €63 in the Green Box). Micro level data sources suggest that European farms have received €51 billion (source FADN, including subsidies to investments) to be compared to the €53 billion as measured by macroeconomic account (see Figure 1).

Figure 1. Agricultural support in the EU according to various approaches



Sources: authors' calculation using Eurostat, FADN, WTO notifications and OECD PSE database.

Table 2. Agricultural Support in the EU using OECD sources, comparison with the United States, 2007

	EU	US
	Million €	Million US$
1) Producer Support Estimate (PSE)	90 839	33 174
A) Support based on commodity output	30 990	13 448
- Market Price Support	30 062	13 072
- Payments based on output	927	377
B) Payments based on input use	11 360	8 894
C) Payments based on current A/An/R/I *, production required	14 658	2 811
D) Payments based on no current A/An/R/I *, production required	218	0
E) Payments based on non-current A/An/R/I *, production not required	31 970	5 683
F) Payments based on non-commodity criteria	1 719	2 338
G) Miscellaneous payments	-76	0
2) General Services Support Estimate (GSSE)	11 231	37 809
3) Transfers to consumers from taxpayers	1 789	26 186
(4)=(1)+(2)+(3): Total Support Estimate (TSE)	103 859	97 169

Sources: OECD PSE database. * A (area), An (animal numbers), R (receipts) or I (income).

Table 3. Agricultural Support in the EU using WTO sources, comparison with the United States, 2007/2998.

	EU	US
	2007_2008	2007
	Million €	Million US$
Amber box	14 990	8 520
(1) Market Price Support (administered prices)	11 691	6 238
(2) Non-Exempt Direct Payments	1 678	14
(3) Product-Specific Equivalent Measurements of Support	769	245
(4) Non-Product-Specific AMS	852	2 023
(5) De minimis (supports inferior to 5% of agricultural production)	2 635	2 260
(6) = (1)+(2)+(3)+(4)-(5): Aggregate Measurement of Support	12 354	6 260
Blue box		
Blue box. Direct Payments under Production-Limiting Programmes	5 166	
Green box	62 616	76 162
(a) General Services	6 781	10 747
(b) Public Stockholding for Food Security Purposes	50	0
(c) Domestic Food Aid	429	54 408
d) Decoupled Income support	31 346	6 130
(e) Income Insurance and Income Safety-net Programmes	14	0
(f) Payments for Relief from Natural Disasters	968	926
(g) Structural Adjustment Assistance provided through Producer Retirement Programmes	944	0
(h) Structural Adjustment Assistance provided through Resource Retirement Programmes	452	0
(i) Structural Adjustment Assistance provided through Investment Aids	7 594	124
(j) Environmental Programmes	6 345	3 827
(k) Regional Assistance Programmes	4 508	0
(l) Other	3 188	0
Total support (De minimis included)	82772	84682

Sources: WTO notifications.

2.5. The methodology adopted in the study

2.5.1. Data sources

The availability of consistent and reliable data at the international level is a major constraint for designing farm support indicators. The main sources of data are the following:

- Agricultural budgets are available in most countries. However, this source is not sufficient to measure agricultural support. Apart from ignoring transfers from consumers pointed out above, accounting conventions are different and often the same accounting item refers to policies that have very different impacts on production, markets and trade.

- Micro-level data sources such as the EU FADN are useful for measuring transfers at the producer level and in particular for identifying the distributional effect of

agricultural support. Comparison with third countries, however, is hardly possible because of incoherence in accounting rules and data collection.

- WTO notifications on domestic support for 126 geographical entities (153 Member States but 126 if one counts the EU as a single entity). The annual notification is mandatory since 1995, but some Member states are particularly late in providing information on their domestic support. Because of the uncertainty on how the countries have notified their subsidies, this source is not fully reliable when one wants to compare the various forms of support across countries.

- The OECD database includes the budgetary data, which has largely been made comparable thanks to decades of work by the Secretariat under the control of national governments. In spite of the limitations mentioned in section 2.3.3, and the differences that appear in the treatment of some of the general services (e.g. research and extension, food aid and social programmes), it is the source that has been the most carefully cross-checked. The database is public and well-documented. It provides information on the OECD members, i.e. 14 entities including the EU, Australia, Canada, Switzerland, Iceland, Japan, Korea, Mexico, Norway, Turkey, USA, Israel, Chile, between 1986 and 2010, as well as some transition countries between 1995 and 2010 (Brazil, China, Russia, Ukraine, South Africa).

In brief, among all these sources, the OECD dataset is clearly the one that includes the most detailed and reliable information. Other data sources are either incomplete (budgetary sources), not fully reliable in terms of what is actually included, or not up to date (WTO notifications), too aggregated (international databases such as the Global Trade Analysis Project data.

2.5.2. Indicators

Section 2.3.4 showed that the AMS is hardly suited for economic comparisons of agricultural support across countries, and even over time. The concept has lost connection with current markets due to the fixed price references; Notifications are too discretionary and the classification of support lack consistency both across countries and over time. Overall, the AMS is more suited to the monitoring of a compliance with policy commitments. The OECD methodology is more in line with the economic reality, the conventions used are more consistent and there is a more coherent effort to gather all subsidies and payments, even though some measures are also left out of the PSE calculations.

There are nevertheless two areas where the WTO methodology is particularly useful, and which could inspire a methodology for a relevant indicator. First, using fixed references (prices, exchange rates) in AMS, Green and Blue box notifications allow monitoring the way WTO members fulfil their commitments when their agricultural policies change. Second, the typology focuses on distinguishing the types of support that generate world market distortions and externalities for other countries. It is therefore a useful complement of the OECD approach and could inspire an indicator focusing more on trade issues than the PSEs.

Given the pros and cons of the various measures of support, the examination of the properties of each measure and data source leads us to several conclusions.

- In terms of data sources, there is no equivalent to the OECD dataset used for the calculations of the PSEs and the CSEs. Regardless of the indicator actually used, the information contained in the OECD database is an obvious choice.

- Accounting for market price support remains necessary for meaningful comparisons across countries. While some of the OECD methodology is not fully satisfactory (e.g. the choice of particular reference prices), ignoring market price support is clearly not an acceptable solution.

- There is an interest in defining aggregates that provide more information on the efficiency and distorting nature of various forms of support. Here, the OECD PSE sub aggregates provide little information on this. By contrast, the WTO classification is more oriented towards assessing the trade distorting nature of the support.

2.5.3. Using purchasing power parities

The exchange rate issue. A major problem in the measurement of support across countries and time is the sensitivity of the measure to variations in exchange rates. Despite the general superiority of the OECD PSE database and calculations, the sensitivity of the measure to currency fluctuations as well as the choice of a reference currency is a problem. Indeed, if one looks carefully at the work published annually by the OECD on the measurement of agricultural support, sometimes the very central message that results from the indicators expressed in dollars can be in contradiction with the indicators in euro.

Several attempts were made to make the measurement of support less sensitive to exchange rates. The WTO Member states, when signing the 1994 Marrakesh agreement, imposed that the WTO figures (i.e. the AMS) be calculated using fixed exchange rates. This created other problems, such as disconnecting the measurement of support from actual market based references. It also ignored that in the long run, exchange rates reflect some fundamental trends in the economy, such as the inflation rate.

Here, we propose to use a measure based on the Purchasing Power Parity (PPP) of the currencies. PPPs are computed by several international organisations for a basket of goods that, most of the time, reflect the patterns of consumption of the average consumer.[16] The method therefore requires some adaptation for being used in the measurement of support. Butault (2011) presents extensively how PPPs can help international comparisons of agricultural support.

Purchasing power parities. The exchange rate is determined by numerous factors and does not necessarily reflect the purchasing power of the different currencies. The fact that one dollar can be exchanged for one euro does not mean that it is possible to buy the same basket of goods with one dollar in the US as with one euro in the European Union. Here, we will consider that a currency is undervalued if its market price is lower than its real purchasing power and overvalued if the opposite is true. That is, we use the GDP-based

[16] The OECD, Eurostat and the World Bank base their calculations of purchasing power parities on all the commodities that make up each country's GDP. This provides an indicator that can be used to deflate, across countries, economic magnitudes expressed in national currency, in order to evaluate them in terms of purchasing power. For example, the World Bank publishes the gross national income (GNI) per capita for the different countries in current dollars and in current international dollars (PPP). These two denominations result in different wealth rankings for countries.

PPP as a long term equilibrium exchange rate and a benchmark for gauging the undervaluation or overvaluation of a currency.[17]

Exchange rate fluctuations can affect the measurement of support when the agricultural policy takes the form of price support or a subsidy fully coupled with output, as it affects the level of border prices after they are converted into national currency. Border prices increase in a country where the currency is depreciating and decrease in a country where the currency is appreciating. If two countries maintain the same level of price support for a given agricultural commodity, the support will fall in the country whose currency depreciates and rise in the second case. There is nothing artificial about this exchange rate effect. In "unprotected" sectors, the devaluation of a country's currency stimulates the competitiveness of that country's export sectors, whereas a revaluation penalizes them. Countries with an undervalued currency have fewer constraints on supporting their farm prices.

Consider the case of the OECD PSE. The PSE comprises transfers from taxpayers and consumers to agricultural producers. It is therefore appropriate to assess the evolution of the PSE in terms of purchasing power. In this case, the appropriate price indexes for deflating the PSE in each country over time are those that reflect inflation, i.e. the variation in the purchasing power of these transfers. That is, the price index (in the time dimension) should be the GDP price index or the consumer price index. Indeed, international comparison of support in nominal national currency across countries over time is rather meaningless as inflation rates vary over time (in all countries) and between countries.

For comparison between countries, it is tempting to express the PSE of each county in a common currency. For example, the OECD publishes support indicators such as the PSE in both US dollars and in euro. However, expressing a country's PSE in another country's currency unit is misleading. As a general rule, for the same level of support in a country, the PSE will increase if it is converted into a depreciating currency and fall if it is converted into an appreciating currency. Unlike the preceding point concerning the relationship between the exchange rate and the formation of the PSE, in this case it is a measurement bias.

This problem arises, in particular for the calculation of an aggregate PSE for the OECD as a whole. In such case, the OECD uses the currency of a particular country, the dollar or the euro, as a common currency. However, the aggregate indicator, and the variations over time will depend on the choice of currency. As we will see, the trends for the same OECD wide PSE can even be different if expressed in euro or dollars. Using current PPPs does not solve this problem, as the aggregation still depends on the countries' respective inflation rates. One must use constant PPPs for international comparisons (Schreyer *et al.*, 2002).

If we use fixed-based PPPs for a benchmark year and the GDP based price index over time, neither the choice of the country for which GDP purchasing power parities (GDP PPPs) are calculated, nor the choice of the year of the rate, affects the resulting trends in the value of support. The PPP rate between two countries evolves as follows:

$$PPP_{t+1}^{A/B} = PPP_{t}^{A/B} \cdot \frac{PI_{t/t+1}^{A}}{PI_{t/t+1}^{B}},$$

[17] Note that there are many other ways to define a benchmark exchange rate than the PPP (for example one might define an exchange rate that would keep trade balanced). The PPP as a long term reference exchange rate is criticized, and the relevance of PPP as a benchmark to gauge the appreciation of a currency is uncertain, in particular in countries where there is a large informal sector.

where $PPP^{A/B}$ is the PPP between two countries *A* and B, and *PI* is the GDP price index between *t* and *t+1*.

Obviously the absolute value of support varies with the choice of reference PPP rate but, when it is expressed in indices, support trends are the same irrespective of which base country and year are chosen. Purchasing Power Parities can be calculated not only on the GDP but on any economic aggregate (Bureau and Butault 1992). This leads to calculate spatial price indexes across countries and spatial volume indexes specific to a basket of goods representing agricultural products.

The construction of such indexes has raised controversial methodological issues (see Deaton and Heston, 2009 for a recent synthesis). Indeed, no index satisfies all the properties that are considered as desirable by an axiomatic approach which provides rigorous guidelines for choosing a particular methodology (Diewert, 2003). Desirable properties include additivity, reversibility, transitivity and equicharacteristicity. Equicharacteristicity means that no country is privileged in the weighting. Another approach, the economic approach, proposes to choose an aggregation formula based on the economic properties of the underlying producer technology or consumer preferences.

Building on previous studies involving some of the authors of this report (Bureau et al 1992, Ball *et al.*, 1997), and backed by academic literature on both the axiomatic and the economic approach that support the use of Fisher indexes in aggregating economic variables, we propose to have used the same procedure as international agencies to establish GDP PPPs, that is to say, EKS indices. The EKS indices were established for one year (2005) and extrapolated over time by Fisher indices (Box 2.1). EKS indices meet the requirements of reversibility, transitivity and equicharacteristicity, but not additivity of the components.

In this study we will use such PPPs for those goods that are common to the countries of interest and which are identified in the OECD dataset.[18] The information on prices is collected for the benchmark year 2005. Intertemporal price indexes for each commodity are also collected. The calculation of a matrix of PPPs makes it possible to compare the aggregate volume of production (for the group of commodities) between countries and over time, and to aggregate these volumes of production for the whole OECD (or a group of emerging countries). For this aggregate of countries it is therefore possible to calculate price indexes, both at the border or at the farm gate level that are comparable to those indexes constructed for each country of the aggregate.

[18] These are the 16 commodities that represent most of arable crops and animal productions that are referred to as "PSE commodities" in the rest of the text. The OECD compiles information for these commodities for all OECD Member states and emerging countries. It also compiles information for other commodities in particular countries, but this list of 16 commodities is common to all the countries in the sample.

BOX 2.1. CALCULATING A VOLUME INDEX OF PRODUCTION SUPPORT FOR A LIST OF COUNTRIES

Comparing the volume of output between two countries (i) and (j) at a particular time (t°), is equivalent to the more common practice of comparing two periods of time (t and t°) within a single country. The Laspeyres index (L) uses the price system (p) of the base country (j) to aggregate quantities (x) in the two countries.

$$L^{t^\circ}_{i/j} = x_i^{t^\circ} * p_j^{t^\circ} / x_j^{t^\circ} * p_j^{t^\circ}$$

The Paasche index (P) uses the price system of the other country (i).

$$P^{t^\circ}_{i/j} = x_i^{t^\circ} * p_i^{t^\circ} / x_j^{t^\circ} * p_i^{t^\circ}$$

Fisher's index (F) is the geometric mean of the Laspeyres and Paasche indices.

$$F^{t^\circ}_{i/j} = \sqrt{L^{t^\circ}_{i/j}} * P^{t^\circ}_{i/j}$$

If the comparison involves several countries (n=m), this index is not transitive, meaning that the direct index between (i) and (j) does not equal the index indirectly derived from comparisons between (i) and (k), on the one hand, and between (j) and (k), on the other. A transitive index is the EKS (Elteto-Köves-Szulc) index, which is a geometric mean of the direct and indirect indices.

$$EKS^{t^\circ}_{i/j} = (\prod_{k=1}^{m} F^{t^\circ}_{i/k} * F^{t^\circ}_{k/j})^{1/m}$$

The output volume for country (i) can then be compared with that of an aggregate of countries. Consider for example that we focus on the OECD area. The index for the OECD can be constructed by adding together the indices in relation to the base country (j). As the indices are transitive, the result will not be affected by the choice of base country (j).

$$Q^{t0}_{i/OCDE} = EKS^{t0}_{i/j} / \sum_{k=1}^{m} EKS^{t^\circ}_{k/j}$$

This index shows country (i) as a share of the total output volume (Q) in the OECD areal. The sum of these shares equals 1 for the OECD area, i.e..

$$\sum_{i=1}^{m} Q^{t^\circ}_{i/OCDE} = 1$$

Established in t°, these volume indices (Q) can be extrapolated to another period (t) using temporal Fisher indices.

$$Q^{t}_{i/j} = EKS^{t^\circ}_{i/j} * F^{i}_{t/t^\circ} / F^{j}_{t/t^\circ}$$

From this we can indirectly calculate a temporal volume index for the OECD area.

$$Q^{OCDE}_{t/t^\circ} = \sum_{i=1}^{m} \cdot Q^{t^\circ}_{i/OCDE} * F^{i}_{t/t^\circ}$$

In addition to being transitive, the EKS is reversible. A purchasing power parity index can be calculated by reversing the prices and quantities given in the formula above and the product of this price index with the volume index is the value index. The EKS index also meets the requirement of equicharacteristicity in the sense that no country is privileged in the weighting.

2.5.4. An illustration of indicators of support in real terms

Currency fluctuations and the measurement of agricultural support. In order to understand how exchange rates affect the measurement of support, consider the relative changes between currencies. Table 4 displays the exchange rate of OECD countries in 2009 in 1986-1987 and 2008-2010 and the GDP based PPPs calculated by the OECD and Eurostat, which we use as a benchmark for the undervaluation or overvaluation a currency relative to the euro (Figure 2). **Table 5** provides the same information for selected emerging economies between 1995-1997 and 2008-2010. The GDP based PPPs were calculated by the World Bank for the reference year 2005 and we extrapolated them over the period.

The 1986-2010 period is characterized by moderate inflation for most countries, in particular at the end of the period. Turkey is an exception. Mexico, Russia and Ukraine have also experienced high inflation rates. Inflation has been rather similar in the EU and the US and the ratio between the euro and the dollar has remained stable in PPPs (roughly €1=US$1.15). However, the nominal exchange rate between the two currencies has experienced considerable variations, for other reasons than inflation. The PPP benchmark suggests that at the beginning of the period, the US dollar was overvalued compared to most of the currencies of the sample. Other currencies remained overvalued relative to their PPP level (e.g. Swiss Franc), while the currencies of emerging countries remain undervalued. Some of these countries had a very high rate of inflation.

In order to explore the effect of the use of PPPs in the measurement of support, consider the case of the whole OECD PSE. It will tend to increase if the aggregate is expressed in a currency of a country that appreciates, and to decrease if the aggregate is expressed in a currency that tends to depreciate over time (Figure 3). This results in significant differences depending on whether the aggregate OECD PSE is expressed in euro, dollar or yen for example. If the OECD PSE is expressed in yens, it tends to go down over time given the progressive appreciation of the yen compared to other currencies over time.

Some economists, such as Doyen and al (2002) have suggested using current PPPs as an exchange rate. This does not solve the problem. Indeed, current PPPs vary between countries according to respective inflation rates, and when taking a particular country as a basis, the PSE is affected by the inflation rate of this particular country. This explains, for example that if one calculates the OECD PSE aggregate using current PPPs but expressed in yens, leads to results that differ considerably from the results obtained in euro or US dollar as shown in Figure 4.

PSE comparisons with a fixed based PPP and GDP based price extrapolation. In order to avoid the problem of the sensitivity of the measure to aggregation units, the OECD focuses on relative measures such as the percentage PSE. In such a case, using nominal exchange rates or PPPs only affects the measure through the country weights, but overall the results are close. Indeed Figure 5 shows that the downward trend in the PSE measured on the basis of the percentage PSE was not identified clearly using indicators in absolute value in Figure 3 or Figure 4.

Here, we propose to use real values, i.e. using a reference PPP (Figure 2). The procedure consists in using the GDP price indices and the GDP purchasing power parities between countries in order to construct an aggregate such as the OECD as a whole. This has been calculated using the US dollar and 2005 as the base year. With this methodology, the trends are not sensitive to either the country or the year chosen. Figure 6 shows that when

one constructs the aggregate indicator in real terms, i.e. using the 2005 PPP in this case, the evolution of the (absolute) PSE in real terms is fairly similar to that of the percentage PSE. There are some discrepancies between the two measures (for example, between 2008 and 2009, the percentage PSE increased from 20.8% to 21.6% whereas, in real terms, the PSE remained virtually the same. This discrepancy arises from the drop in farm prices following the price surge in 2007 and 2009). However, using a coherent unit of measurement, allows a decomposition of the components be made, which cannot be done when using relative indicators such as percentage PSEs.

When there are large differences in inflation between countries, and when the relative position of the currencies relative to their PPP level varies, then the aggregation using real values and a reference PPP leads to larger discrepancies with the percentage PSE. In particular, if one attempts to construct an aggregate PSE for the emerging countries monitored by the OECD, the gap is visible in Figure 7. The image of agricultural support is different, in particular due to the role of China in the aggregate. However, the measure in real values (billion euro PPP 2005) reflects the specific rate of inflation in China, and we consider it an overall preferable measure.

In the following chapters we therefore report the evolution of measures of agricultural support such as the PSE and its components expressed in real terms.

Table 4. Exchange rate, PPP and inflation rate in OECD countries

	EXCHANGE RATE: 1 €=XNC		PPP: 1 EURO=…NC		PPP/EXCHANGE RATE		INFLATION 100 IN 1986
	1986-88	2008-10	1986-88	2008-10	1986-88	200810	2010
AUS	1.54	1.66	1.56	1.82	1.01	1.10	222
CAN	1.45	1.50	1.54	1.48	1.06	0.98	175
CHE	1.74	1.49	2.51	1.98	1.44	1.33	144
EU1	1.00	1.00	1.00	1.00	1.00	1.00	187
ISL	45	154	55	163	1.22	1.06	541
JPN	0.16	0.13	0.25	0.14	1.53	1.05	94
KOR	0.89	1.64	0.59	0.94	0.66	0.58	282
MEX	1.65	17.27	0.69	9.96	0.42	0.58	6957
NOR	7.57	8.33	11.59	10.88	1.53	1.31	249
NZL	1.88	2.05	1.77	1.93	0.94	0.94	202
TUR	0.00	2.01	0.00	1.23	0.50	0.61	632220
USA	1.11	1.39	1.24	1.22	1.12	0.88	176

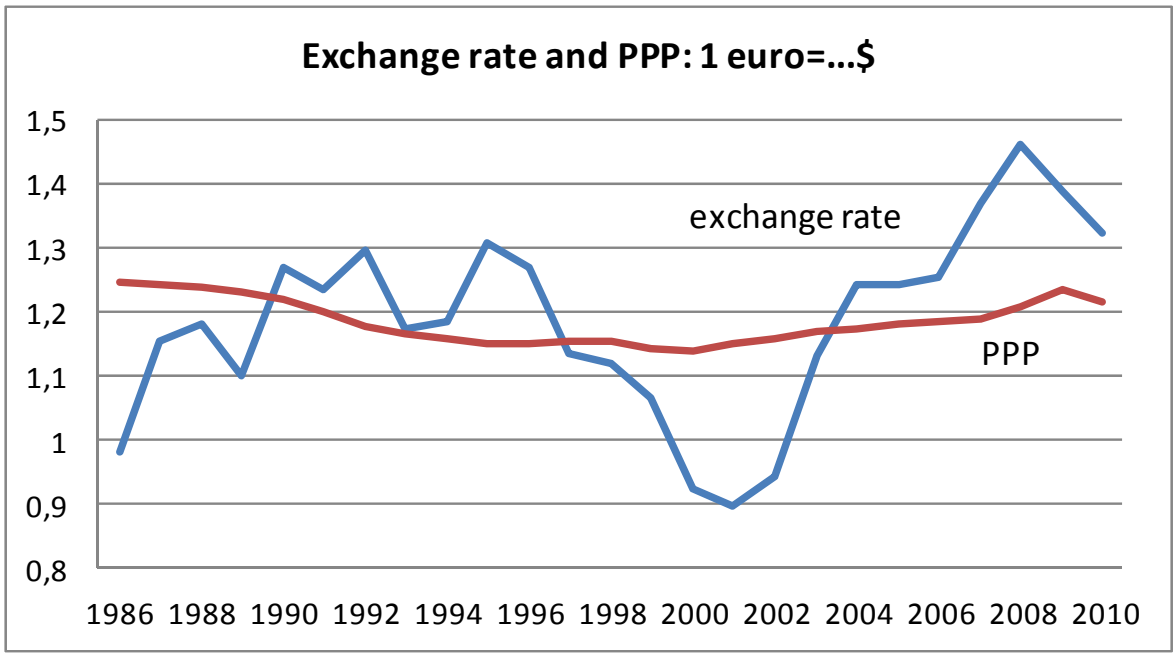
Source: Authors' calculation using Eurostat, World Bank PPP data. Inflation is measured as the GDP Price index.

Table 5. Exchange rate, PPP and inflation rate in selected OECD and emerging economies

	EXCHANGE RATE: 1 EURO=...NC		PPP: 1 EURO=...NC		PPP/EXCHANGE RATE		INFLATION (100 IN 1995
	1995-97	2008-10	1995-97	2008-10	1995-97	2008-10	2010
BRA	1,23	2,60	0,69	1,88	0,56	0,73	332
CHL	505,74	739,13	297,34	435,78	0,59	0,59	210
CHN	10,29	9,53	3,72	4,36	0,36	0,46	160
ISR	3,96	5,22	3,66	4,26	0,92	0,82	161
RUS	6,36	40,24	2,48	19,21	0,39	0,48	1696
UKR	2,12	9,68	0,59	3,29	0,28	0,34	1448
ZAF	4,99	11,16	2,87	5,90	0,58	0,53	298

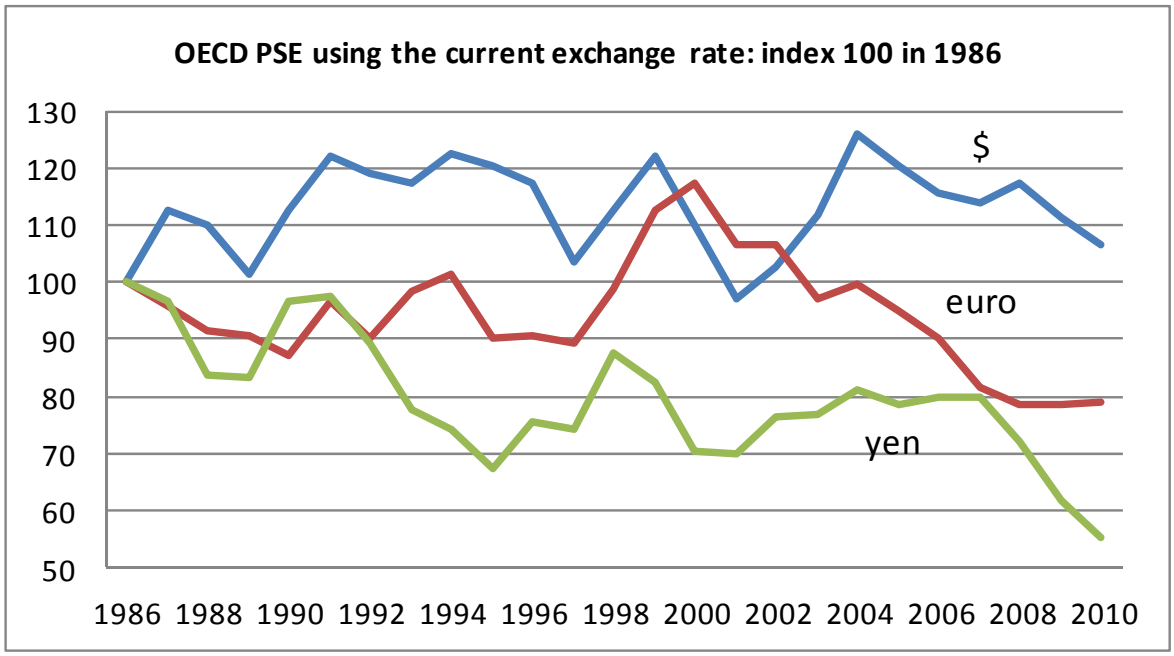
Source: Authors' calculation using Eurostat, World Bank PPP data.

Figure 2 : Nominal exchange rate and real (PPP) exchange rate



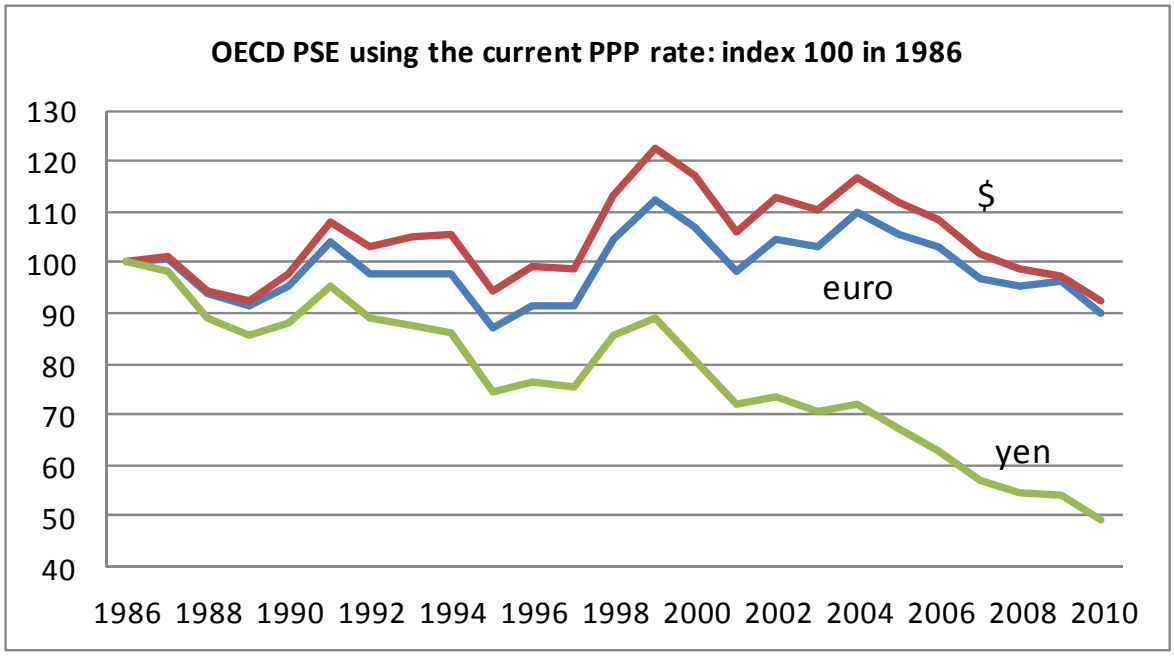
Source: Authors' calculation using Eurostat, World Bank PPP data.

Figure 3. Computation of an OECD wide PSE expressed in various currencies



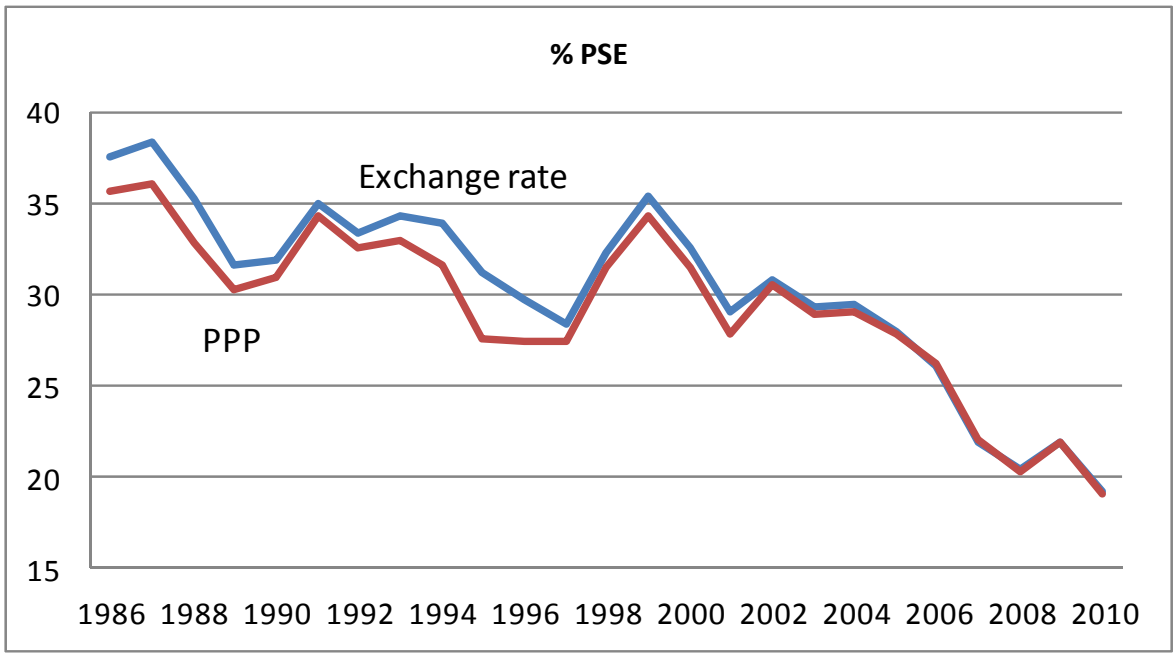
Source: OECD PSE database.

Figure 4. Sentivity of PPP based aggregation to inflation in a particular country



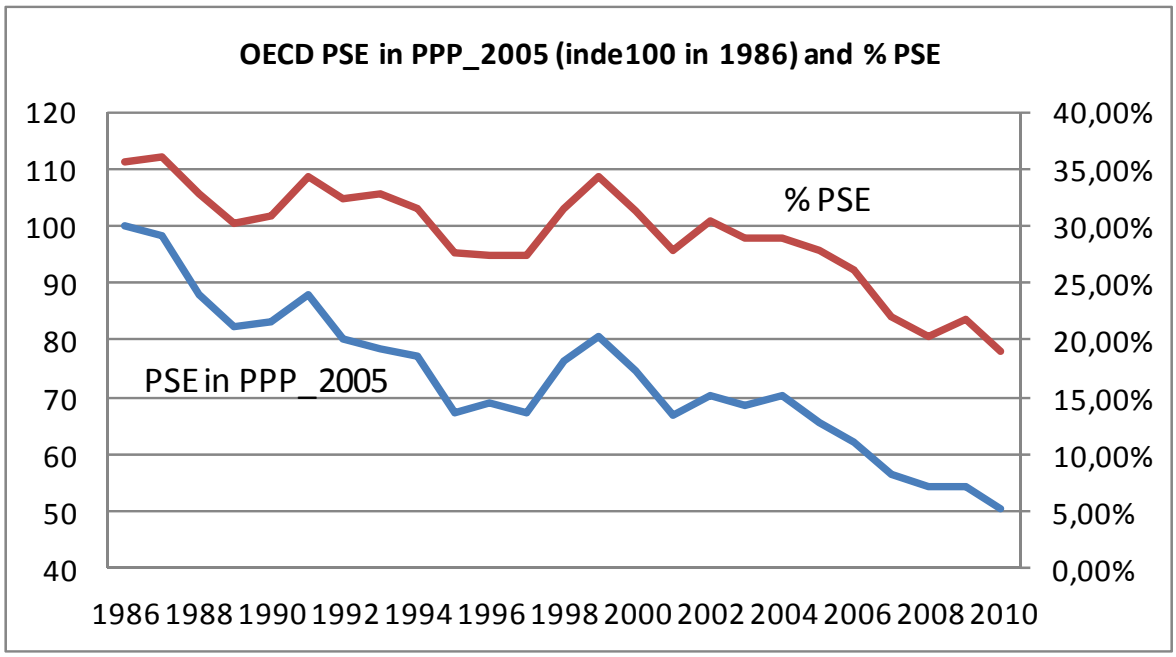
Source: Authors' calculation using the OECD PSE database.

Figure 5. Percentage PSE for the OECD as a whole and the choice of an exchange rate



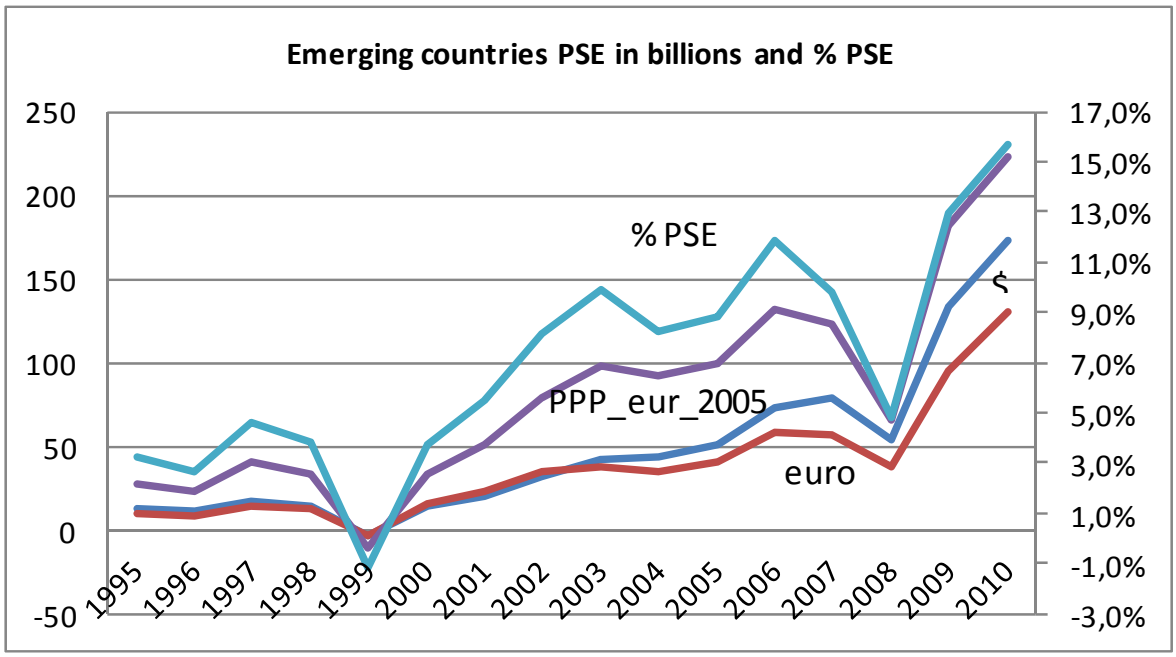
Source: Authors' calculation using OECD PSE database.

Figure 6. Comparison of changes in the OECD PSE expressed in real terms and in percentage



Source: Authors' calculation using OECD PSE database.

Figure 7. Aggregate PSE for emerging countries, comparison of exchange rates aggregators



Source: Authors' calculation using OECD PSE database.

2.6. Conclusion: the methodology adopted

2.6.1. The methodology

Based on the lessons drawn from the analysis of the various data bases and indicators, in the following section we will use mostly the PSE database. For the analysis of the composition of support we will also use microeconomic and budget data, in particular for the EU, but given the caveats of the WTO notifications, the PSE dataset is the only one that makes it possible to make meaningful comparisons.

Because we consider that any measure ignoring the transfers from consumers introduces considerable bias in international comparisons (as well as in intertemporal comparisons in countries where budgetary support has replaced transfers from consumers), we judge the PSE methodology to be currently the most meaningful approach. However, the approach adopted in the next sections departs from the standard OECD methodology in several respects:

We develop indicators using a fixed reference PPP as a cross section price index (constructed as an EKS index), which we extrapolate over time using country-specific Fisher indexes of inflation based on GDP. This reduces sensitivity to exogenous factors such as the current under/over valuation of currencies or nominal exchange rates and inflation. Using real measures (PPPs) allows to unravel price and volume effects, and to control for the effect of exogenous price changes and currency appreciation/depreciation on indicators such as the PSE.

Rather than using the complex classification of the OECD relying on the way support is granted to producers, we use a classification of payments that focuses more on the distorting/non distorting aspect of the payments. For example, the OECD methodology has

difficulties to distinguish countercyclical payments from more production neutral payments, while we believe that it is important to do so. Reference to the WTO classification of payments (Amber vs. Green box) appears relevant here.

In particular we distinguish explicitly the role of the coupled support through prices by using a synthetic index of domestic prices relative to border prices. And we isolate the payments that are linked to market conditions, since the OECD methodology tends to give a misleading image of the support in countries which have maintained countercyclical payments: the corresponding budgets might be low during the recent years, but the instrument is in place and the support potential should not be underestimated under alternative market conditions.

In terms of transparency and communication, the OECD methodology is too complex for being easily understandable. While the information contained in Appendix 1.2. (OECD labels) is a very useful information for an ad hoc classification of payments, for international comparisons we use a simple criterion, which is the ranking of the top payments for each country. We believe that by simplifying information we make it more easily accessible.

2.6.2. The list of countries to focus on

In order to assess the how EU agricultural support compared to other major trading nations, we selected a sample of countries on a rather ad hoc basis. The goal is to focus both on major trading partners and on countries that show particular forms of support whose relevance is currently discussed in the EU.

In Section 3 we provide a comparison of the measures of support based on the indicator defined in the previous section. It is noteworthy that, that we rely on the OECD PSE data, even though our calculations requires using other sources of information for the PPPs (namely Eurostat and the World Bank) in order to express support in real values. Because we rely on a consistent dataset, we are able to include a rather large number of countries in the analysis. Namely, we consider the EU, Australia, Canada, Switzerland, Iceland, Japan, Korea, Mexico, Norway, New Zealand, Turkey, USA (all OECD members) and some emerging economies, i.e. Brazil, Chile, People's Republic of China, Israel, the Russian Federation, Ukraine and South African Republic.

We illustrate how the various instruments differ between the EU (Section 4) and other typical countries (Section 5). The case of the US is interesting since, while the level of support is lower than the EU one, the US has maintained a system of payments that tends to protect farmers from both price and output fluctuations. The case of Canada is also illustrative, since historically Canada has supported farmers through indirect ways, such as subsidising transportation of grains, and has recently developed instruments to protect farmers from market fluctuations, with the risk that these instruments overlap. Switzerland, while not being a major trading partner, has developed forms of support that focus on specific public goods, such as the protection of rural vitality, of biodiversity, of landscapes, all of which are of considerable interest for the definition of the future CAP in the EU. Finally, China and Brazil are of particular interest, since they tend to support infrastructure and the modernization of the sector rather than supporting farm incomes as the EU does. In the case of China, there is also suspicion that the level of support has increased significantly over the recent years, up to a point where it might exceed WTO commitments (DTB Associates, 2011).

3. RESULTS OF THE COMPARISON

KEY FINDINGS

- EU support to producers expressed as a percentage of agricultural receipts (%PSE) has decreased significantly over time, in a **proportion that exceeds** that of the OECD average. It is now close to the OECD average. It is, much lower than the one in Japan or Switzerland, but still **much higher than in the US**.
- The EU, as well as those developed countries that supported prices, have reduced considerably **support through market prices over time**, and have turned to direct payments. Domestic prices are now much closer to world prices in the EU. Domestic prices remain higher in Japan, Korea, Norway, in spite of large cuts.
- The EU is among the countries where the share of **market distorting support in total support is low**, due to the progressive shift towards decoupled payments. All developed countries have reduced their support that was most market distorting. However, in emerging countries, not only agricultural support tends to increase, but it also **takes distorting forms**.
- Over the recent years, Brazil, Ukraine (which used to tax their farmers), Russia and China have increased dramatically their support to agriculture. **Preliminary estimates for China suggest that the rate of support is now similar to the EU one**. The volume of Chinese agricultural support **exceeds the combined support** of the EU and the US when expressed in real terms. This has to do with the size of the Chinese agricultural sector but also with the under-appreciation of the currency.

3.1. A comparison of agricultural support in OECD countries

The methodology of the comparison as described in section 2.6 is applied to those countries monitored by the OECD.[19] While the data source is the OECD PSE (and PPPs calculated by Eurostat, the OECD and the World Bank), support is measured in real values. Specific PPPs have been constructed on a list of 15 agricultural products that are common to all countries (i.e. wheat, rice, milk, beef, pork, sheep meat, poultry meat, wool, eggs, maize, sugar, soybean, rapeseed, sunflower, other grains). The GDP price index in each country is used to extrapolate the 2005 real values over the period.

3.1.1. The evolution of price support

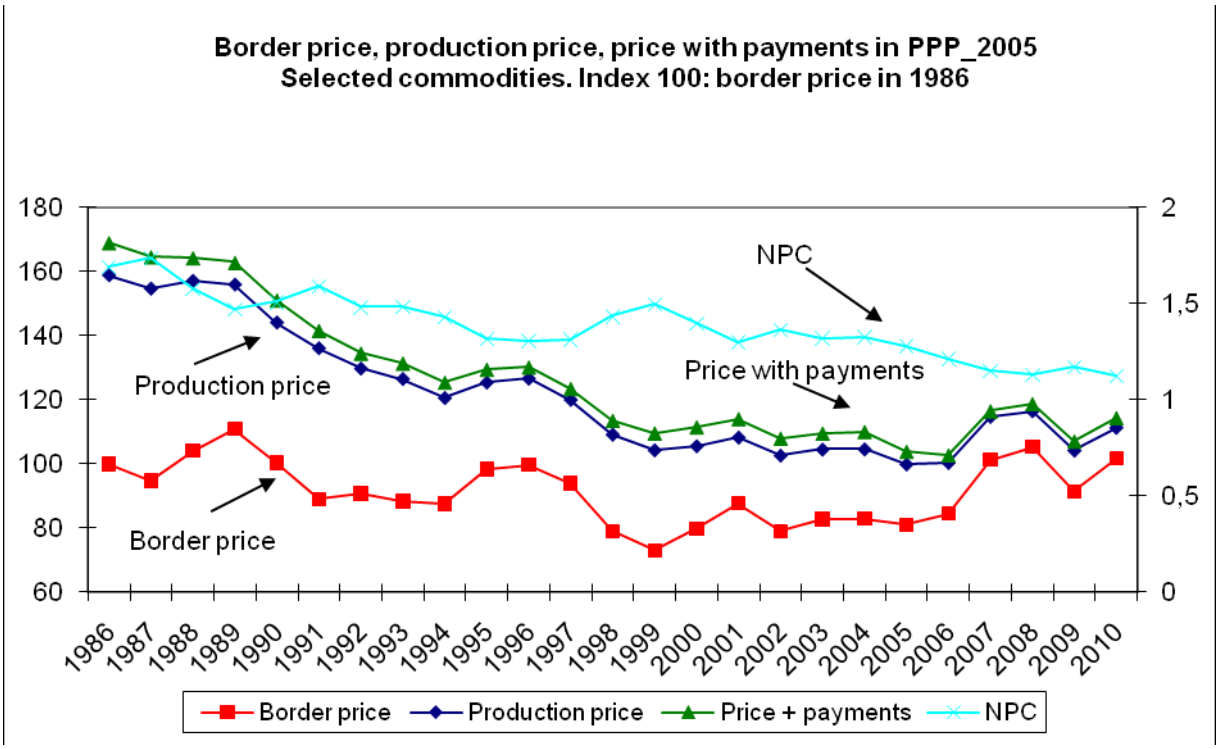
Average prices measured at the border have decreased until 1999 before recovering in the second half of the period considered (Figure 8). However, there are (at least) two reasons why border prices may differ strongly between countries, say Mexico and Korea (Figure 9). First of all, international market prices are primarily given in dollar such that national devaluations and revaluations are relevant as explained in Section 2.5. Second there are effects from the composition of output. Real border prices have fallen for pork and poultry and have increased considerably for dairy products (Figure 10).

[19] We consider the EU, Australia, Canada, Switzerland, Iceland, Japan, Korea, Mexico, Norway, New Zealand, Turkey, USA (all OECD members) and some emerging economies, i.e. Brazil, Chile, People's Republic of China, Israel, the Russian Federation, Ukraine and South African Republic. Due to the availability of data, the comparison takes place over the 1986-2010 period for OECD countries, and the 1995-2010 period for other countries.

As a result of the 1994 Agreement, many countries have reformed their domestic policies and let their domestic prices move closer to world level prices. They have also reduced the (coupled) support directly enhancing output. It is visible in Figure 8 that the gap between domestic and border price has been narrowed down considerably in the OECD. However, the recovery of world market prices at the end of the period also contributed to this finding.

It is noteworthy that, in the EU, the gap between domestic and international prices has been reduced more than on average. In 1986, the ratio between prices including support (coupled payments) and the border price (i.e. the NPC) was 2.1 in the EU and 1.46 in other countries that make up the OECD.[20] In 2010 it was 1.08 for Europe and 1.15 for the aggregate of other countries. This aggregate includes countries such as Australia and New Zealand that have totally eliminated price support over the period 1986-2010 (starting from already low levels). In the US, the ratio between domestic and border prices went down from 1.25 to 1.03 over the period (Figure 11). A rather similar evolution can be observed in Canada. In some countries with a very high initial price gap (Korea, Norway, Iceland, Japan and Switzerland) reforms were even more radical than in the EU. In Switzerland, for example, 1986 domestic prices were more than four times higher than border prices, while the ratio is now 1.7. Finally Turkey and to a lesser extent Mexico are OECD members where the price support rose compared to the 1980s.

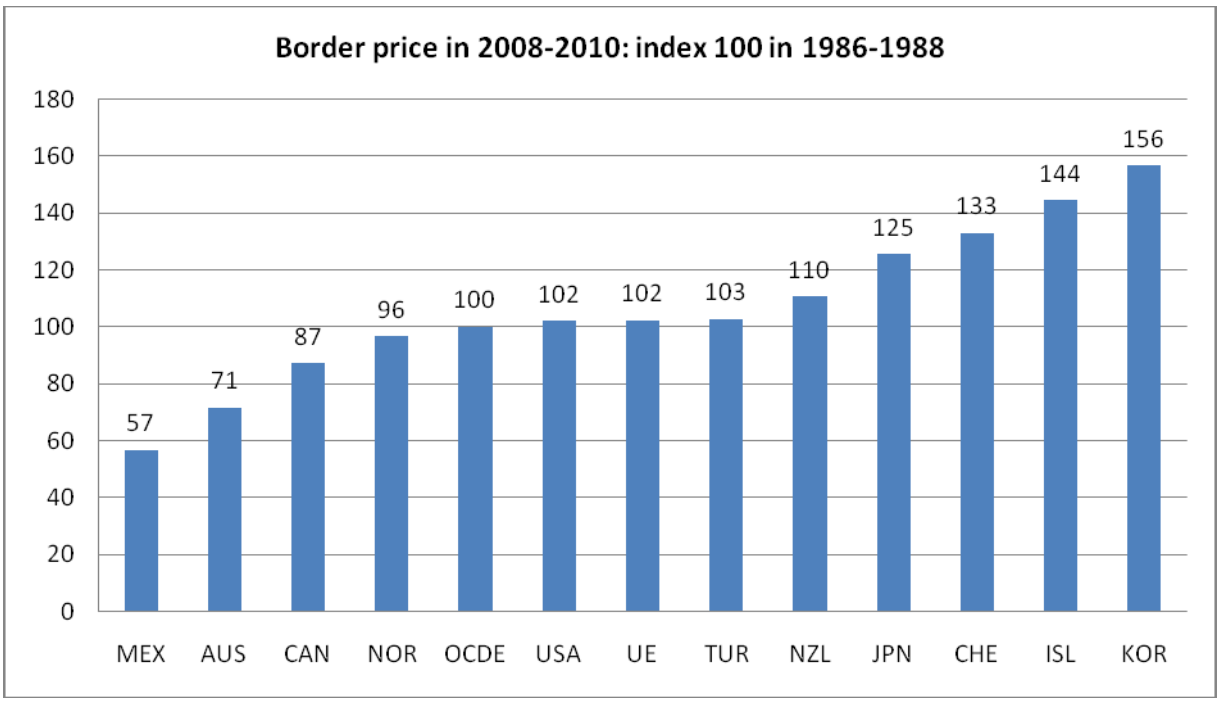
Figure 8. Border and domestic price, producer NPC, OECD countries



Source: Authors' calculation using the OECD dataset.

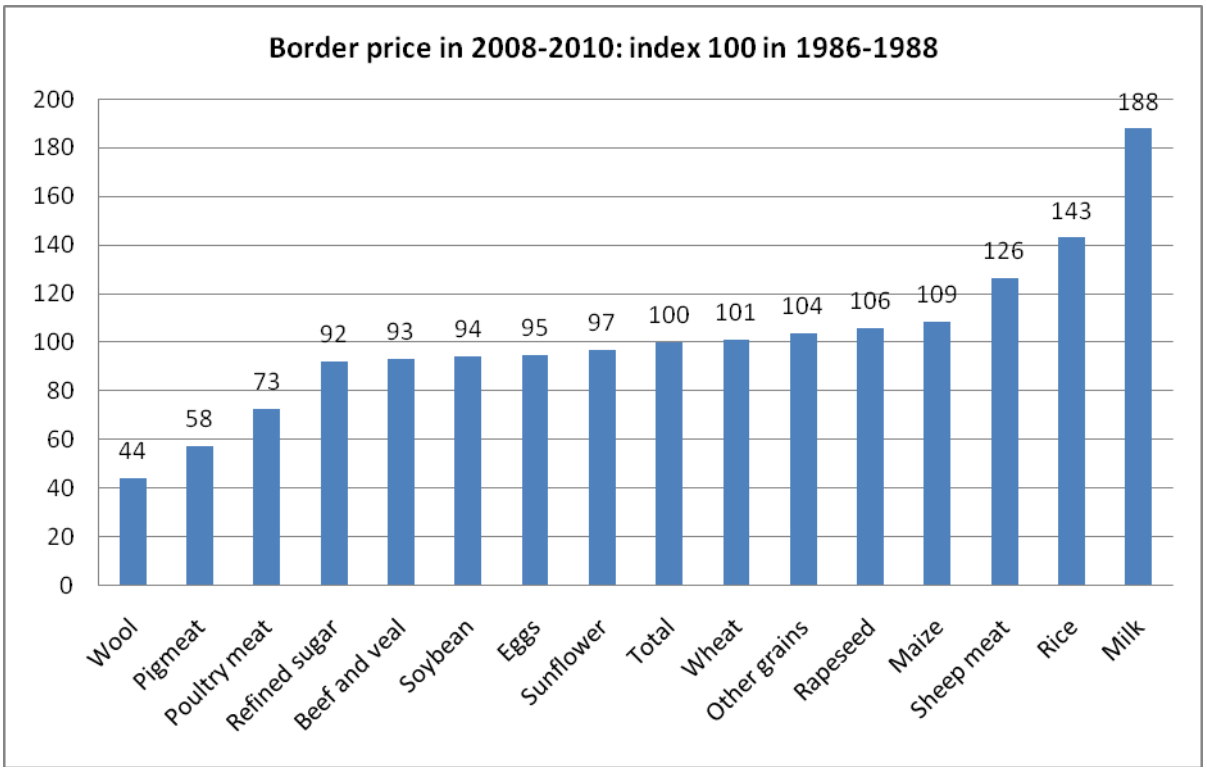
[20] Note that our calculation differs from the OECD NPC. In particular we do not include the effect of price support on agricultural inputs such as feedstsuffs.

Figure 9. Variations over time of border prices, selected countries



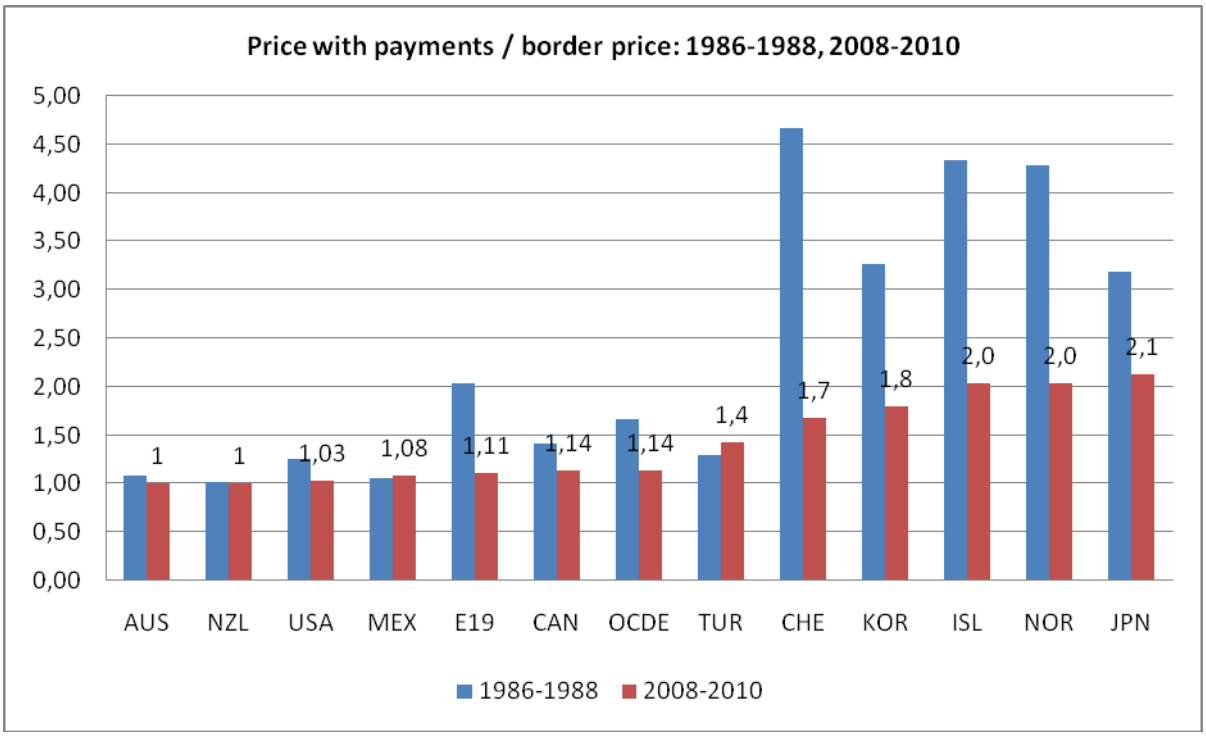
Source: Authors' calculation using the OECD dataset.

Figure 10. Variations across commodities of border prices, selected countries



Source: Authors' calculation using the OECD dataset. Prices are aggregated using an EKS index.

Figure 11. Evolution of price support, selected countries



Source: Authors' calculation using the OECD dataset.

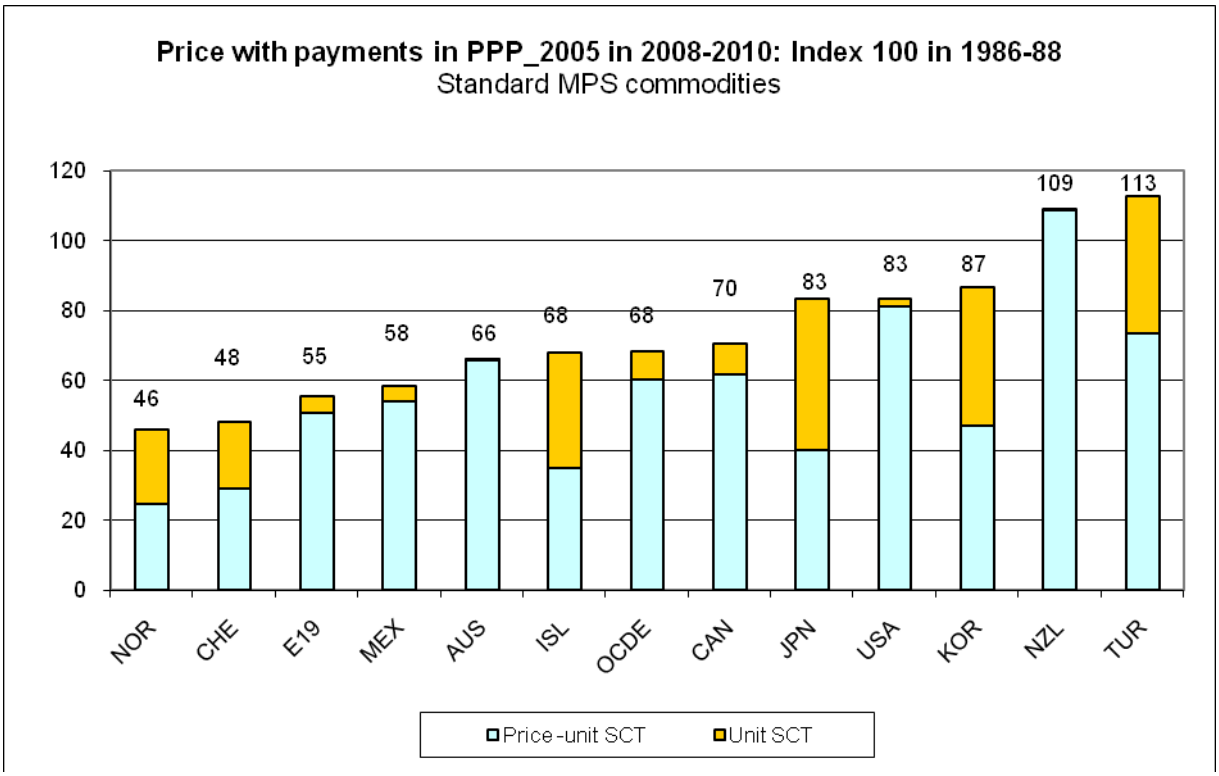
3.1.2. Changes in prices and product specific price support

Figure 12 shows the changes in the price of an aggregate of 15 commodities that are common to the list of countries in the sample, expressed in real values using the product specific EKS PPP. First of all, the transition to real prices shows that agricultural prices tend to lag behind the GDP deflator. This is visible for the OECD average real price entering. In 2008-10, the unit price is still highly supported by product specific support in Japan, Norway and Iceland as shown as the share of the Single Commodity Transfer (SCT) in the current price including payments.[21] In Turkey, the recent increase in product specific support leads to an increase in real prices compared to the 1986-88 period.

The decline in prices was particularly important in countries where the product-specific support was large in the early period. Indeed the decline reaches 50% in Norway, Switzerland and 45% the EU. It is more limited in Japan and Korea, given the continuing supports and high rice prices at the end of the period. The decrease is only 18% in the US. In New Zealand agriculture benefits from the recent increase in dairy prices on world markets.

[21] The SCT measures the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, measured at the farm gate level, arising from policy measures directly linked to the production of a single commodity (see Annex 1).

Figure 12. Changes in price support, for selected countries 2010 relative to 1986 (price component and Single Commodity Transfer component)



Source: Authors' calculation using the OECD dataset. The share of support that is product specific (i.e. the upper section of each bar) as a percentage of the height of each bar is given for the average 2008-2010 year.

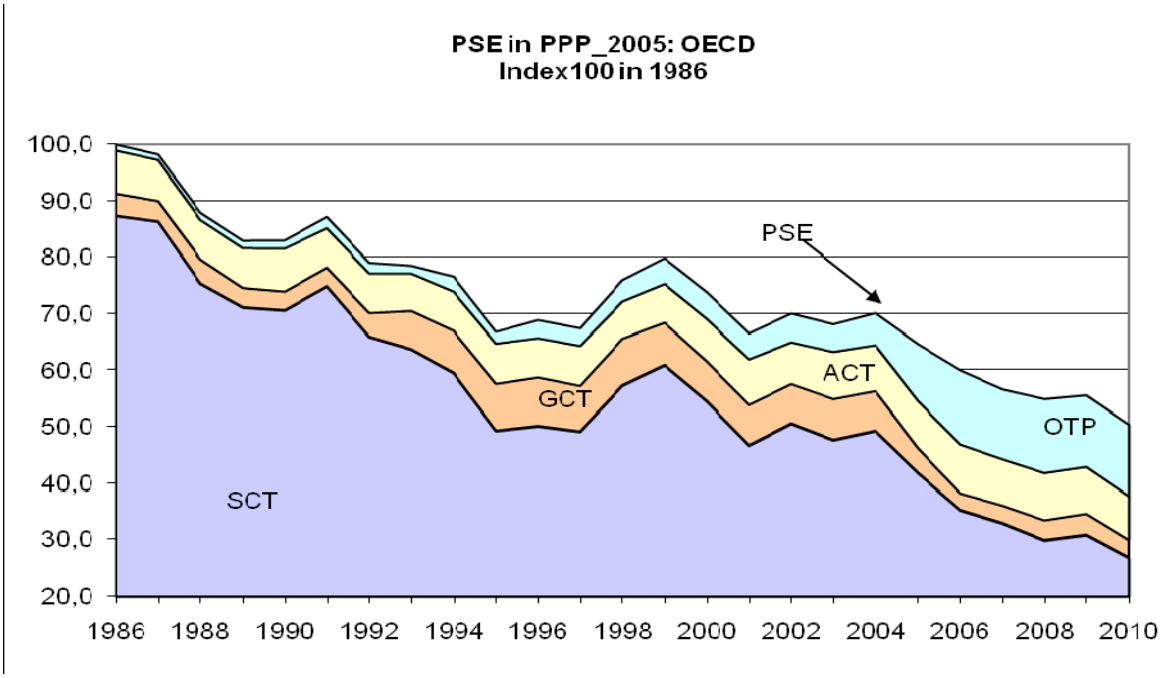
3.1.3. Changes in the real Producer Support Estimate

Changes in the composition of support. For the OECD as a whole, price support and coupled payments as measured by the Single Commodity Transfer in 2005 PPP have been reduced by two thirds in real terms between 1986 and 2010 (Figure 13). Decoupled payments went up. Overall, the decline in the real PSE is 45%. Until the 2000s, the reduction in price support, together with the decrease in world prices led to a downward trend in farm receipts. After 2005, farm receipts went up, helped by higher prices. While it is difficult to conclude with certainty, it is likely that the policy changes in developed countries, in particular the decoupling of payments and the reduction in export subsidies have played a role in the reversal of the downward trend in world prices.

In order to assess the distorting nature of support, we consider the degree of decoupling of agricultural support, and the fact that payments are conditional to particular requirements. Transfers directly linked to production of a particular output have been reduced significantly over time. Payments coupled to a particular product have largely been replaced by non product specific forms of support (Group Commodity Transfers, All Commodity transfers, Other Transfers to Producers). In the EU, those payments that are non specific to a particular product have been multiplied by four since 1986 (Table 6 item "other PSE"). They have also increased considerably in Korea and Switzerland. By contrast, the US has shifted less to this form of decoupled support. After some farm bills that had involved ambitious decoupling of payments at the end of the 1980s and 1990s, the US Congress went back to instruments that are more price related, in particular countercyclical payments.

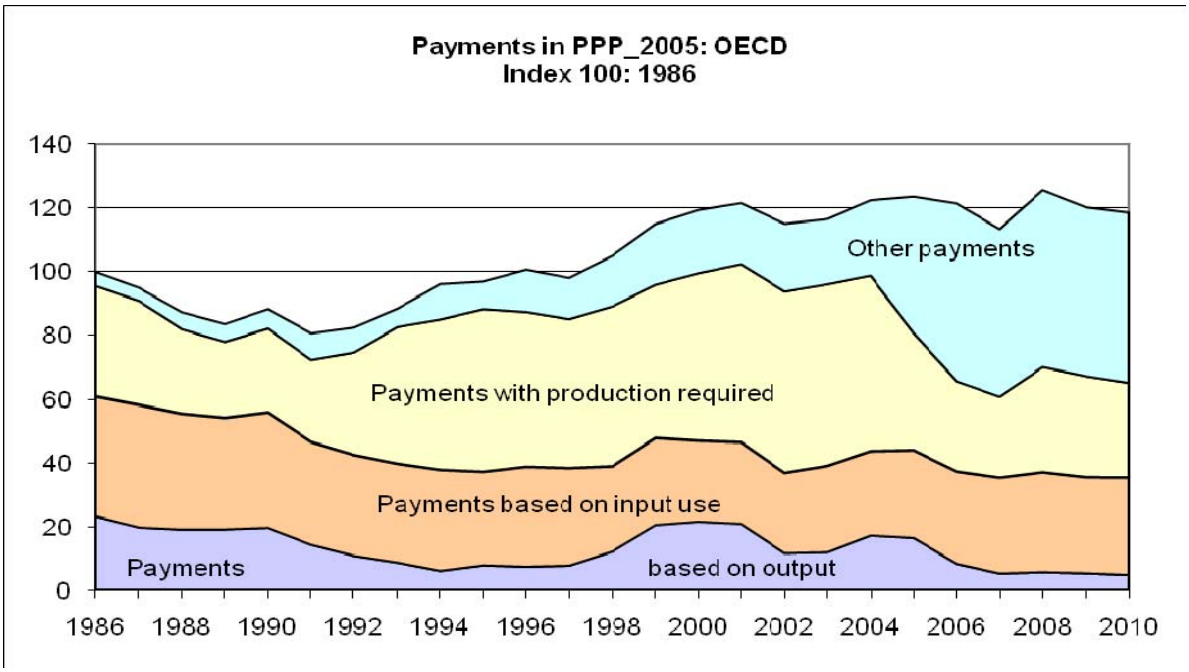
The EU imposes requirements on 64% of the payments. This rate is 70% in Switzerland and 48% in the US. Payments that are contractual and linked to either environment or animal welfare represent 11% of payments in the EU, against 20% in the US, 30% in Korea and Japan.

Figure 13. Changes in the real support and composition over time, OECD as a whole



Source: Authors' calculation using the OECD dataset. For abbreviations see Annex 1. ACT stands for Group Commodity Transfers, CGT for All Commodity Transfers, and OTP Other Transfers to Producers.

Figure 14. Changes in payments over time, OECD as a whole, in real values



Source: Authors' calculation using the OECD dataset.

Table 6. Changes in the composition of real support over time

SCT: INDEX 100 IN 1986-88					OTHER PSE: INDEX 100 IN 1986-88				
	1986-1988	1998-2000	2004-2006	2008-2010		1986-1988	1998-2000	2004-2006	2008-2010
AUS	100	27	1	0	AUS	100	94	149	118
CAN	100	51	52	54	CAN	100	61	93	58
CHE	100	55	42	31	CHE	100	167	181	180
E19	100	50	33	12	E19	100	232	325	395
ISL	100	71	65	46	ISL	100	32	44	42
JPN	100	76	68	61	JPN	100	65	61	108
KOR	100	101	97	78	KOR	100	488	568	494
MEX					MEX	100	53	75	81
NOR	100	61	43	39	NOR	100	108	82	79
NZL	100	20	47	28	NZL	100	4	5	2
TUR	100	186	212	269	TUR	100	114	121	87
USA	100	84	37	16	USA	100	162	149	121
OECD	100	69	51	35	OCDE	100	154	185	198
PSE: INDEX 100 IN 1986-88					**FARM RECEIPTS: INDEX 100 IN 1986-88**				
AUS	100	46	43	33	AUS	100	115	111	109
CAN	100	54	63	55	CAN	100	108	107	120
CHE	100	71	62	53	CHE	100	75	71	70
E19	100	64	55	41	E19	100	74	71	75
ISL	100	69	64	46	ISL	100	74	74	74
JPN	100	76	68	64	JPN	100	82	81	84
KOR	100	105	102	82	KOR	100	114	116	122
MEX	100	504	323	364	MEX	100	87	85	97
NOR	100	74	54	50	NOR	100	74	58	56
NZL	100	6	10	6	NZL	100	112	120	134
TUR	100	170	192	228	TUR	100	125	126	151
USA	100	106	68	45	USA	100	98	104	121
OECD	100	80	68	56	OCDE	100	87	87	95
% SCT					% PSE				
AUS	7	2	0	0	AUS	10	4	4	3
CAN	26	12	13	12	CAN	37	18	22	17
CHE	65	48	39	29	CHE	76	72	67	58
E19	37	25	17	6	E19	40	34	31	22
ISL	72	69	63	45	ISL	77	71	66	48
JPN	59	56	50	43	JPN	64	59	54	49
KOR	67	60	56	43	KOR	68	62	60	46
MEX	-5	14	5	6	MEX	3	19	13	12
NOR	51	42	38	35	NOR	70	70	66	63
NZL	1	0	1	0	NZL	11	1	1	0
TUR	16	23	26	28	TUR	20	27	31	30
USA	16	13	6	2	USA	22	23	14	8
OECD	30	24	18	11	OCDE	35	32	27	20

Source: Authors' calculation using the OECD dataset and Eurostat/OECD PPPs.

Support and farm income. The real PSE has gone down for the OECD as a whole since 1986 (Figure 15). The reduction of support is quite diverse, ranging from striking changes in New Zealand to a modest reduction in Japan. Figure 15 also shows the share of support that is not linked to the production of a particular commodity ("Other PSE") in 2008-2010. It is noteworthy that the real PSE has increased in Turkey and Mexico since 1986.

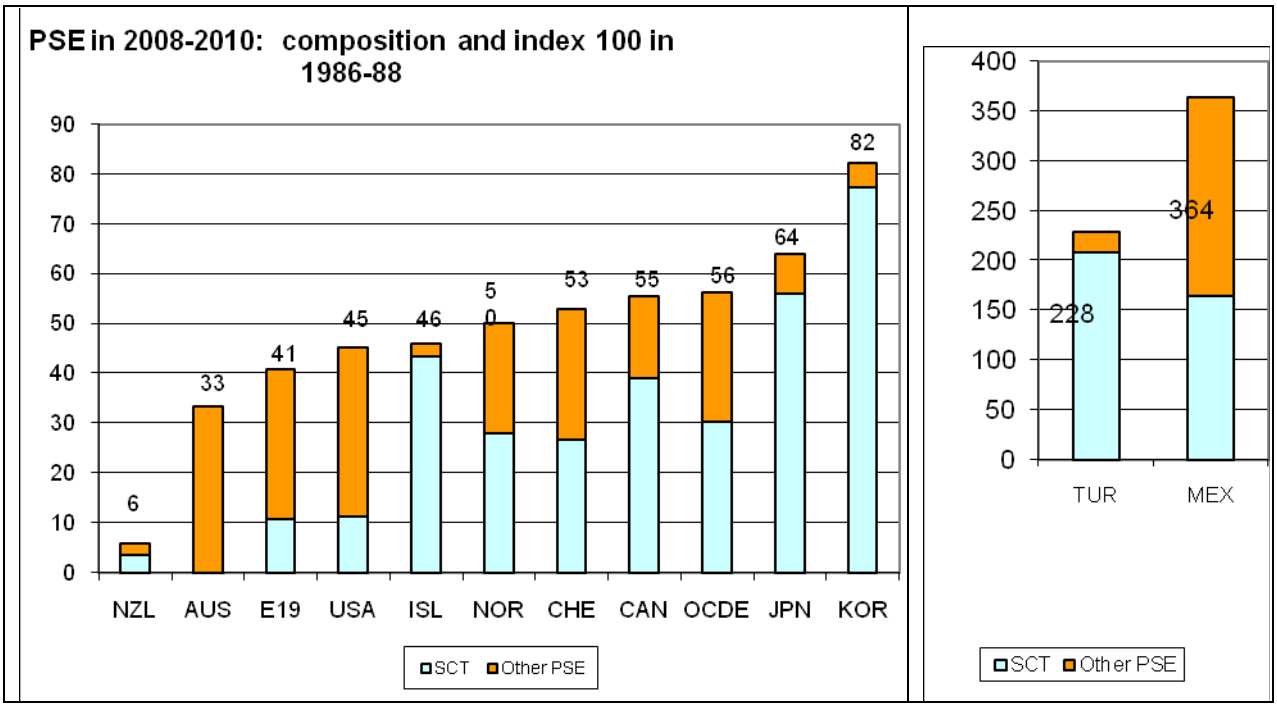
As a percentage of farm receipts the PSE has declined in the OECD from 35% to 20% in the period under investigation, but with remarkable differences. In Turkey and Mexico the percentage PSE has even increased whereas it has gone down in the EU from 40% to 23% over the 1986-2010 period. It also declined from 20% to 8% in the US, whereas it remains high at the end of the period in Korea, Iceland, Japan, Switzerland and Norway, compared to the EU (Figure 16).

In spite of a rise in commodity prices at the end of the period, the value of real farm receipts output went down in Norway, Switzerland, the EU and Japan (Figure 17). In the EU the decline is by 25% between 1986 and 2010. The dismantling of intervention mechanisms and from cuts in export subsidies and tariffs played a role, even though the fall in institutional prices was partly compensated by direct payments. A slowdown in EU productivity may have also contributed to the decline of receipts (Butault and Requillart 2012). Finally the real changes are also depending on the GDP deflator used in the calculations.

Countries that granted lower support to agriculture at the beginning of the period have experienced an increase in farm receipts due to both an expansion of sales in a growing market, at a time where reforms in the EU and the US led these countries to reduce exports, and the positive trend in world market prices at the end of the period. Over the period, real farm receipts grew by 34% in New Zealand, for example, in sharp contrast with the EU (which also benefited less from the boom on dairy markets than New Zealand).

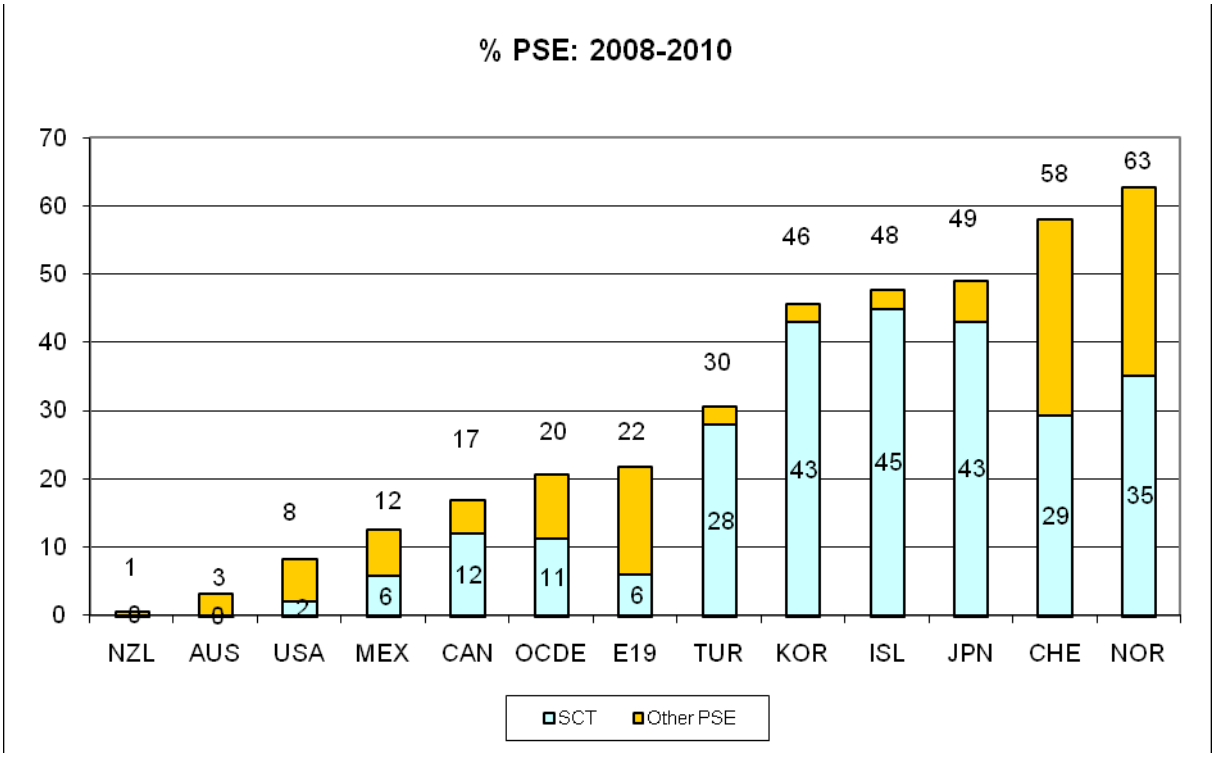
The EU has managed most of the adjustment to market conditions. There is little scope for further decrease in coupled support in the future. In case of high world prices, producers will be able to take advantage of them, while this might not be the case in Korea and Norway, where domestic prices are still higher than world prices and where reforms have not gone as far as in the EU.

Figure 15. Changes over time and composition of real support (in 2008-2010), selected countries



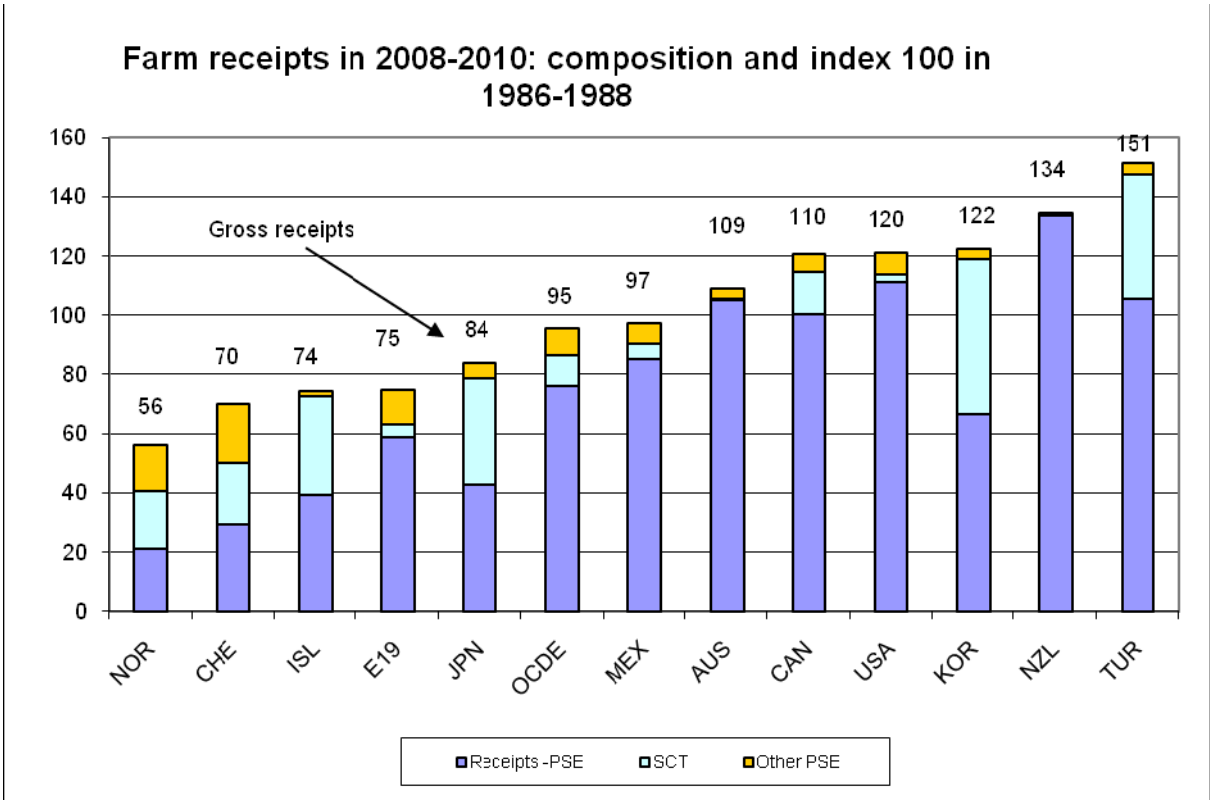
Source: Authors' calculation using the OECD dataset.

Figure 16. Percentage PSE 2008-2010 for selected OECD countries



Source: Authors' calculation using the OECD dataset. SCT stands for Single Commodity Transfers, and the bottom section of the bar therefore indicates how product specific (and therefore market distorting) support is.

Figure 17. Share of the PSE and the couple support in farm receipts, changes between 1986 and 2010, selected OECD countries



Source: Authors' calculation using the OECD dataset.

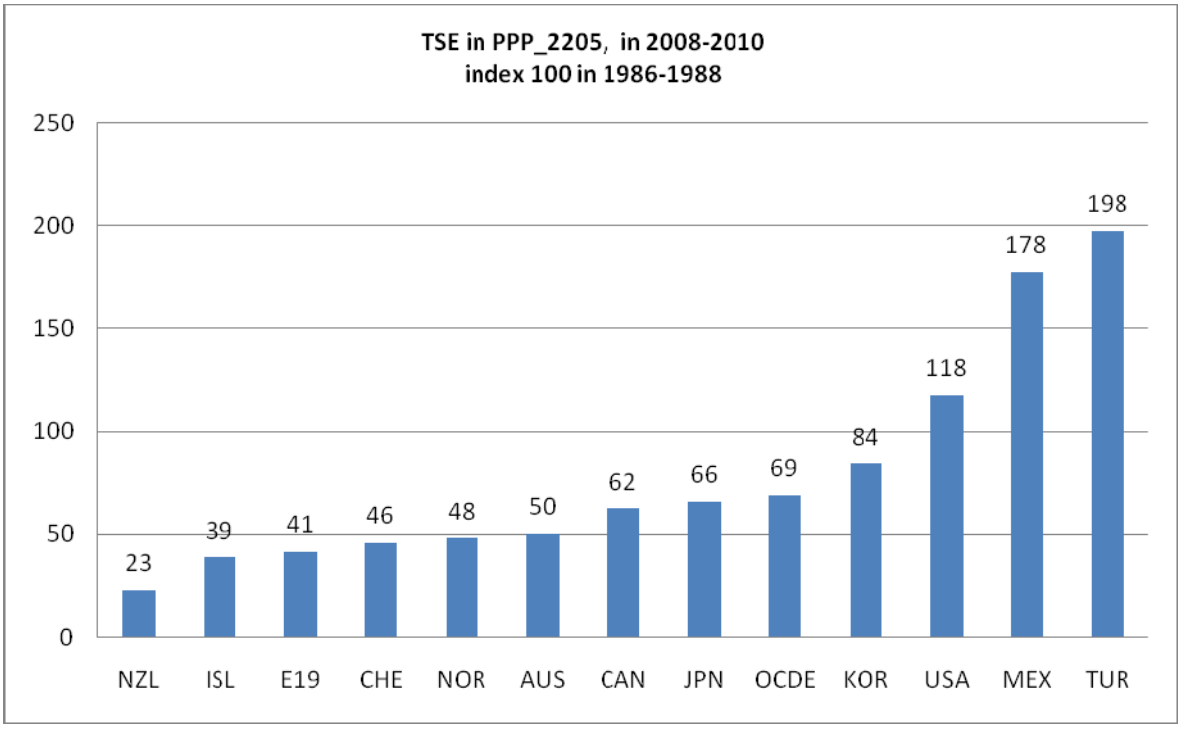
3.1.4. Changes in (real) total support over time

Transfers from taxpayers to consumers and budgets for general services represent in 2010 at the OECD level, respectively 11 and 27% of total support. The data on total transfers (as measured by the Total Support Estimate) includes very different policies and make international comparisons somewhat meaningless. For example, in the US, a large share of social support to poor people goes through the food stamp program. This results in a considerable budget granted to consumers (some US$ 94 billion a year at the end of the period), which is included in the general services heading, representing 70% of the TSE.

Transfers to consumers and general services have increased in real terms in Australia, Turkey, and the US where the food aid program has recently increased. The fall in transfers from consumers is remarkable in the EU (-55% in the aggregate 19 OECD countries) reflecting the progressive dismantling of the system of public purchases, surplus disposal and storage costs.

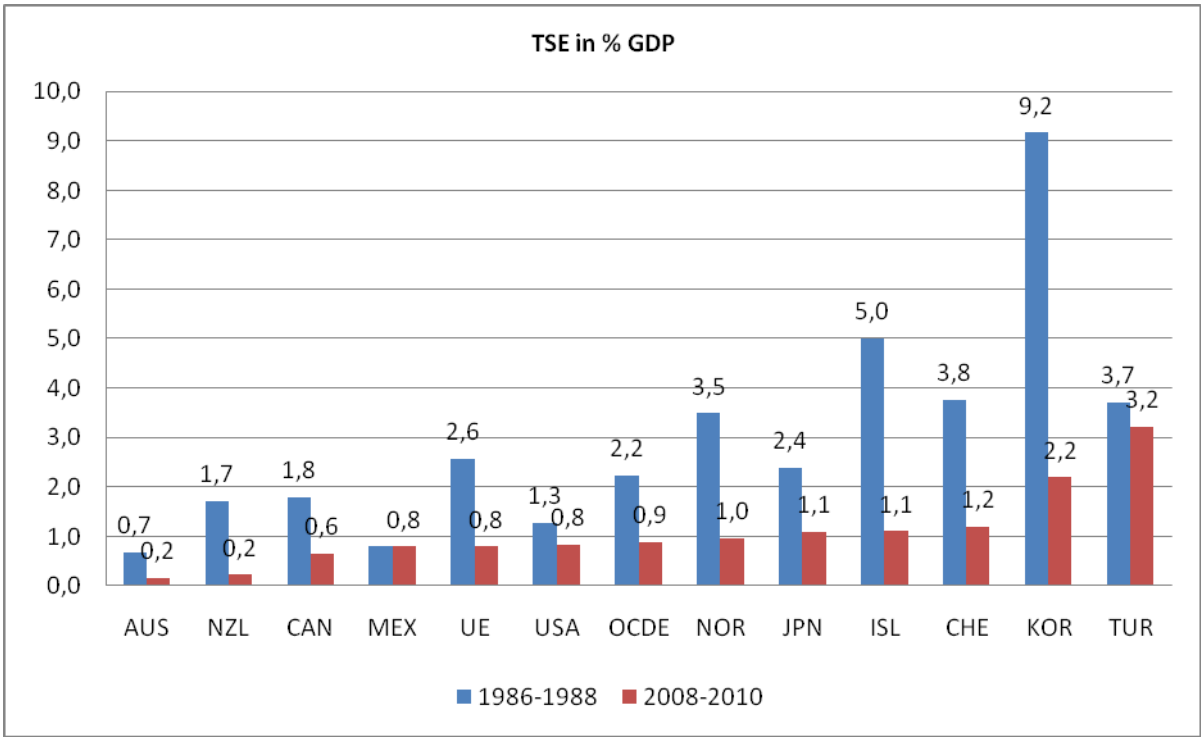
Total support decreases by 30% in the OECD as a whole between 1986 and 2010 Figure 18). In the EU (or more exactly in the 19 EU countries members of the OECD), this decline is much higher (60%). Total support increases in Turkey and Mexico, but also in the US given the evolution of food aid. As a share in GDP TSE declines in all countries, for the OECD average from 2.2% to 0.9% between 1986 and 2010 and very similar for the EU (Figure 19).

Figure 18. Real total support (TSE), changes in selected countries 1986-2010



Source: Authors' calculation using the OECD dataset.

Figure 19. Total support as a percentage of GDP



Source: OECD dataset.

3.2. A comparison with selected non-OECD countries

The indicators defined in section 2.6 can also be used to measure agricultural support in a series of emerging countries. These countries are characterized by particular inflation rates and exchange rates fluctuations, which make international comparisons difficult.

The OECD dataset provides information on agricultural support for some emerging countries, from 1995 to 2010. Chile and Israel became OECD members in 2008, but the OECD also monitors agricultural support in Brazil, China, Russia, Ukraine and South Africa. There are considerable differences in agricultural conditions across these countries and agricultural policies do not share the same objectives. Brazil is a large exporter and its agricultural policy reflects the willingness to develop its exports, while Chinese agricultural policy intends to respond to the growing demand of a domestic population and to food security objectives that the Chinese government considers as strategic.

Agricultural support as a whole, expressed as the percentage PSE in agricultural receipts is low in emerging countries. Since 1995, it has gone down in Israel, Chile and South Africa, but it increases in China, up to the point where it is getting close to the OECD average in 2010 (Figure 20 refers to 2008-10 but preliminary data for 2010 suggest that the percentage PSE reaches 20% in China, see

Figure 27). It is noteworthy, though that if the percentage PSE goes down over the last period for emerging countries, this is partly caused by higher prices and partly caused by a higher agricultural output, at least in some countries of the sample.

Real agricultural receipts have increased dramatically between 1995 and 2010, by 80% in China and 70% in Brazil (Figure 21). While real receipts have gone down in Russia and Ukraine due to a decrease in production in the 1990s, they have increased during the most recent years.

Until the very recent period, one common characteristic of the emerging countries was the undervaluation of their currencies relative to a PPP benchmark. This resulted in a *de facto* protection of their agriculture that was significant. Over time, the relative position of the currencies has largely driven the changes in agricultural prices. For example, the progressive appreciation of the Brazilian Real, while the Chinese Yuan remained rather undervalued compared to the PPP benchmark, partly explains the relative evolution of agricultural border prices in these countries (Figure 22 and Figure 23). Recently, sustained economic growth as well as the raise in export receipts – linked to the high demand for mineral and agricultural products – has led to an appreciation of some of the currencies, in particular in Brazil and Chile. This has led to a decrease in agricultural support. At the same time, the undervaluation of the Chinese Yuan protects farmers from a fall in income that would prevail if the currency appreciated.

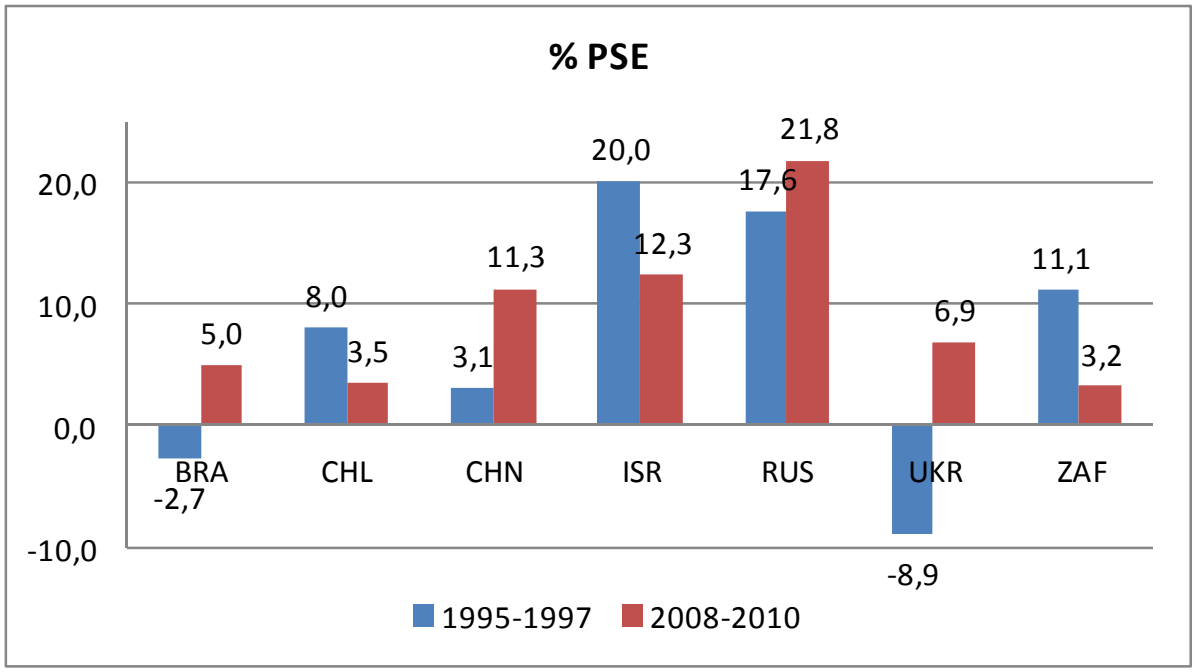
Data from the OECD PSE dataset suggest that there is little price support in emerging countries, the Nominal Protection Coefficient or NPC being sometimes lower than one in Brazil and Ukraine, meaning that border prices are higher than domestic prices (Figure 24). In those countries where there was a significant positive gap between domestic and world prices, such as Israel, South Africa and Chile, the NPC has been reduced over time. There is however an increase in the price support in China and Russia over the recent period.

Most of the emerging countries in the sample support dairy production (Figure 25). Typically the countries in the sample do not support their main products, which are often exported, but those that governments see as strategic to develop. This is particularly the case in China, where support is higher for pigmeat and poultry meat but is be negative for rice due to a lower domestic price than a border one. On the other hand, some of the products receive negative support (cereals in Ukraine and Russia).

Direct support, through payments that are either coupled or decoupled from production, tends to go down as a percentage of receipts in Brazil or Russia (see the item "Other PSE" in Figure 26. The growth in these forms of support is noteworthy in China and in Ukraine. The composition of these payments is very different across emerging countries. China makes a significant use of subsidies to variable inputs, such as fertilizers, pesticides, fuels. The same applies to Russia, Ukraine and South Africa. In Brazil, public support is mostly targeted to financing of investment, through subsidized loans. Public support to investment is also important in Chile and South Africa.

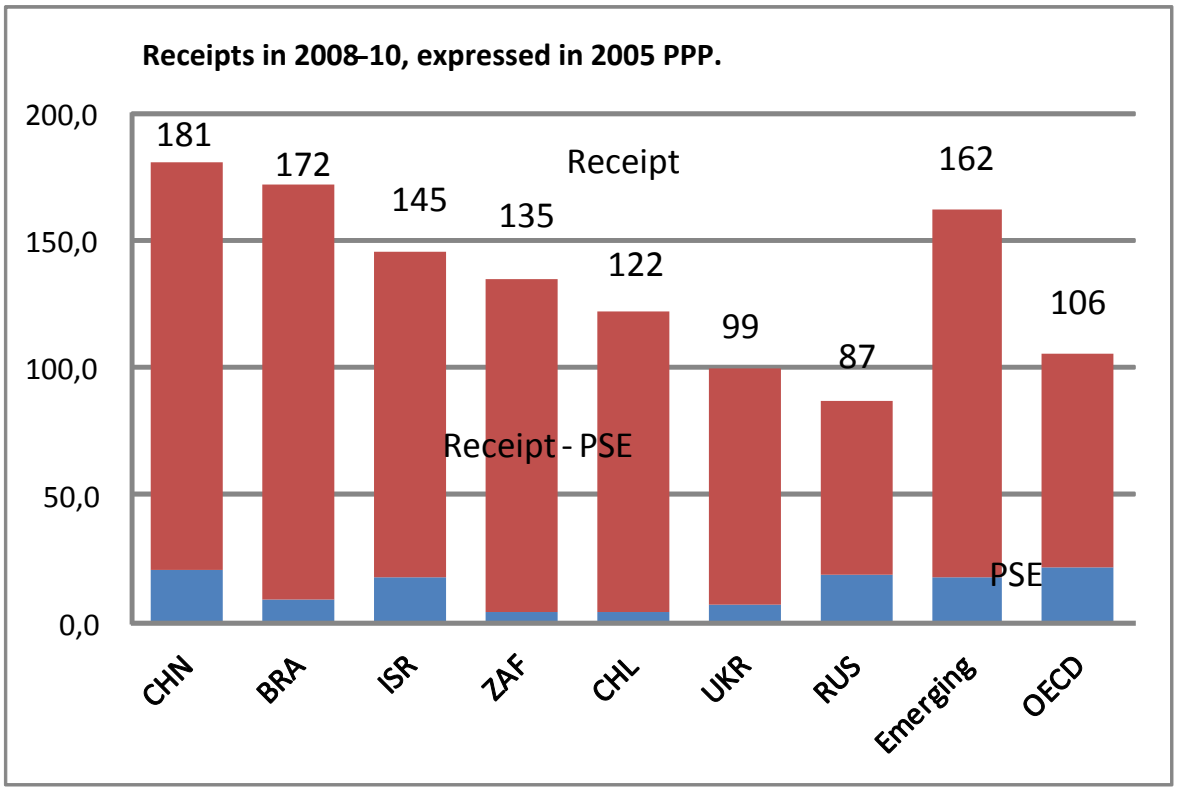
In brief, emerging countries still support their agriculture at a lower level than the EU. However, agricultural support is increasing rapidly in Brazil, China, Ukraine and Russia. In addition emerging countries support their farmers by subsidies that are more distorting than the EU direct payments. These subsidies include subsidised loans, fertilizers, capital grants and other instruments that are intended to increase in productivity, production, and exports of selected commodities (Table 7).

Figure 20. Changes in the percentage PSE, selected emerging countries, 1995-2010



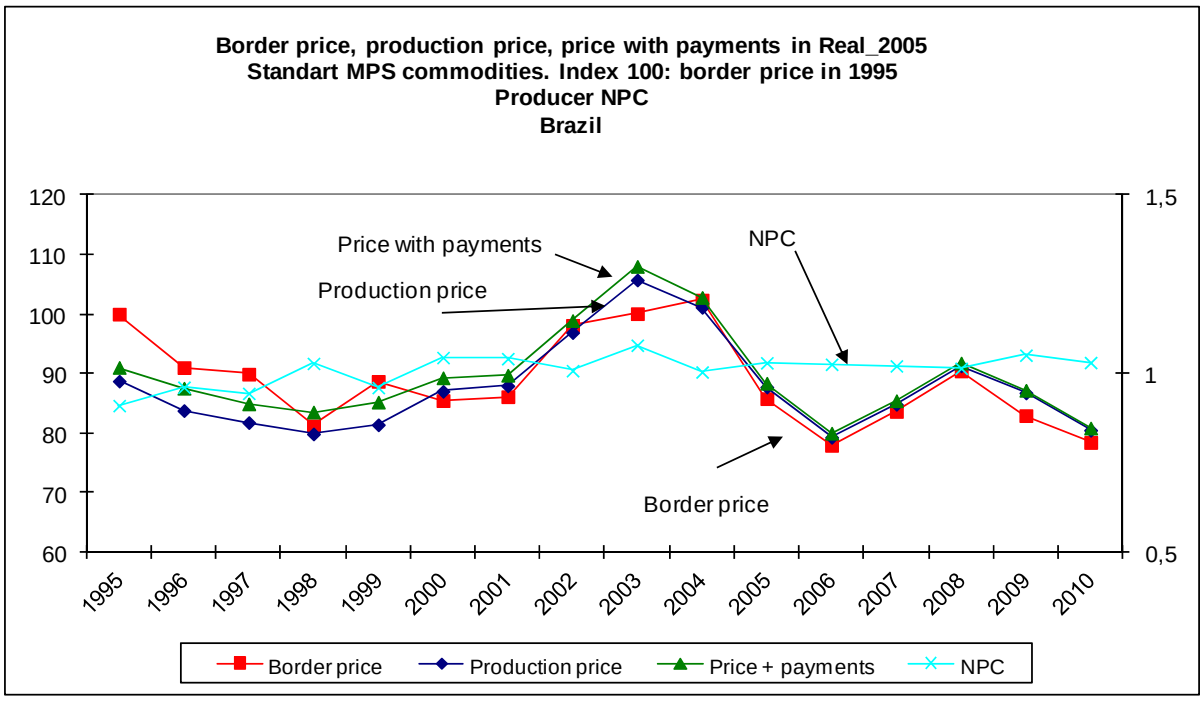
Source: OECD dataset**.** Note that the sharp increase in Chinese percentage PSE in 2010 is not visible here, since the figures are an average of 2008-2010. Preliminary estimate indicate a 20% percentage PSE in China for 2010.

Figure 21. Changes in real agricultural output and share of public support, 1995-2010



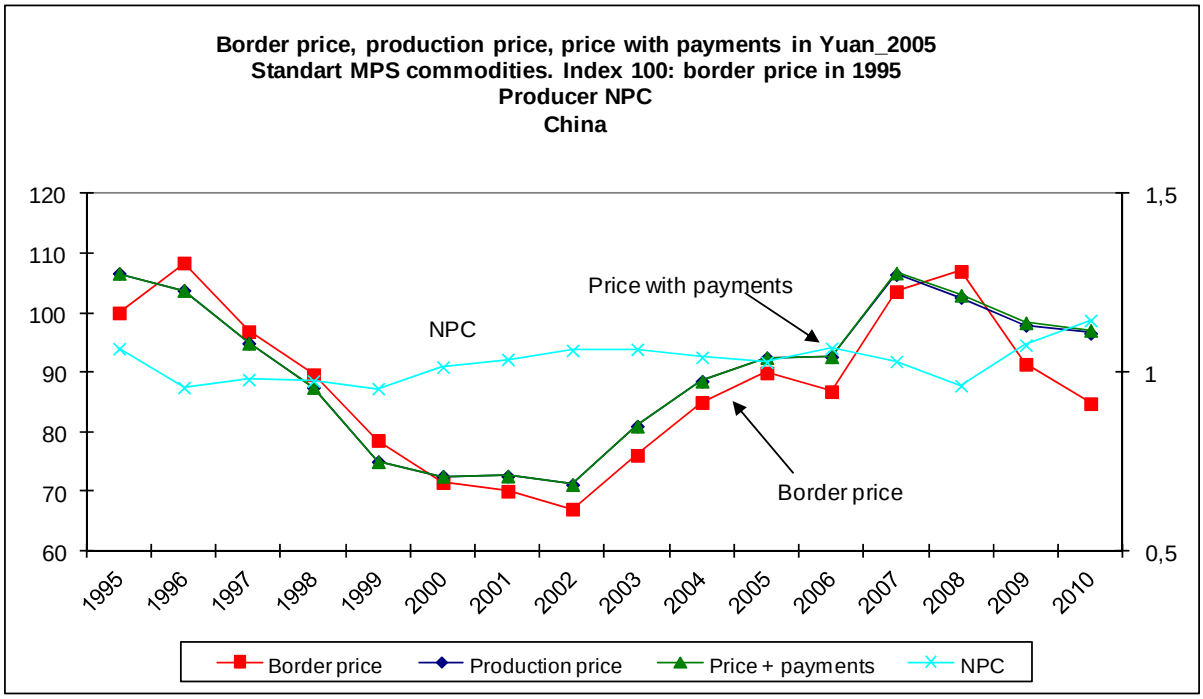
Source: Authors' calculation using the OECD dataset. The index is 100 for the average year 1995-1997.

Figure 22. Changes in real price support, Brazil, 1995-2010



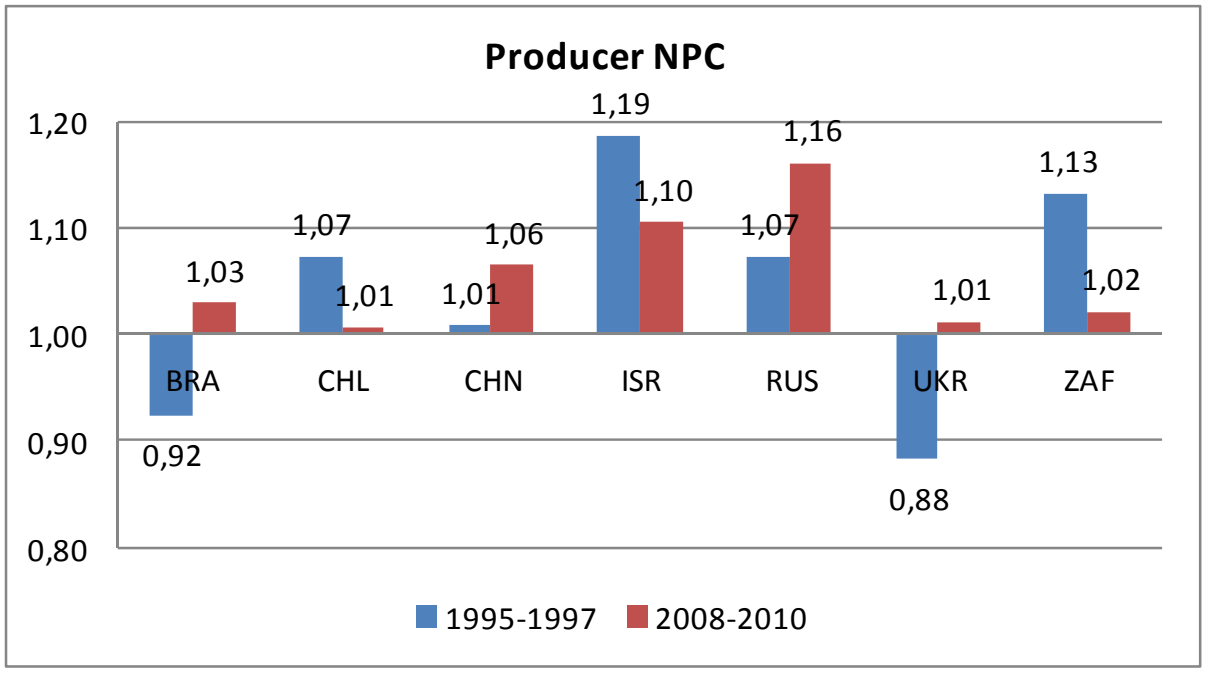
Source: OECD dataset.

Figure 23. Changes in real price support, China, 1995-2010



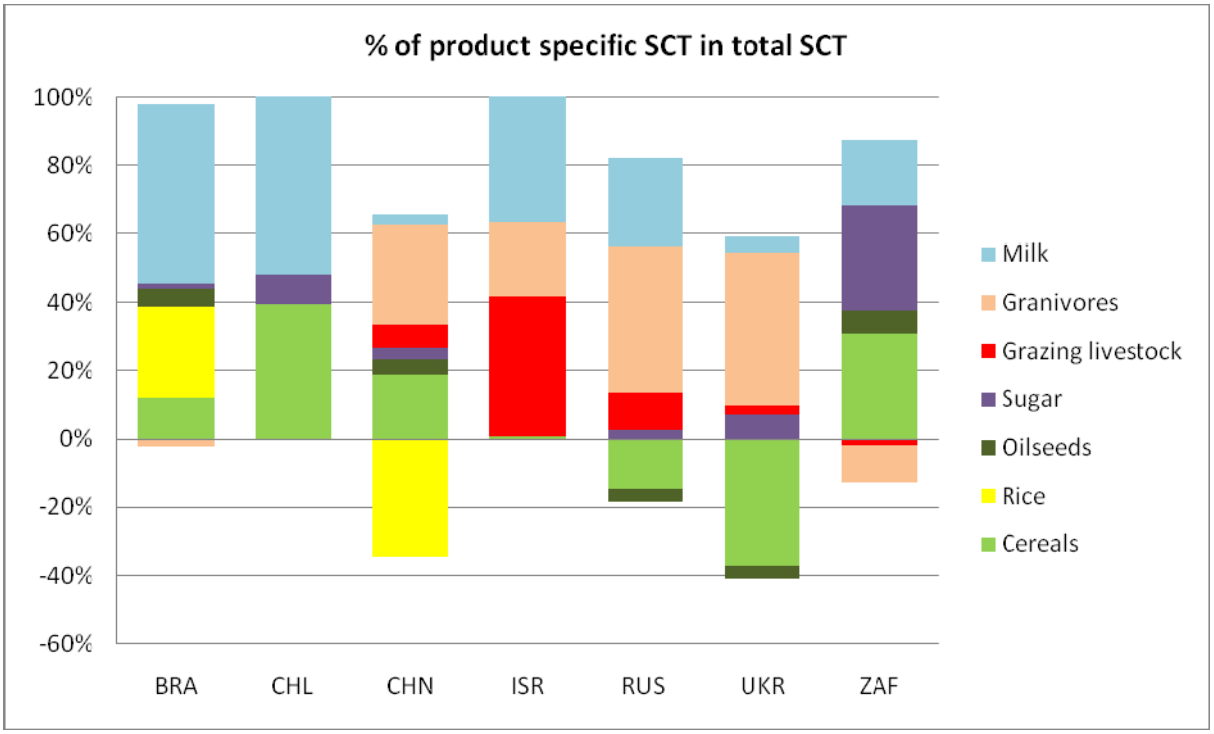
Source: OECD dataset.

Figure 24. Price support as measured by the Nominal Protection Coefficient



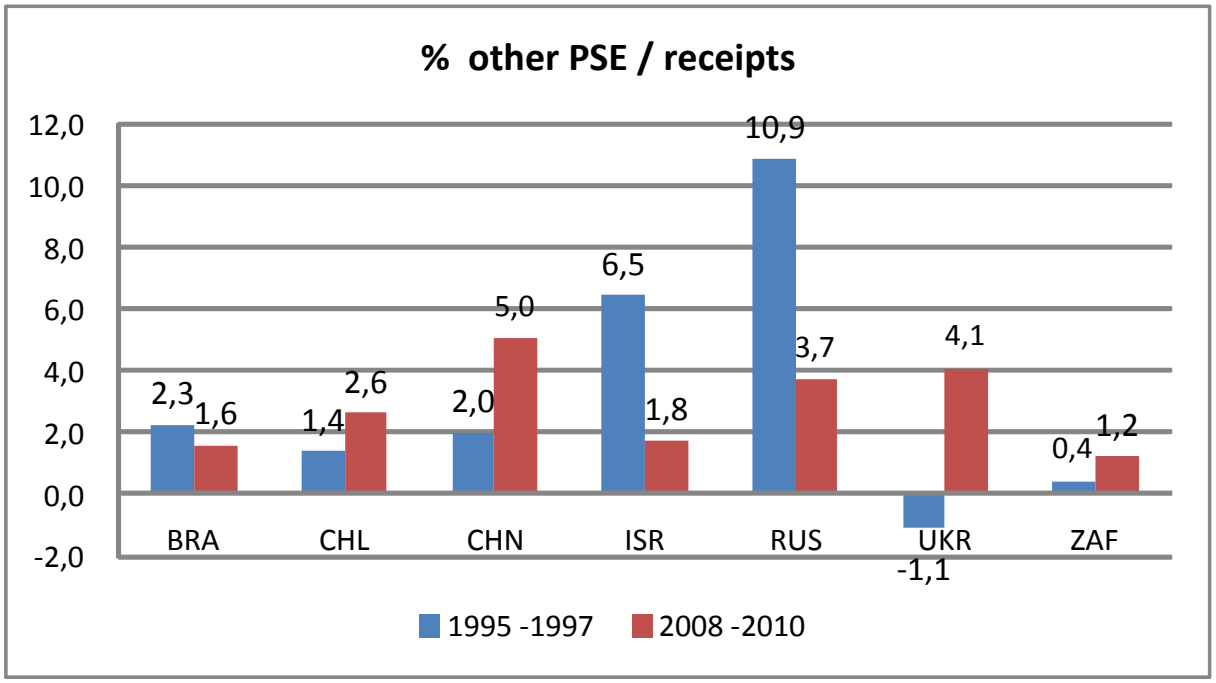
Source: Authors' calculation using the OECD dataset.

Figure 25. Product specific support in selected emerging countries



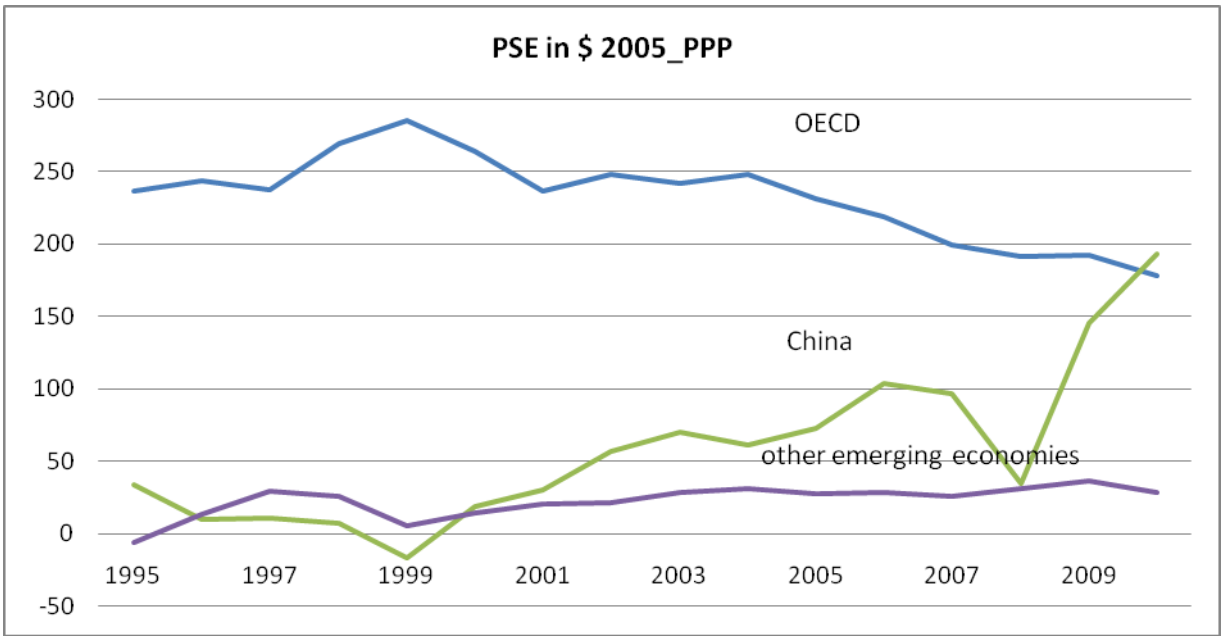
Source: Authors' calculation using the OECD dataset.

Figure 26. Decoupled support as a percentage of agricultural gross receipts



Source: Authors' calculation using the OCDE dataset.

Figure 27. Change in Chinese real PSE, a comparison with OECD as a whole (1995-2010)



Source: Authors' calculation using OCDE data, and PPPs from various sources. Note that the 2010 results for the PSE are still preliminary and subject to possible large revision in the OECD data.

Table 7. Main forms of support for selected non-OECD countries

	Cumulative percentage of support
BRAZIL	
Preferential interest subsidy	68%
Debt rescheduling	94%
Rural insurance	98%
ISRAEL	
Farmers Agreement	17%
Specific on- the- spot treatment	30%
Water price support	41%
CHILE	
Agricultural investment	22%
Irrigation Programmes	38%
Development of Poor Areas	48%
RUSSIA	
Interest subsidies	48%
Input subsidy	60%
Compensation of damage	66%
SOUTH AFRICA	
Fuel tax subsidy	38%
Land grants	67%
Investment on farms	96%
CHINA	
Variable Input subsidy	31%
Poverty programme	43%
Return Farmland to Forest	52%
UKRAINE	
Input subsidy	85%
Capital grants	92%
Support for orchards	96%

Source: Authors' calculation using the OCDE dataset. The categories of support are ranked according to the increasing importance in terms of transfers, and the figures represent the cumulative percentage of total support.

4. AGRICULTURAL SUPPORT IN THE EU

KEY FINDINGS

- Support to EU agriculture is assessed using a variety of sources, i.e. economic accounts, farm level survey data, and OECD as well as WTO notifications.
- Neither macro nor microeconomic data accounts for the support that is provided through prices, but provide useful information regarding subsidies actually received by farmers (both national and EU funded). In the EU**, subsidies per family worker went up** from 7500 to 12000 between 1995 and 2008 in constant 2005 euro. Subsidies went from 47% of the family income in 1995 to 60% in 2008.
- EU support has **moved towards decoupled direct payments**, is less and less product specific and therefore more and more production neutral, and now has a limited impact on world markets.
- While direct payments are now the largest part of EU support, there are still some very large transfers to farmers through **fuel subsidies** and tax rebates, and **capital subsidies**. These transfers are as large as agri-environmental payments and less favoured areas payments.
- International (WTO) commitments on domestic support are based on the AMS, an indicator that has little economic relevance. However, the EU AMS is now less than **20% of the authorized ceiling**.
- Neither the OECD nor the WTO takes into account biofuel policies into the measures that support farmers, even though they now play an important role in the EU and the US.

4.1. Changes in the structure of agricultural support in the EU

Background. The CAP of the 1960s to 1980s relied heavily on measures that supported prices. At the end of the 1980s, the domestic price of cereals were more than 2.5 times higher the world prices, suggesting that considerable transfers took place from consumers (in particular from the animal feed sector, and hence livestock farmers) to grain producers. The high level of protection and the supply control granted to sugar and dairy production also led to considerable transfers from consumers to producers. At the same time, taxpayers were asked to contribute significantly to a growing CAP budget, given the needs to get rid of surplus production, resulting in storage costs and export refunds. [22]

Since 1992, successive reforms of the CAP have followed a consistent path. Institutional prices were reduced progressively and the system of intervention (i.e. government purchases when prices go below a certain threshold) was made explicitly or *de facto* inactive for several major commodities including beef, sugar and coarse grains. In the cereal, oilseed, protein seed and beef sectors, the corresponding losses in income were compensated by direct payments. Until 2008, they were subject to production limiting conditions (obligation of setting land aside and a cap per number of heads per hectare, in addition to national maximum payments) and were based on fixed yields. This made their impact on production rather unclear. The shift towards the single farm payments between

[22] See EP (2007; 2010); Bureau (2008); Ritson and Harvey (1997) for an introduction to these issues.

2003 and 2008 completed the move towards a form of support that is largely production neutral. These reforms have made it possible to solve major disequilibria, including the market imbalance for cereals.

In parallel, it was increasingly recognised that certain types of agriculture delivered environmental benefits and that farmers providing these benefits needed to be remunerated via public support. The Agenda 2000 reforms served to deepen the reform process, with greater support for rural development. It resulted in the emergence of a "second pillar" of the CAP. An administrative and financial framework - with common objectives and a single set of programming, financing, monitoring and auditing rules - was progressively implemented for EU rural development policy.

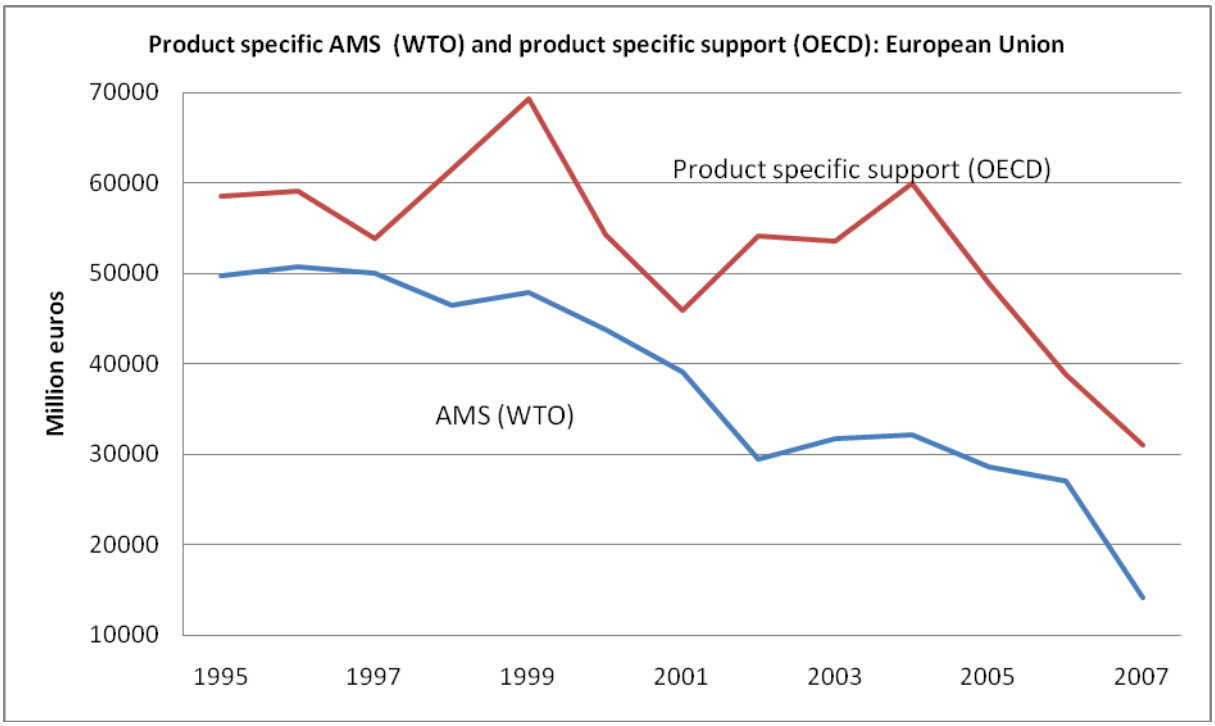
Today's CAP comprises Pillar 1 which includes market measures as well decoupled direct payments supporting income (including the Single Farm Payment scheme or SFP, the Single Area Payment Scheme or SAPS, available to new Member States) and a few coupled payments that have persisted. Pillar 1 is funded under the European Agricultural Guarantee Fund (EAGF), the main expenditures being direct payments to farmers and measures to regulate agricultural markets such as intervention purchasing, and the remaining export refunds. The second component of the CAP Pillar 2 - "Rural Development" - is a common policy with strategic objectives set at the EU level. It is directed at enhancing the environment and countryside, improving competitiveness of EU agriculture and forestry and improving the quality of life in rural areas and is funded under the European Agricultural Fund for Rural Development (EAFRD) for the programming period 2007 – 2013.

While the budget devoted to agricultural policy has remained large reforms have reduced some expenditure such as storage costs and export subsidies. Payments now benefit farmers more directly, and their decoupling has reduced international foreign criticisms with regard to the negative effects of the CAP on world prices and third country producers. Reforms have also increased the legitimacy of the policy, with a change in objectives making the policy more in line with societal demands and the needs of rural areas.

Changes in the measures of support. The various indicators proposed to measure the level of farm support in the EU, and to assess the changes in the composition of support acknowledge that some considerable progress has been made over the last two decades. In particular both the OECD product specific PSEs and the WTO AMS have gone down considerably while measures of total support remained more stable. This reflects both a reduction in the market price support but also a shift of support directed to production towards transfers that are more directed to rural development (Figure 28 and Figure 29). The OECD monitoring of agricultural policies also shows clearly that, in the EU, a shift has taken place towards policies that were less distorting and more efficient at transferring income to farmers (OECD 2011).

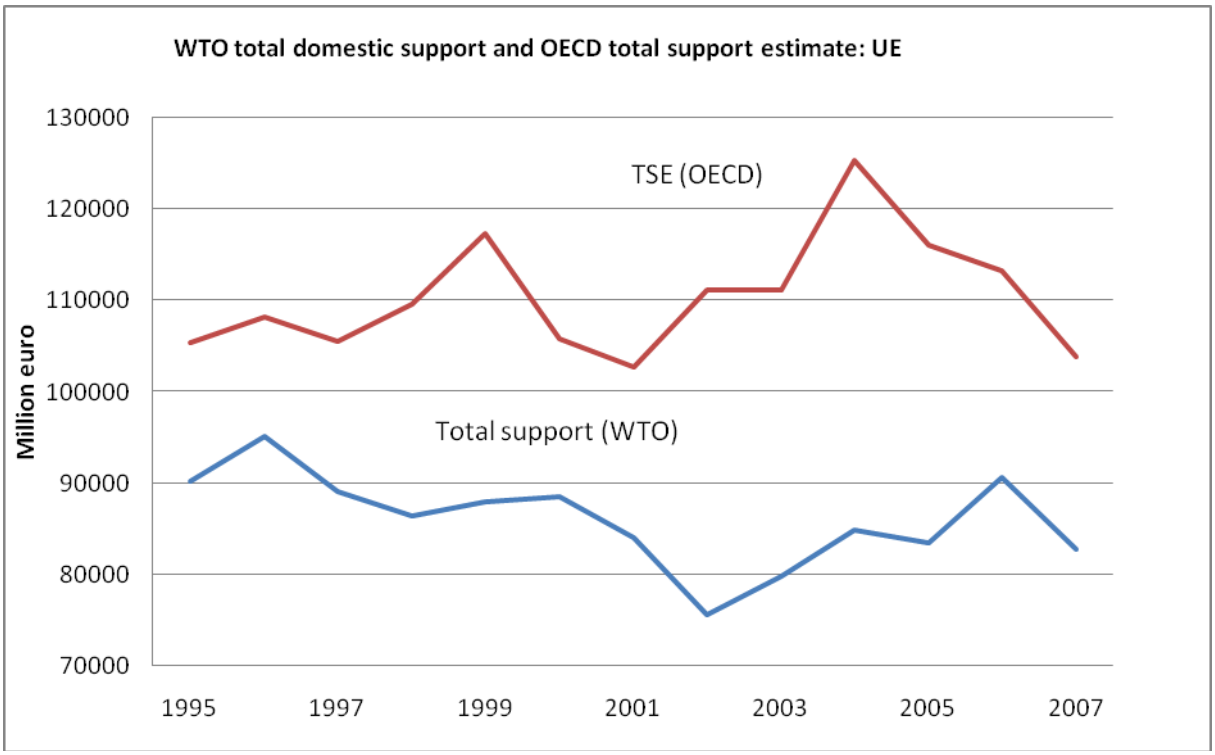
It is important that any measure of farm support be able to assess the efficacy of the CAP against the main issues that remain at stake. The first issue is the cost-effectiveness of the CAP. A larger share of the money spent reaches farmers than 20 years ago, but there are still some significant leakages of support through administrative costs as well as pass-through to asset owners. The ability of the CAP to address the over-utilization of water, the reduction of biodiversity, the contamination by chemical substances of soils and water is another issue, and there are questions on whether the reforms have actually strengthened the role of agriculture as a provider of positive externalities. The efficacy of EU agricultural support must be measured against these criticisms.

Figure 28. Changes in the product specific support as measured by the OECD and the WTO (AMS specific) 1995 -2007



Source: Authors' calculation using WTO notifications and OECD PSE database.

Figure 29. Changes in the total support as measured by the OECD (TSE) and the WTO (Green, Blue, Amber and de minimis) 1995 -2007



Source: Authors' calculation using WTO notifications and OECD PSE database.

4.2. EU agricultural support: A picture using the EU budget

The agricultural budget. Since 2007, budget expenditure for agriculture and rural development fall under the general item "Preservation and management of natural resources". The respective payments amount to €56.1 billion, out of a global budget of €120.5 billion, i.e. 46% according to the 2010 financial report. €43.4 billion were allocated to market support and income and €11.5 billion to rural development. Since 2000, agricultural expenditure has only progressed slightly in constant Euro terms (Figure 30).

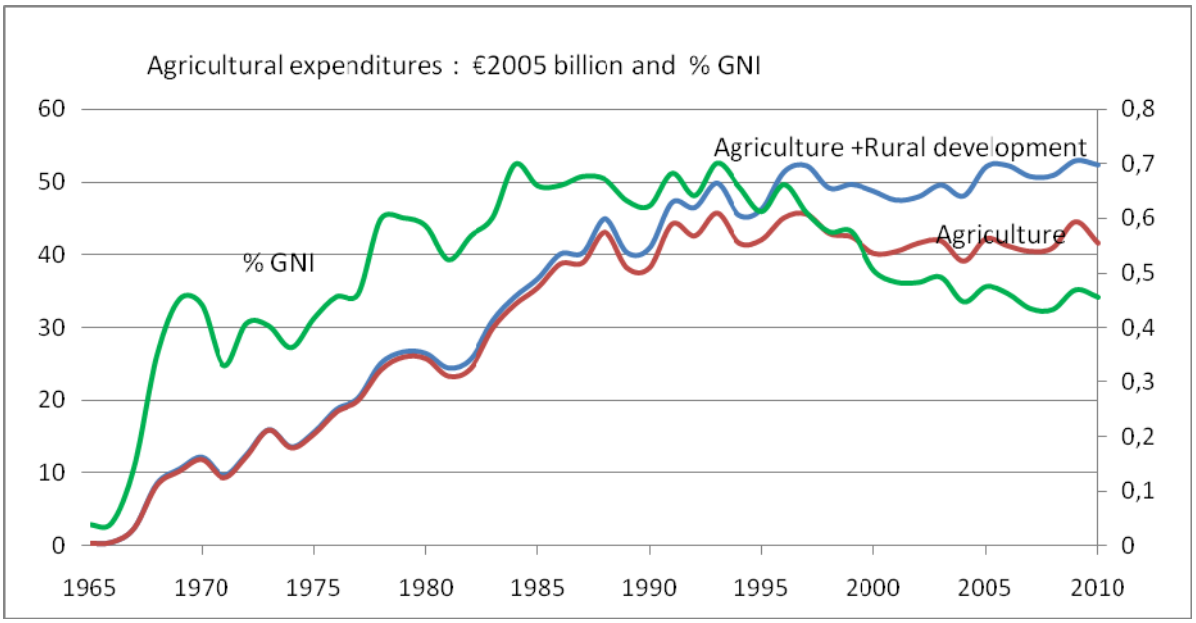
An issue that is often neglected by analysts is the difference between expenditure allocation and actual payments. Sotte (2011) warns about analyses that rely on inconsistent definitions when discussing the agricultural budget. For example, the share of the CAP in the total budget has been significantly higher in terms of appropriations for payments. The total volume of CAP expenditure and its distribution between Pillar 1 and 2 also show significant differences in terms of appropriations when moving from the multiannual financial framework to the annual budgets and, in the latter, when shifting from appropriations for commitments to those for payments. Another issue is that the relative weight of Pillar 1 and Pillar 2 changes considerably, from a 3 to 1 ratio (commitments) to a 4 to 1 ratio (payments). The explanation lies in the different nature between Pillar 1 and 2.[23]. Sotte (2011) points to an even more striking difference if payments actually paid are considered rather than appropriations for payments. He shows that in 2009 the ratio in terms of payments between Pillar 1 and Pillar 2 was close to 5 to 1 (figures for 2010 are close to 4 to 1). This suggests that figures based on appropriations largely overestimate the weight given to rural development and underestimate the weight given to market and income support in the CAP.

Expenditures for market support and income. Figure 31 shows that in 1990, more than 80% of the budget was devoted to market support. A considerable amount of money spent in export refunds and storage costs were also high. Direct payments were limited to a few products (sheep meat, beef and tobacco). Market related expenditure was progressively phased out with the 1992, 1999, 2003 and 2008 reforms, which largely put an end to artificially supported prices. By contrast, the budget devoted to direct payments increased.

Budget based comparisons are often misleading if we compare commodities. Some highly supported commodities such as sugar and dairy have been relatively costless for the taxpayer as they were mostly funded by consumers experiencing high prices (Figure 32). This being said, arable crops (cereals and oilseeds) represented half of the expenditure and beef 20% prior to the decoupling of payments. In 2010, direct payments reach €39.4 billion (source: financial report 2010, payments) whereas expenditure for market support now represent limited budgets (€3.9 billion in 2010).

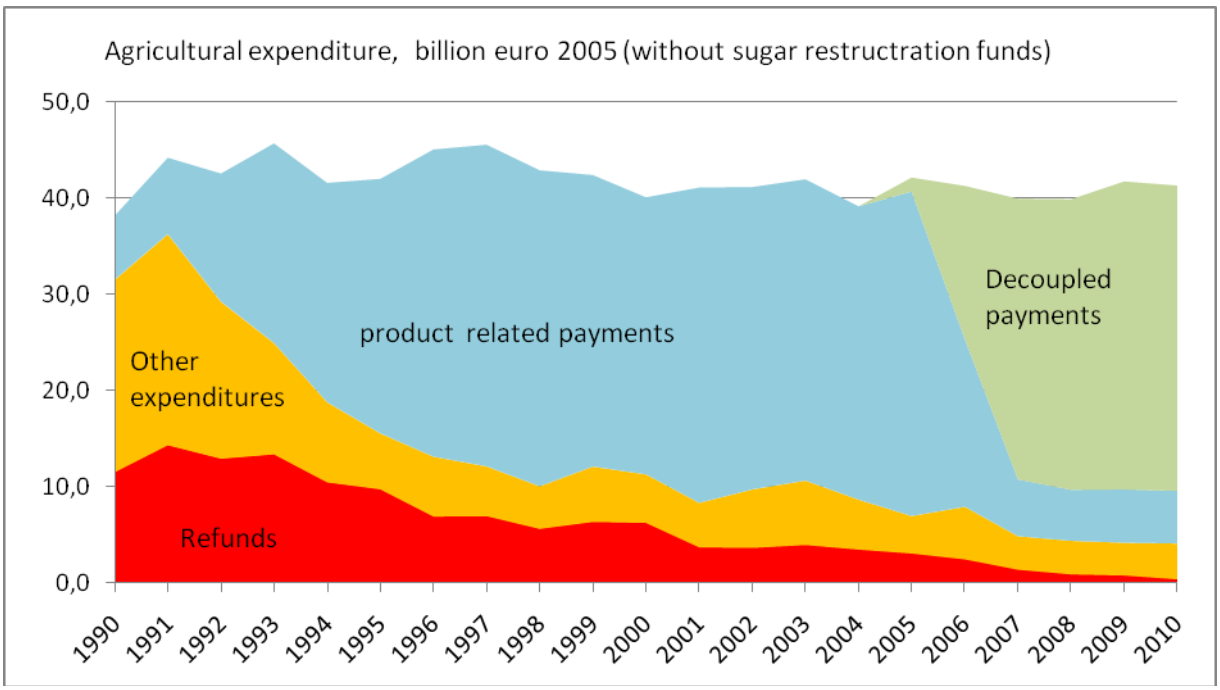
[23] Pillar 1 contains essentially transfer measures, with a predefined amount of money automatically paid by the Paying Agencies and reimbursed soon after by the EU (e.g. the Single Farm Payment). The spending process under Pillar 2 of the CAP has a multi-annual nature, as projects and programs require time for execution. Even before execution, several steps such as design, definition and emission of tenders, collection of applications, applications appraisal, selection, approval of the ranking, commitment, etc., take time. Sometimes the payment does not follow the commitment and the funds be disengaged and return available for other uses, and payments, when they occur, are not adjusted for inflation (Sotte 2011).

Figure 30. Agricultural expenditures, annual, changes in constant euro, EU, 1990-2010.



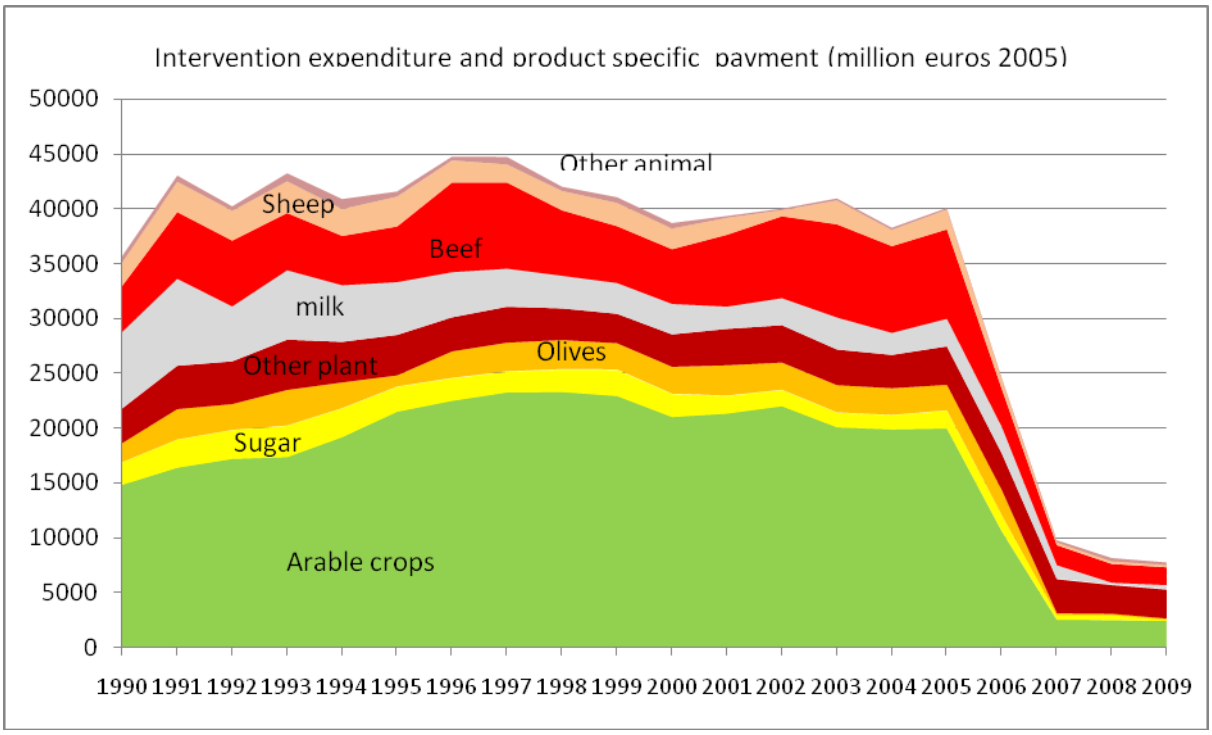
Sources: Authors, using FEOGA and EU Financial reports (payments).

Figure 31. Agricultural budget, composition, in constant euro, EU, 1990-2010.



Sources: Authors calculation using FEOGA then EAGF data (payments).

Figure 32. Product specific budgetary expenditure, EU, 1990-2010



Sources: Authors' calculation using FEOGA then EAGF data (payments).

Expenditures under rural development. The terms "rural development" and "second pillar", introduced with the 1999 reform, have been used to include a set of rather heterogeneous measures. They are now funded under the EAFRD.

In spite of the "rural development" appellation, most of the measures still target farmers. Agricultural support under Pillar 2 includes many different measures: agri-environmental measures, afforestation, payments to less favoured area, modernization of agriculture, early retirement incentives, etc. Since the 1999 reform, Member States choose their own rural development plan by selecting a set of provisions in a menu of 22 possible measures (agri-environmental measures being compulsory). In addition, new Member States benefited from special clauses. The contribution from the EU budget is complemented by national cofinancing.

The 2007-2013 financial framework includes commitments of €96 billion, in four different axes.[24] The obligation of cofinancing results in some underspending. Because of the introduction of "modulation" (i.e. funding of Pillar 2 measures by siphoning Pillar 1 payments for larger beneficiaries), the budget allocated to rural development has increased over time. In current euro, payments reached 11.4 billion in 2010 (source 2010 financial report). If this corresponds only to 21% of the total budgetary expenditure for agriculture, the growth in real terms is significant: from €2.7 billion (in constant 2005 euro) in 1990, the budget is now €10.7 billion (constant 2005 euro) in 2010.

[24] More specifically the programmes cover three groups of themes or 'axes': Axis 1: competitiveness in agriculture and forestry, focusing on knowledge transfer, modernisation, innovation and the quality of the food chain; Axis 2: biodiversity, the preservation and development of high-nature-value farming and forestry systems and traditional agricultural landscapes, water and climate change; Axis 3: quality of life in rural areas and diversification. A further requirement is that some of the funding must support projects developed by local action groups under the so-called 'Leader' approach. This is to encourage highly individual projects designed and executed by local partnerships to address specific local problems.

The contribution of national budgets. The EU budget is not the only source of support. Member states also participate with their own budget, as a cofinancing for Pillar 2, or with specific programs in areas where there is some subsidiarity, such as education, food aid, forestry, risk management, etc.

There is no centralized source of the national expenditures for agriculture, but the OECD dataset includes some of the payments from Member States budgets (the primary source is the collection of such information by the EC Commission). On average, the share of the EU funding in the total agricultural support in EU member states has increased from 56% in 1986 to 75% in 2010, even though this share has been rather stable since the mid 1990s. However, the OECD source is not fully satisfactory regarding Member States contributions, in particular in countries where there is support granted at the regional level. It is noteworthy that the evolution is different across Member States. For example, the share of national sources in the overall agricultural budget tends to go down in France, contrasting with the EU average.

4.3. EU agricultural support: A picture using data on farm subsidies

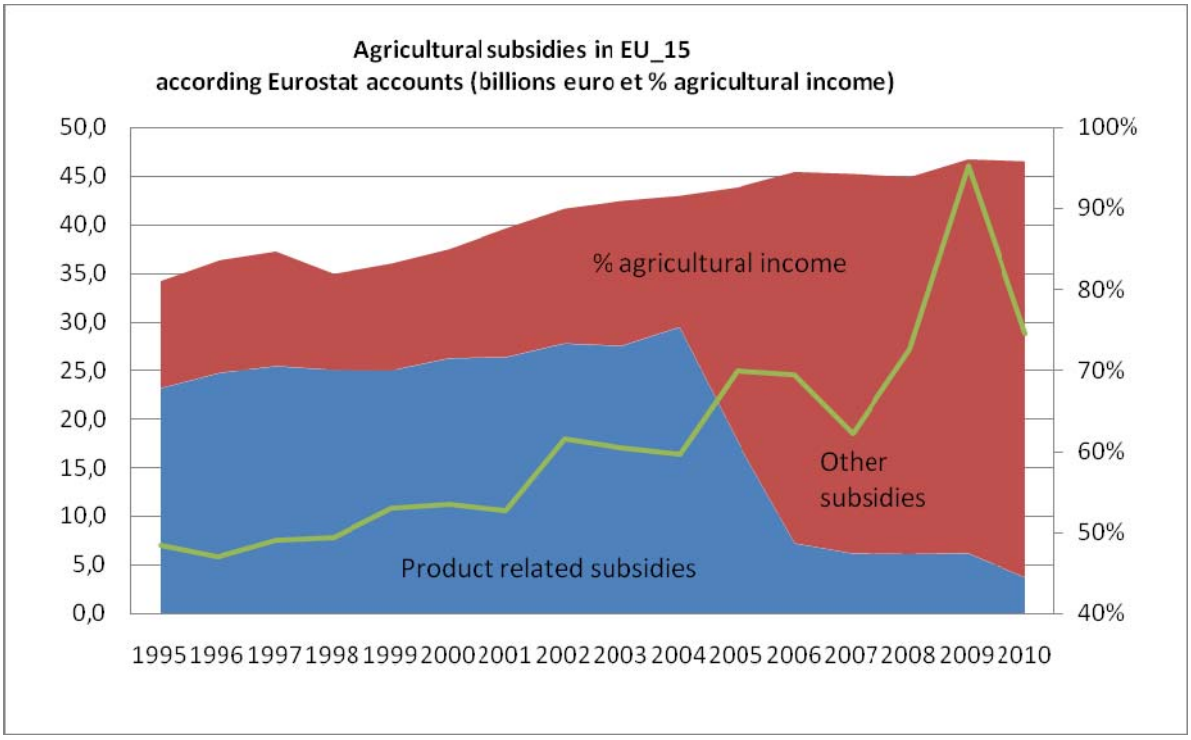
As explained in section 2.3.2., budget data include some type of expenditure that do not benefit only to farmers, such as payments that that benefit other stakeholders under rural development programmes. On the other hand, farmers receive subsidies that come from both the EU and national budgets, so that focusing on EU budgetary sources does not give the full picture. A way to assess how much agricultural producers benefit from taxpayer's money is to focus on the subsidies actually received according to some statistical source.

Macro economic sources. Figure 33 shows the changes over time of agricultural subsidies as they appear in Eurostat's economic accounts between 1995 and 2010 for EU-15 so as to make historical comparisons unaffected by the enlargement. In 2010, agricultural subsidies (excluding investment subsidies) as reported in the economic accounts amounted to €56 billion. This figure includes both EU funded and national subsidies and includes Pillar 1 and Pillar 2 payments. The share of support in agricultural income has increased over time.

The economic accounts do not provide much detail regarding the types of subsidies. They only show that product related subsidies have gone down compared to other subsidies, mostly decoupled payments. Product specific subsidies now account for less than 10% of the total subsidies, while they represented 68% in 1995.

The shift from price support to decoupled payment has also made it more apparent that farm incomes depend heavily on public support. The share of subsidies in net income of farmers (net business income as measured by Eurostat) has increased from 48% in 1995 to 98% in 2009 (a year of low prices).

Figure 33. Farm subsidies in EU economic accounts as a percent of net income, 1995-2010

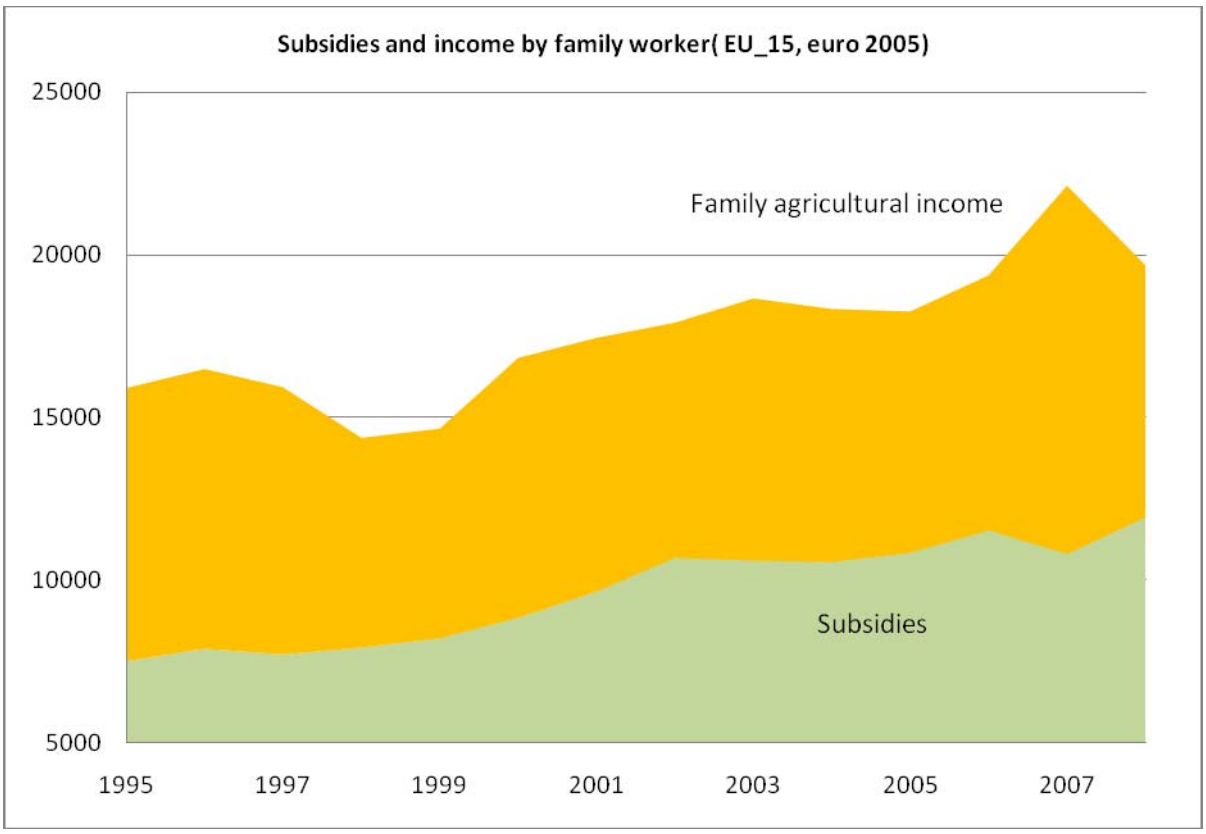


Source: Authors' calculation using Eurostat economic accounts. Income is defined as net business income (Eurostat definition).

Microeconomic sources. Figures from the FADN (accessible through http://ec.europa.eu/agriculture/rica/database/database_en.cfm) suggest that the total amount of subsidies received by EU15 farms amounted to €55.3 billion in 2008. This figure is therefore higher than the Eurostat information, but unlike the macroeconomic accounts, they include some €1.5 billion of investment subsidies. On the other hand the FADN information is an estimate based on a sample that does not represent small farms very well. The FADN makes it possible to identify subsidies that are linked to rural development programmes, i.e. pillar 2 payments. In 2008, decoupled payments amounted to €32.9 billion, while Pillar 2 payments amounted to €9 billion, mostly made of €4.7 billion of agri-environmental payments and €3.4 of payments for regions with a natural handicap.

Figure 34 shows the evolution (for EU15 Member States) of the subsidies (excluding investment subsidies) as a share of total income per family worker (income coming from agricultural activity). The evolution is rather similar to the one measured using the economic accounts. Subsidies per family worker went up from 7500 to 12000 between 1995 and 2008 in constant 2005 euro. Subsidies went from 47% of the family income in 1995 to 60% in 2008.

Figure 34. Farm subsidies in FADN (EU 15), 1995-2008



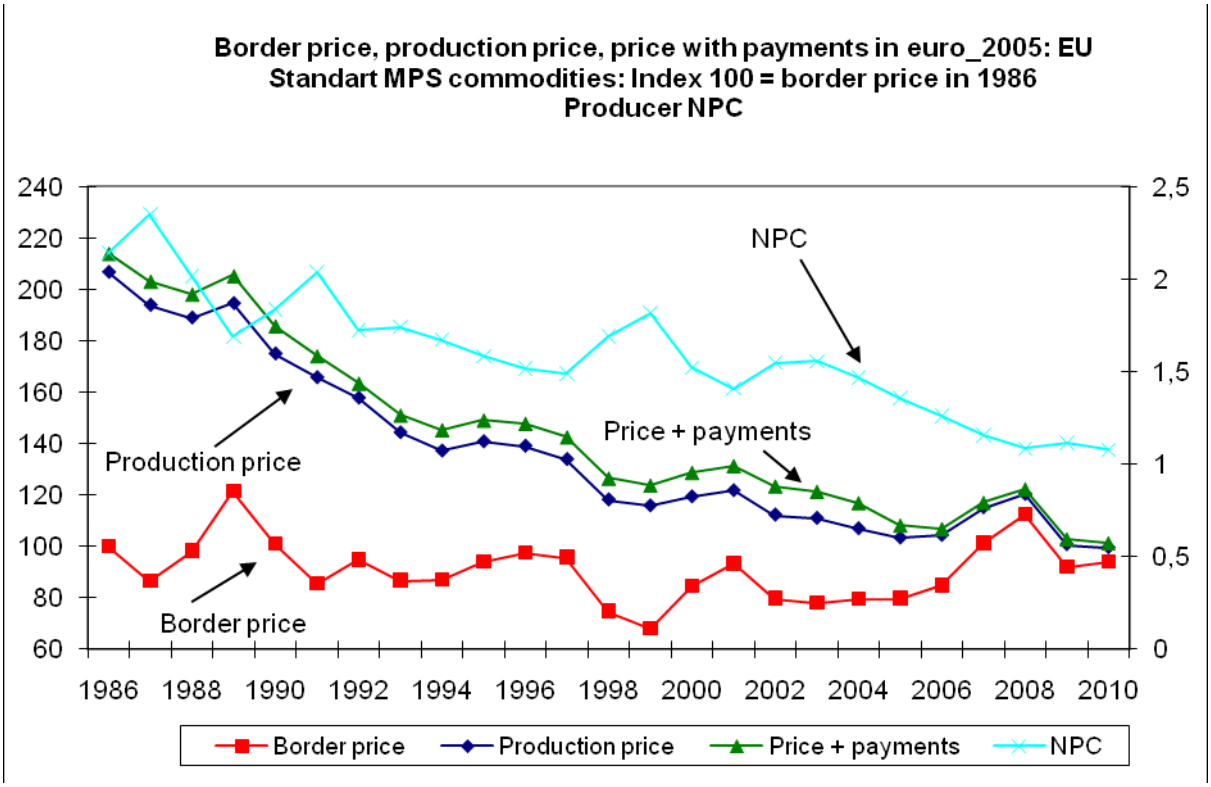
Source: Authors' calculation using EU FADN.

4.4. EU agricultural support: A picture based on the OECD information

Neither the EU budget data, nor micro and macro data on the subsidies received by farmers make it possible to take into account the agricultural support that goes through tariffs, guaranteed prices and production quotas. While the role of this support is likely to have decreased over time in the EU, it is still important in other countries. Ignoring it would not allow meaningful international comparisons. As argued in section 2.3.3 the OECD database is comprehensive, well documented and most suitable for this purpose.

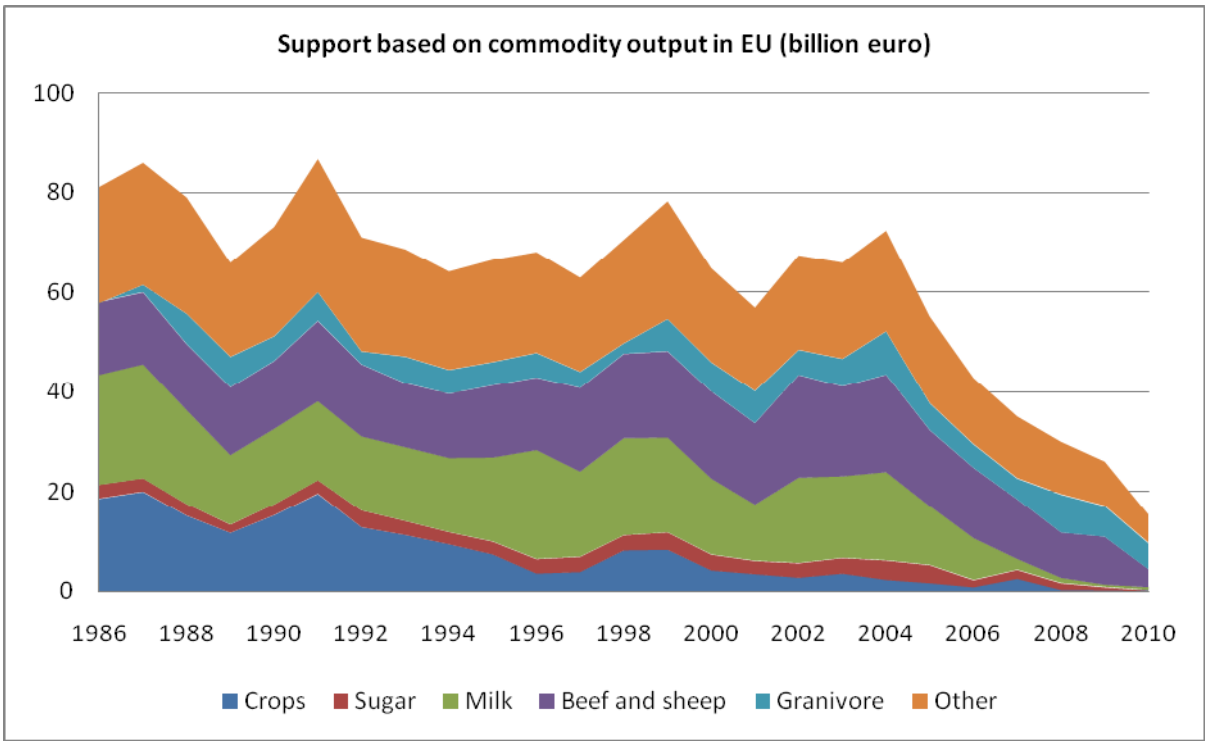
The reduction in market price support. During the 1990s, institutional prices have been brought down closer to world prices. In the 2000s, several of the institutional prices were eliminated altogether. However, during the recent period the changes in the market price support estimates calculated by the OECD also reflect a reversal in the historical downward trend in world prices (Figure 35). The EU nominal protection coefficient (NPC, i.e. the ratio between producer prices inclusive of subsidies and border prices) has been divided by more than two since 1986. The NPC is now slightly above 1, i.e. EU average domestic prices have approached world prices in spite of high bound tariffs. While the bulk of the support to EU agriculture in the 1980s was market price support, in particular for dairy, cereals, sugar and beef, the level of this kind of support has gone down considerably (Figure 36).

Figure 35. Domestic prices and world prices, EU, 1986-2010



Source: Authors' calculation using OECD PSE database. Note: the NPC calculated by the authors is different from the one calculated by the OECD (NPC stands for Nominal Protection Coefficient).

Figure 36. Changes in commodity specific support over time, EU, 1086-2010



Source: Authors' calculation using OECD PSE database.

Changes in direct payments. Producer prices for the set of commodities followed in the PSE dataset have experienced large fluctuations since 1999 but have shown a limited downward trend (Figure 35), which contrasts with the sharp fall experienced during the 1986-99 period. However, producers have received an increasing amount of direct payments, as a compensation for the decrease in institutional prices as well as further reforms. These payments have become increasingly decoupled.

In the OECD classification, payments per hectare or per head of cattle, from the 1992 reform are not considered as commodity specific support but as an aid to a group of products. These payments (excluding product specific subsidies) increased from 12 to 60 billion constant 2005 euro between 1986 and 2010. Until 2004, more than 80% of direct payments kept some link with production.[25] After 2005 the decoupling and greening of the payments through conditionality to good practices, led to a more production neutral system of support (Figure 37). This also shows that subsidies linked to variable inputs are still large. The main reason is that they include considerable tax exemptions for fuel, i.e. roughly €3 billion in 2010. Investment aids (fixed capital payments) are also important, even though they have decreased compared to the situation at the end of the 1980s.

In order to make comparisons with other countries simpler, Table 8 focuses on the main categories that account for most of the direct payments. In 2010, the main categories of agricultural support in the EU have been the Single Farm Payments and the Single Area Payment Scheme a total of €35 billion, but also the tax deduction for fuel, aid to modernization of farms (mostly in New Member States), less favoured areas payments, agri-environmental payments (roughly €3 billion each) and the sucker cow premium (€1 billion). All these payments account for three quarters of all payments (Table 8).[26]

Table 8. Main direct payments in the EU, 2010

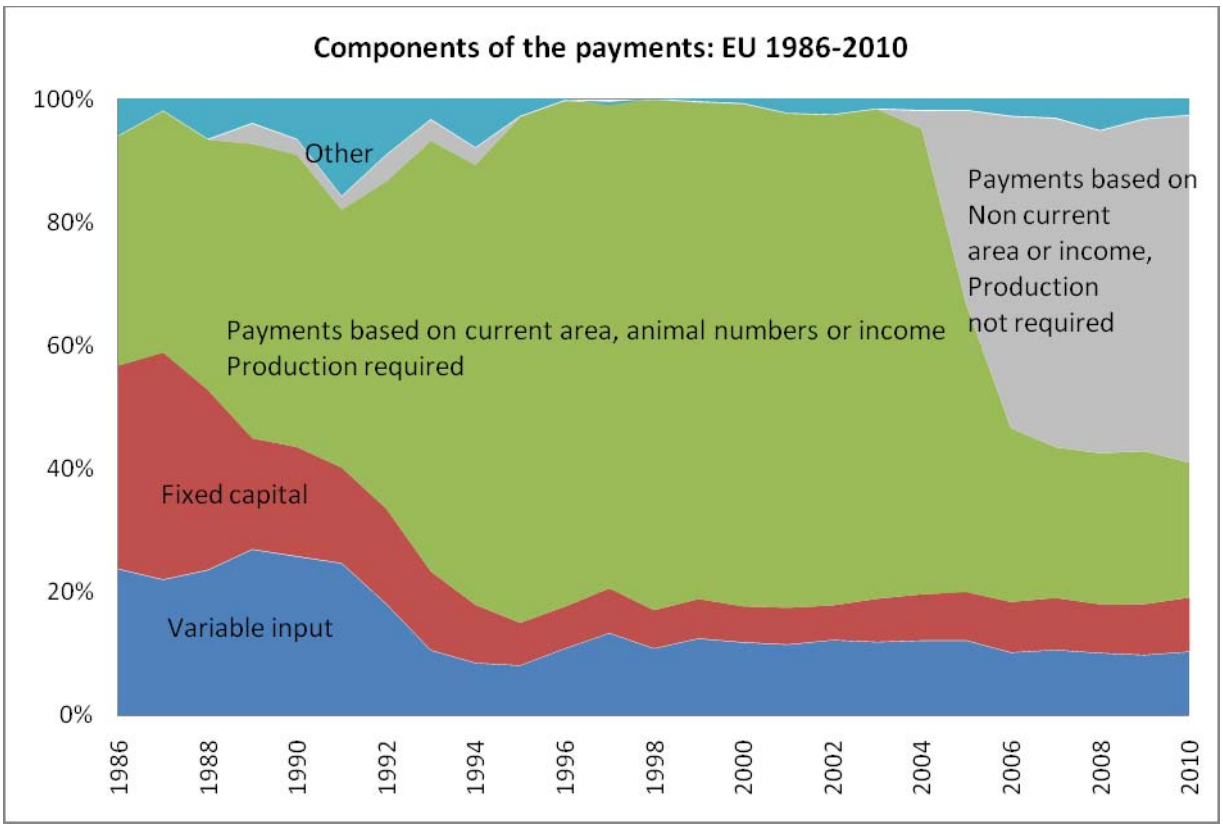
	EURO, MILLION	% CUMULATED
SPS + SAPS	35 525	54.8%
Fuel tax rebates	3 111	59.6%
Investment in agricultural holdings Pillar 2 + National expenditure	3 098	73.8%
Less-favoured area payments	3 071	64.3%
Agri environmental payments	3 047	69.0%
Suckler cow premium	1 007	75.3%

Source: OECD PSE database. National cofinancing is included in LFA and agri-environmental payments. SPS stands for Single Payment Scheme, SAPS for Single Area Payment Schemes (in New Member States).

[25] They were classified in the OECD nomenclature as "payments to surfaces, animal heads, linked to current receipts or income with production requirements". Note that this category includes agri-environmental measures as well as payments for less favoured areas. From 2005, a large share of the payments switched to the category "payments for surfaces, animal numbers, receipts or income without non-current production requirements".

[26] As noted in section 2.3.3, the OECD classification distinguishes payments with constraints on the use of variable inputs, which, for a part of them include environmental payments and payments to extensive grazing.

Figure 37. Changes in the types of payments to producers over time, EU



Source: Authors' calculation using OECD PSE database.

EU support to agricultural producers. The PSE combines direct payments and market price support, giving a global image of the transfers to producers generated by the CAP. The TSE includes general services, i.e. expenditures for the agricultural sector as a whole.

In real terms, the EU PSE was divided by two between 1986 and 2010, from 151 billion of constant 2005 euro to 71 billion, in spite of the enlargement of the EU.[27] This reflects both the changes in the CAP and the increase in world prices at the end of the period. If we focus on the 19 EU Member states that are also OECD members (EU19), so as to keep a constant geographical area over time, the decrease in producer support, both in real terms and as a percentage of receipts is even steeper. The percentage PSE has gone down from 39% to 20% over the period for the EU19 group (Figure 38).[28]

The composition of the PSE has changed dramatically, with a sharp fall of the product specific support, the decreasing role of market price support and the increase in other payments, which include the large component of decoupled as well as Pillar 2 payments.

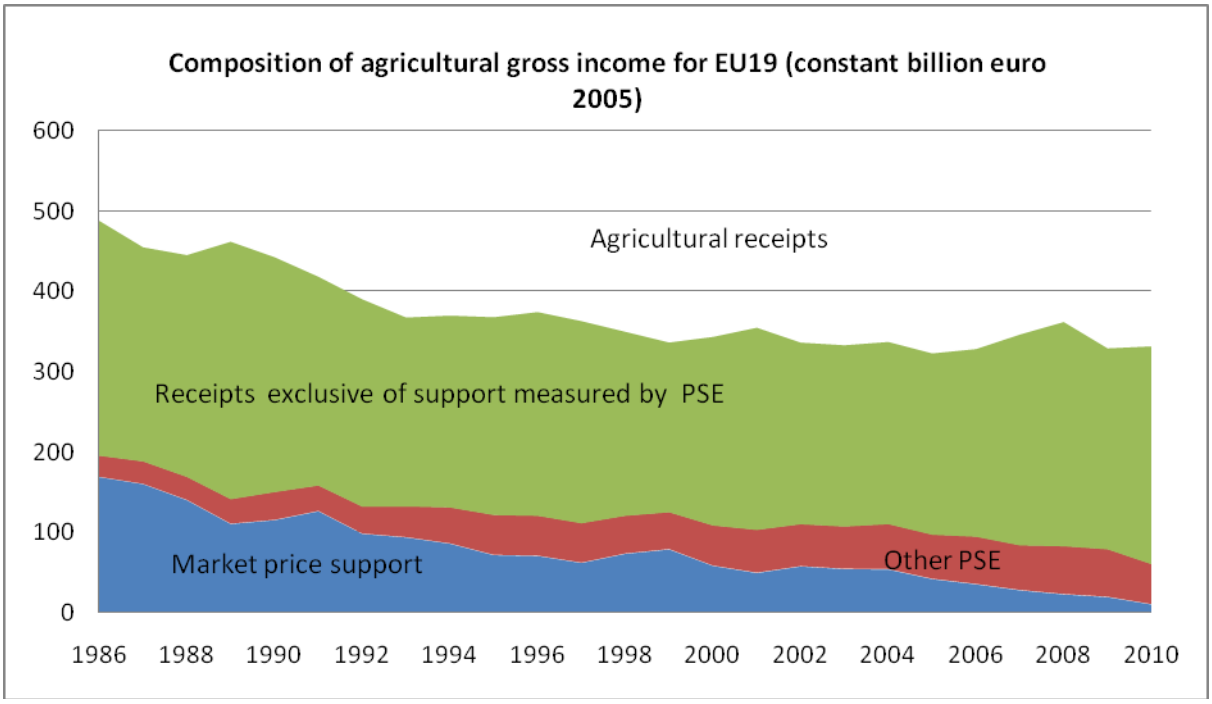
For the EU19 country sample (with OECD data since 1986), it is noteworthy that in real terms, agricultural receipts have fallen sharply prior to 1992. They have then remained rather constant since 1998 (Figure 38). The causes of this relative decline are multiple. One important cause is the contraction of the agricultural sector of some of the Central European members in the 1990s. Another cause is the fall in world market prices.

[27] In nominal terms, the PSE for the EU went from 86.6 billion in 1986 to €76.5 billion in 2010.

[28] A %PSE of 20% means that the estimated total value of policy transfers to individual producers from consumers and taxpayers represents 20% of total gross farm receipts (including subsidies), or, alternatively, that 20% of gross farm receipts come from transfers due to policy measures supporting producers.

Furthermore EU producer prices have declined due to refocusing the CAP away from production incentives (with the end of coupled support and export refunds in particular). Finally the apparent slowdown in productivity gains in the EU is also a possible cause (Butault and Requillart 2011). During recent years, the decline in market price support has been compensated by higher prices on world markets and with higher subsidies.

Figure 38. Farm receipts and share of support, constant terms for EU19

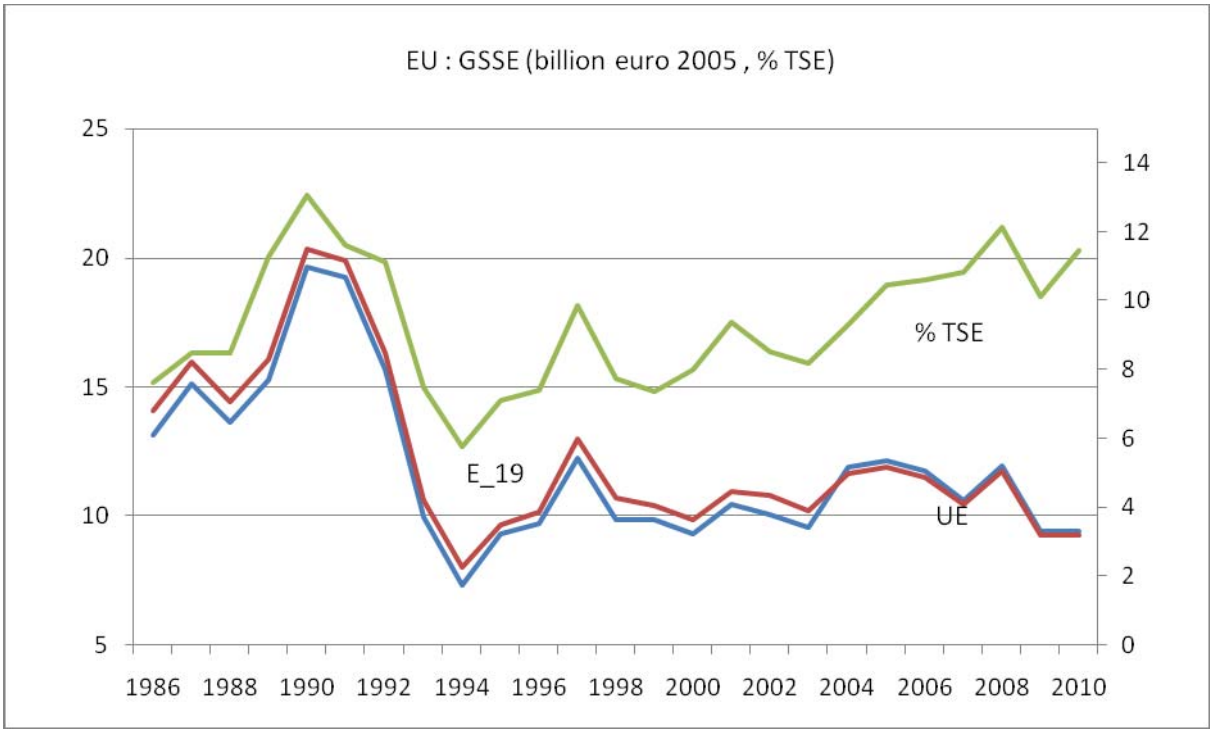


Source: Authors' calculation using OECD PSE database.

A global image of EU support to the agricultural sector as a whole. In the late 1980s, a sharp increase of storage costs, generated by the accumulation of surpluses encouraged by price support, lead to storage expenditure of €8 billion constant 2005 euros in 1990. The successive CAP reforms have progressively put an end to these storage expenditures (counted as general services). Overall, the budget devoted to the general services category has remained stable in constant terms since 2000, roughly €10 billion euros, mostly as research, education and infrastructures, as well as product promotion policies (Figure 39, Figure 40). Consumption subsidies reached significant levels in the early 1990s mostly because of the disposal of dairy surplus at the time, which was counted as consumption aid even though dairy products was reprocessed in feedstuffs and industrial products (€5.5. billion in constant 2005 euros in 1992). The amount of food aid for needy consumers is much smaller (€0.65 billion, including €0.5 billion funded by the EU budget).

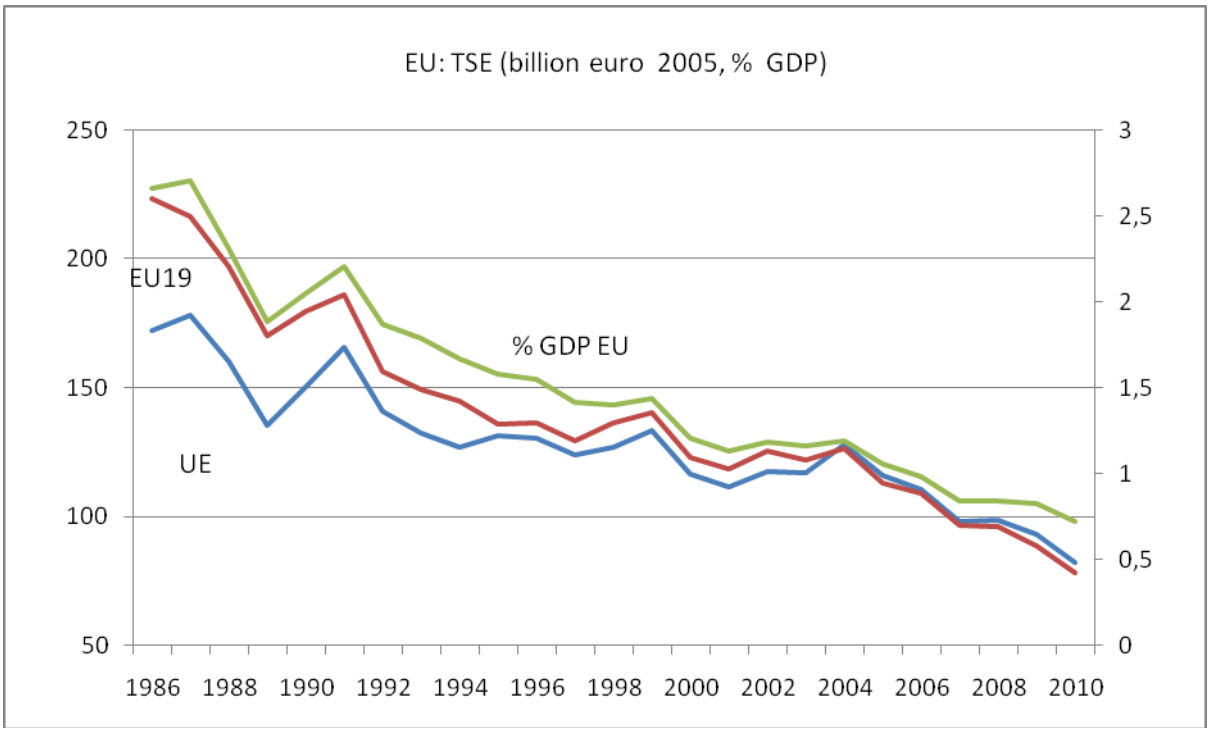
As it is the case for the support to producers measured by the PSE, the total support to EU agriculture as measured by the TSE has gone down in real value (Figure 39). The share of the TSE in the EU GDP has gone down from 2.7% to 0.7% over the period. This decrease is steeper than what one can observe looking only at budgetary figures, since the share of the support paid by the consumer has decreased dramatically (Figure 41). This shows the need to take into account of the support that goes through prices, and not to focus only on budget expenditure.

Figure 39. Evolution of the support granted to EU agriculture through general services, EU



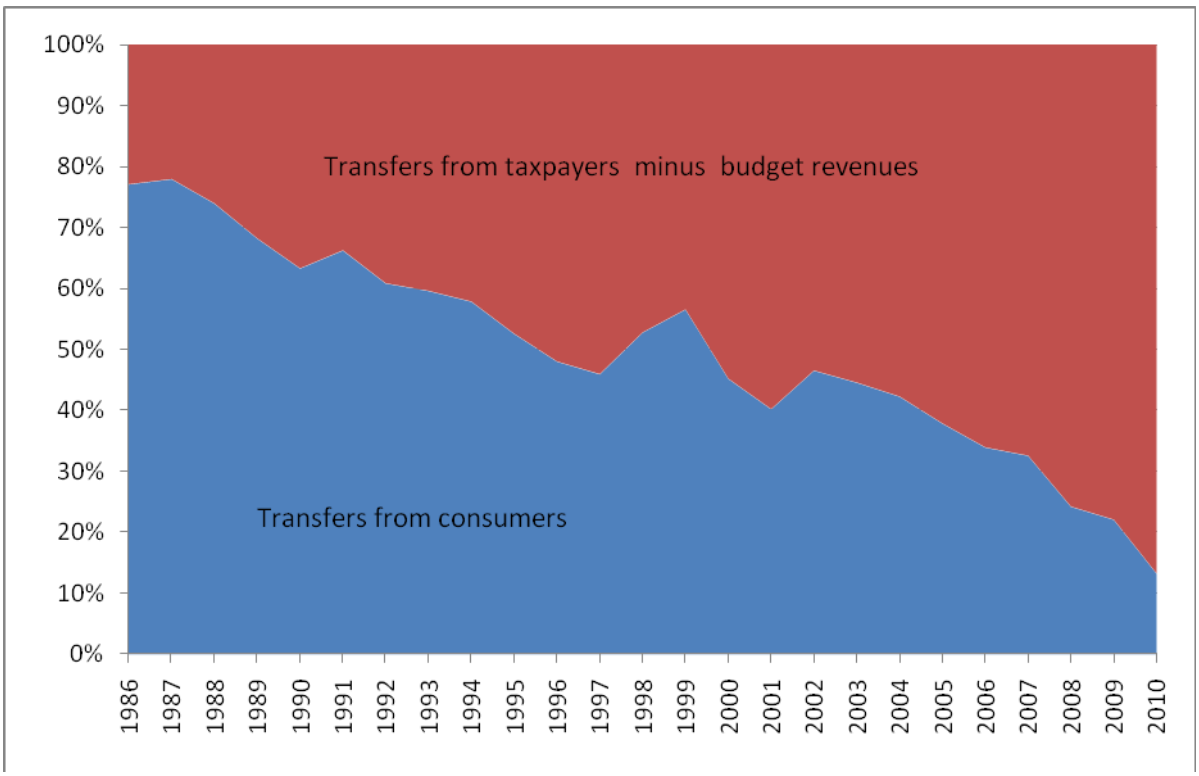
Source: Authors' calculation using OECD PSE database.

Figure 40. Evolution of total support estimate, EU



Source: Authors' calculation using OECD PSE database.

Figure 41. Composition of EU total transfers (TSE)



Source: Authors' calculation using OECD PSE dataset.

4.5. EU agricultural support: A picture based on WTO notifications

As explained in section 2.3.4 the measures defined under the auspices of the WTO, and in particular the Aggregate Measure of Support, is now largely disconnected from market realities, and has little economic significance therefore. The WTO approach is nevertheless interesting in the sense that it distinguishes the various forms of support according to their trade distorting nature rather than according to the way subsidies are provided, as in the OECD approach.

The EU support shows no decrease since 1995, if we consider the sum of the AMS, de minimis, Blue and Green Box support. The Amber box support fell sharply, but Figure 42 shows that overall, there has been a shift in the support from the Blue and Amber Box to Green Box measures over time. The AMS ceiling has changed over time, with the mandatory reduction decided in Marrakesh and then with the enlargements of the EU, now reaching €72.2 billion.

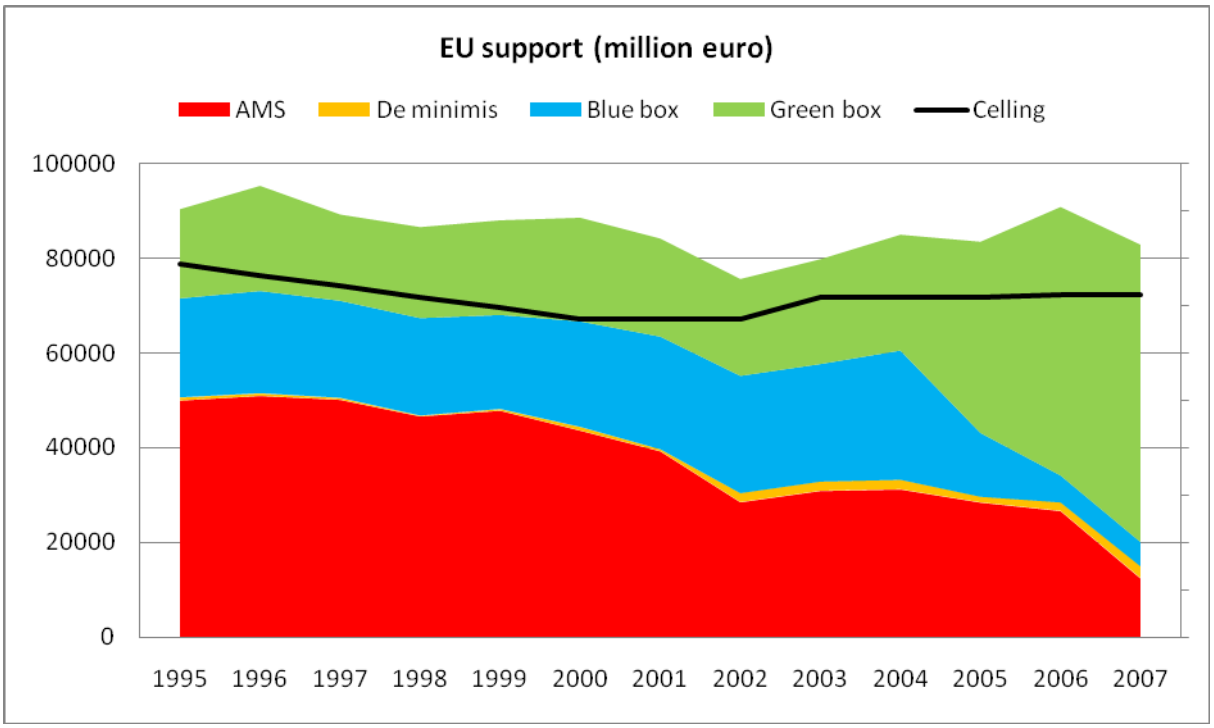
The successive reforms of the CAP have led to reduce strongly the Blue Box payments. The main reason is the decoupling of most of the compensatory payments that resulted from the 1992 and 1999 reforms, which are no longer linked to hectares or heads of cattle (Figure 42). In this category, there is now only the suckler cow premium and some payments under Article 68.

Amber box has gone down too, but the changes also reflect some changes in the methodology (Figure 43). In 2002, the end of the intervention price for beef led to a lower calculation of the beef market price support. New modalities of calculation have recently

taken some €8 billion out of the AMS, even though the reform of the sector has been limited. In addition, the EU is making an increasing use of the de minimis clause, which also makes it possible to exclude some support (e.g. €0.4 billion for maize for example) from the calculation of the AMS. In the most recent notification, the EU AMS was 12 billion, i.e. representing 17% of the overall ceiling. With the dismantling of some intervention prices for coarse grains, it is likely that future notifications will be even lower.

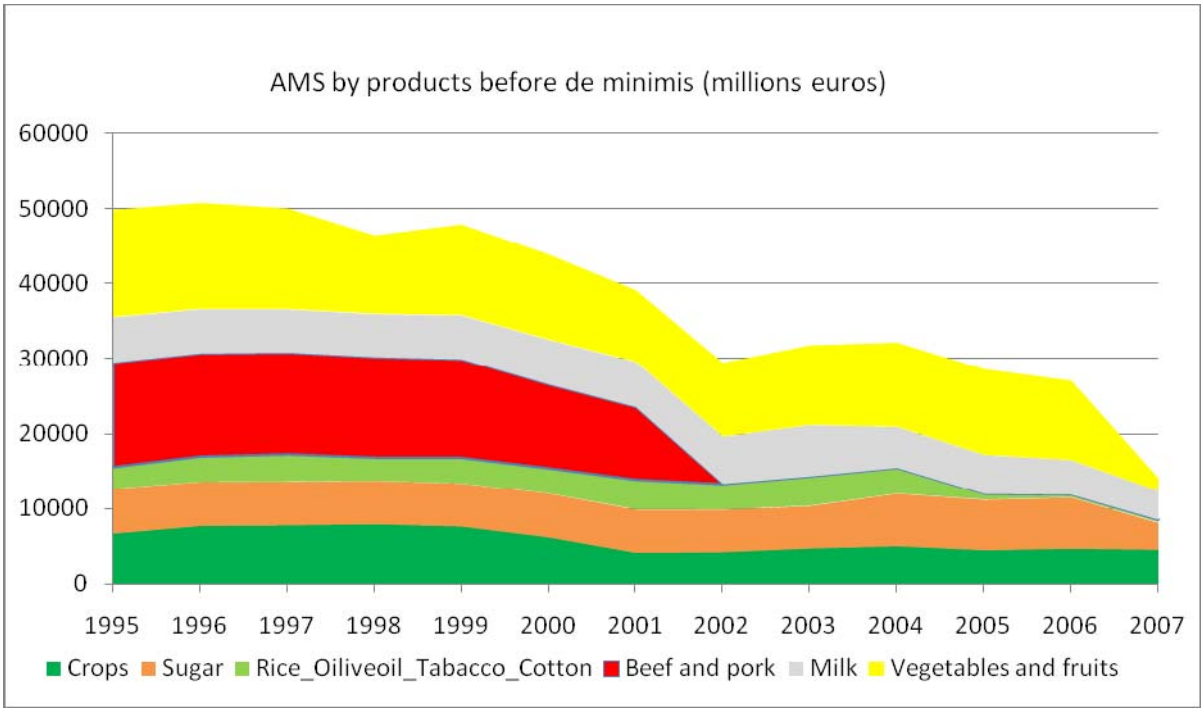
Over the 1995-2007 period, support under the Green Box increased from €19 billion to €62 billion, including 34.5 billion for the SFP and the SAPS. The other large components of the green box include investment aids (€7.5 billion), environmental measures (€6.3 billion) and regional aid (€4.5 billion). The parallel increase in the Green Box and decrease in the Amber and Blue boxes is criticized by third countries, questioning the classification of some payments as being production neutral, given the wealth and insurance effects associated to any direct payment, and given the direct assistance provided by some significant forms of support (less favoured areas, investment aid, for example).

Figure 42. Support under the various WTO categories, EU, 1995-2008



Source: Authors' calculation using the WTO notifications.

Figure 43. Composition of Amber Box support, EU, 1995-2008



Source: Authors' calculation using the WTO notifications.

4.6. The issue of the EU biofuel programme

In the EU, with the progressive dismantling of most market price support instruments, biofuel policy now appears as a major way to support feedstock prices and therefore the income of producers of rapeseed, sunflower, wheat, maize and sugar beets. However, this form of support is not reflected in the measures adopted by the WTO and the OECD.

The EU biofuel programs de facto support prices in a way that shows similarity with the economic mechanisms that characterized farm support of the 1980s, i.e. guaranteed prices thanks to, public purchases and subsidised exports. Indeed, as argued by Bureau et al (2010), biofuel policies can be seen as re-introducing price support through the backdoor, i.e. outside the formal agricultural policy. There are nevertheless differences with former policies, namely regarding terms of trade effects and the distribution of costs and benefits between stakeholders.

Because of the budgetary cost of tax credits and subsidies, there has been a shift towards mandatory incorporation of predefined quantities of biofuels in transport fuel in many EU countries over the recent years (Bureau et al. 2010). As a result quantitative targets are now the main driving force of biofuel. What now appears as the major driver for EU biofuel production is the 2009 Renewable Energy Directive which sets a 10% compulsory target for renewable fuels in transport fuel.

It has been suggested that the effect of biofuel policies should be taken into account in the measurement of farm support in various forms where agricultural policies and subsidies are monitored and disciplined (Steenblik, 2007). Howse et al (2006) examine the compatibility of biofuel tax credits and tariffs WTO agreements and question their qualification as distorting subsidies. Josling et al (2010) also raise technical issues which oppose making biofuel support subject to WTO discipline. The incidence of biofuel subsidies, which are

provided at different level of the supply chain, is difficult to assess due to complex pass-through between blenders, processors and farmers. Their opinion is also that the incorporation of the subsidy effect of biofuel mandates into the PSEs is questionable. The objective of the PSE is to measure the impact on producers of the actions of their own government, and it would be difficult to endogenize the (world) reference price, for both conceptual and political reasons.

Bureau et al (2010) attempted to assess the level of support to EU agriculture that is implicitly provided by the EU renewable mandate. They had to use a special version of a large scale general equilibrium model in order to account for all the market interactions on the food, bioenergy as well as the feedstuffs markets. While their results cannot be the basis of a formal accounting of the farm support impact of biofuels in synthetic indicators such as the PSE and the AMS, it sheds some light on the amounts implicitly transferred to farmers.

They consider the case of support to rapeseed producers through the bioenergy mandate. Considering the structure of the current EU industry and substitution effects the EU biofuel mandate, through its biodiesel component, is equivalent to a 22% increase in the EU rapeseed production price compared to the reference situation. They then compare this benchmark scenario to a counterfactual scenario in which the EU supports rapeseed producers with a system of coupled direct payments, like the one that characterized the EU oilseeds policy in the 1980s. In order to obtain a similar price for EU rapeseed producers, at oil price of 60 US$ a barrel, the corresponding payment would have to reach €1.5 billion.

Supporting agricultural producers through such an outlet do not put the burden of the support on the same stakeholders. Should rapeseed producers be supported by a system of direct payments instead of the biofuel mandate, the EU price of diesel blend would be 2.7% lower for consumers (on an energy equivalent basis). Because of the subsidy to crushers, the price of rapeseed paid by the food industry would also be much lower (-22.7%). That is, the cost of farm support through biofuel policies is paid by diesel consumers and users of the feedstocks in the food and feed industry, rather than taxpayers. The international consequences are also different. Indeed, if EU rapeseed producers were supported by a direct payment, rather than a biofuel mandate, the world price of rapeseed would be lower by 12%. That is, biofuel policies can hardly be counted as a distorting price support detrimental to third countries producers. Indeed, the channelling of rapeseed away from the food market results in higher prices for oilseeds, which spills over into several other crops, either through demand substitution or through supply substitution effects. Foreign consumers, however, lose out due to the higher price of vegetable oil that is induced by the non-food use demand driven by the EU mandate. At USD 60 a barrel of oil, the overall welfare at world level is USD 8.9 billion lower with the EU mandate, the cost being mostly borne by EU consumers (Bureau et al 2010).

4.7. Conclusion

Several conclusions can be drawn from the examination of EU agricultural support.

From the methodological point of view, the various measures of agricultural support converge in the sense that they all show a decrease in the level of farm support over time in the EU. Measures that account for the support to producers granted through guaranteed prices show a steeper decline than those indicators that focus only on the budgetary aspects (e.g. approaches based on the EU budget) or that focus on subsidies actually

received by farmers (e.g. sectoral account or microeconomic data sources) due to the progressive shift of some of the support paid by consumers to support paid by taxpayers

The focus on the EU also validates the methodology defined in Section 2, i.e. which relies on the OECD dataset and uses a version of the PSE and the TSE in real terms. This approach gives a perspective on the level of support which, we believe, is particularly comprehensive. On the other hand, the OECD classification of the various forms of support, based on the way support is granted, is not fully satisfactory when one wants to assess the distorting nature of support. A distinction between general services, environmental payments, decoupled payments and transfers (coupled payments and price support) that maintains incentives to produce can nevertheless be done from the detailed categories of the OECD classification.

On the nature of EU support. The real PSE and TSE indicators show a steep decline of the volume of support in the EU over time. If we consider the AMS, which only focuses on coupled support, the decline is steeper, but it is partly caused in changes in the mode of calculation of the support (for beef and for fruits and vegetable) over time.

The analysis of the nature of EU support shows a strong reduction of the most distorting forms of support. Price support, which was once the main component of the CAP, has largely disappeared. Unlike in some other countries like the US or Canada, the reduction in market price support is not predominantly due to the recent rise in world prices. In the EU, policies have been reformed and the instruments to support prices have largely been dismantled. Coupled payments have also been reduced considerably.

5. COMPARING EU AGRICULTURAL SUPPORT WITH SELECTED OTHER COUNTRIES

KEY FINDINGS

- A comparison of the EU support to those provided by the US, Canada and Switzerland provides some useful information for the current debates on the future of the CAP.
- The **US** supports its farmers **at a lower level** than the EU does. However, the US support **still relies on market distorting instruments**, while the EU has shifted towards production neutral payments that have little impact on third countries.
- The low level of **US** and **Canadian** support are partly caused by the fact that their **support has remained largely countercyclical**. While transfers to farmers have been low during the recent period, instruments are **not dismantled** and could lead to much larger level of support in more adverse market conditions
- The US programmes of **domestic food aid and biofuel** now play an important role in supporting farmers. These programmes are not subject to the international discipline on domestic support.
- Both the US and Canada farm support rely more on **insurance** and risk reduction schemes than the EU one. However, the economic **efficiency of these transfers is uncertain**, compared to the EU direct payments.
- Agricultural support remains high in **Switzerland**, thanks to high tariffs and generous direct payments. There has been a considerable reorientation of support towards the provision of **public goods.** The Swiss policy has gone further than the CAP in conditioning support to **environmental** practices.

In this section we use the indicators defined in section 2 and in particular the real PSE and the TSE calculated on the basis of the 2005 PPP, expressed in US dollar. Except when there is a reference to other sources (i.e. WTO notifications or domestic sources such as the USDA data), the original data used in the construction of the indicators come from the OECD database. As the classification of payments used by the OECD is not satisfactory for an assessment in terms of economic consequences, we draw in terms of classification both on OECD as well as WTO concepts.

5.1. Agricultural support in the United States

Agricultural support in the US has been the topic of a specific study published by the European Parliament (EP, 2008). The US agricultural policy is defined by a "farm bill" on a regular basis (in general five years). The US agricultural policy combines several instruments, with a mix of direct payments, coupled support through guaranteed prices (dairy, sugar) and a set of target prices and subsidies that adjust to market conditions for most of the crops.

The US agricultural policy is far from being as coherent as the EU one. Over time, there has been some reversal in the general orientation of moving towards less distorting forms of support, while the EU has been more consistent. The US policy also maintains multiple instruments that tend to overlap. One reason is the dominant role of the US Congress,

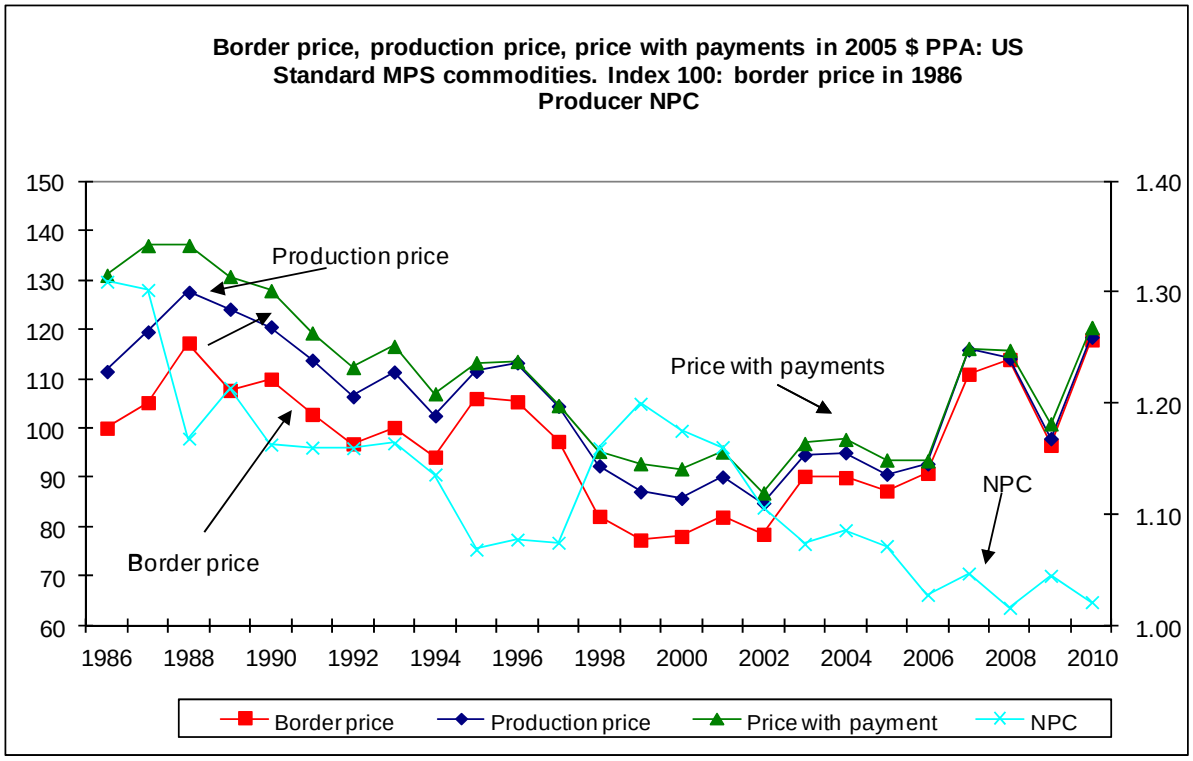
subject to lobbyism and political clientelism. In particular, the 2002 and 2008 farm bills have introduced extra programs that intend to compensate farmers in adverse situations of agricultural production or markets (see EP, 2008). As a result, the US agricultural support is a multi layer system of payments, particularly complex and whose cost efficiency has been questioned (in particular regarding the insurance system, see Babccok 2008). A major difference with the EU is that it tends to isolate producers from market signals by providing payments that vary with market prices.

5.1.1. Market price support

The Nominal Protection Coefficients (NPC, i.e. the ratio of the domestic price inclusive of payments and the border price) for wheat and sugar have reached high levels in the past. For cotton the NPC was still 1.4 in 2004, for example (Figure 44). During the last period, most of the gap between domestic and international price disappeared. However, this has been caused much more by the combined effect of high world prices and the low level of the US dollar than by a change in policies.

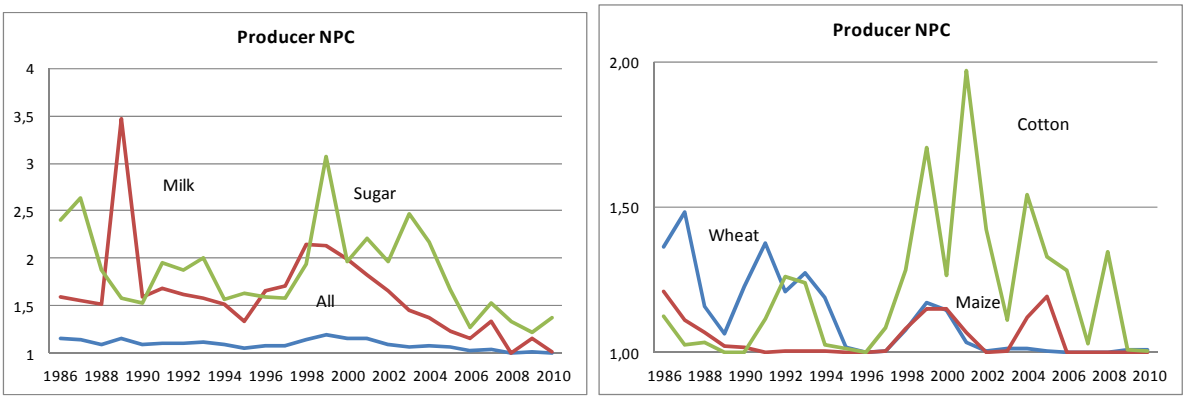
Support is very limited for meat, fruits and vegetables, but sugar and dairy are still benefitting from price support (Figure 45). Arable crops are supported by several layers of subsidies, one of them (marketing loan rates) being fully coupled to production. It is noteworthy, though, that because a large share of the US agricultural support is dependent on low world market prices, the instruments have been rather inactive during the last years, explaining the low level of agricultural support measured by most indicators of support. For example, there has not been any coupled payment for maize since 2005. A problem with standard indicators of support, in particular those from the OECD or WTO, is that they show a decline in the level of support while the instruments are still in place and could potentially generate large payments, if world market conditions changed.

Figure 44. Evolution of price support over time in the US, 1986-2010



Source: Authors' calculation using the OECD dataset.

Figure 45. Evolution of US NPC, selected commodities, 1986-2010



Source: Authors' calculation using the OECD dataset.

5.1.2. Direct payments

Note that US agricultural support policies are described extensively Section 2 of the 2008 European Parliament report (EP, 2008; Debar 2008, Diakosavvas 2011). Appendix 5.1 to this section gives a review on the support for commodity program crops.

Not all direct payments are decoupled in the US system. In addition to the system of marketing loans and the corresponding payments to farmers, one can distinguish a system of counter cyclical payments, as well as insurance payments, emergency payments and the ACRE (Average Crop Revenue Election) and SURE (Supplemental Revenue Assistance) systems (see Appendix 5.1). A major characteristic of the US agricultural support is the emphasis on the protection of farmers against climatic and market fluctuations.

Decoupled payments. A series of direct payments was put in place under the 1996 Act. Like EU decoupled payments, it was initially a compensation for a cut in intervention prices. Since 2002, these payments have been based on historical references. These references are nevertheless product specific, unlike the EU Single Farm Payment. The budgetary expenditure for these payments corresponds to some US$5 billion annually. It is noteworthy that the decoupled nature of these payments and the eligibility to the Green Box in WTO notifications was challenged by Brazil in the particular case of cotton.

CCPs. The 1996 agricultural act had introduced a large degree of decoupling in farm payments, setting an example that many countries followed, including the EU. However, during pre-election years, at a time where the Clinton administration experienced political difficulties (impeachment procedure), the US Congress introduced a series of coupled payments in the beginning of the 2000s in order to respond to the situation of low international prices and a strong US dollar. These payments were granted on the basis of the 1996 historical production. In the OECD classification they are considered as payments on a historical basis without compulsory production, but in the WTO they were not notified under the Green Box due to the fact that they depended on world prices for a particular crop (Appendix 5.2.). The 2002 Act made these exceptional payments part of the US policy as "countercyclical payments" (CCPs). These payments compensate the differences between a target and production price and are based on a historical acreage references. These CPP represent significant expenditure. So far the US has notified these payments under the Amber box.

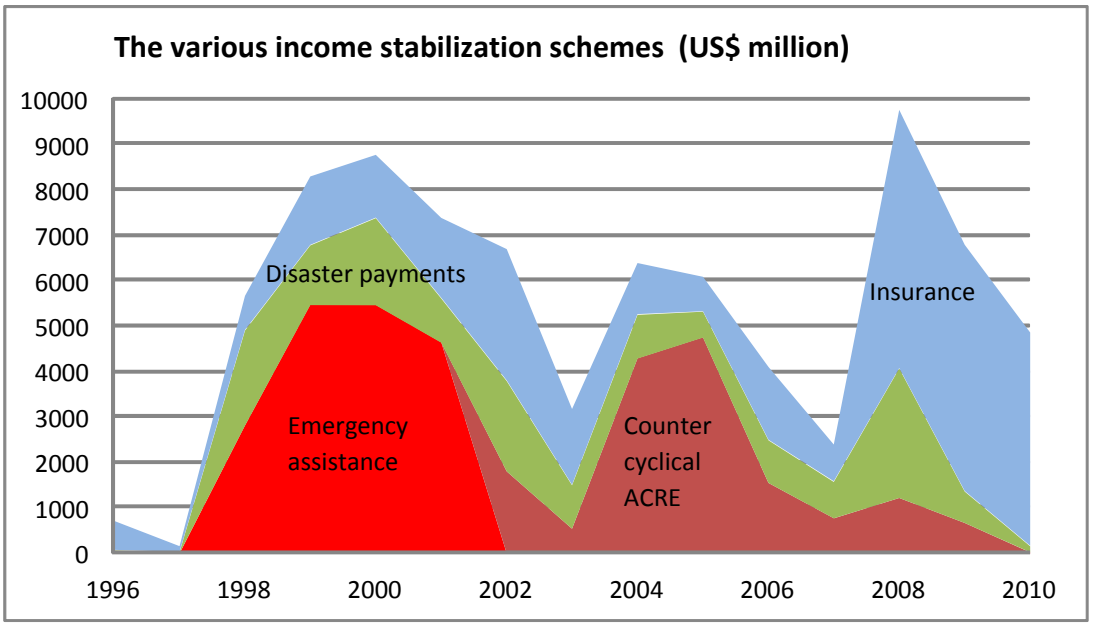
Other programs. Since the 2008 Act, payments stabilize farm receipts on a multiannual basis. This is the case of the ACRE program, which guarantees 90% of the historical receipts of the farm, provided that farmers give up CCP and 20% of the direct payments as well as a fraction of other variable payments (see Appendix 5.1.). The corresponding expenditure is notified under the Amber box. In the current context of high prices, this program has not been attracted many farmers and expenditure have remained limited.

The US agricultural budget also shows that extra budget appropriations to compensate the losses of a particular sector are decided on an ad hoc, but regular basis. Indeed, through multiple ad hoc programs, Congress has consistently provided farmers and ranchers with significant subsidies in case of weather-related production losses. In practice, supplemental budget appropriations have become rather systematic in the 2000s. This adds to the impression from the history of US farm bills that the US authorities will alter legislation as soon as farm income is under pressure, creating expectations for farmers that, regardless of the situation, the government will support them. This is a difference with the EU. Indeed, the EU budget does not allow for the same type of "supplementary appropriations" that can top the planned expenditures. The Commission makes use of all available instruments when the market situation or a natural or animal health-related crisis creates a demand, but this has to be done within stricter budgetary lines. The impacts of the expectations that are created by the frequent supplementary appropriations are unclear, but it is likely that they generate an incentive to increase production in uncertain times (for more details on these supplementary appropriations see EP, 2008).

Agricultural support also takes the form of public funding of insurance schemes, covering production losses, natural disasters, price fluctuations or lower receipts in general. These programs are detailed in EP (2008, section 3.4). The corresponding expenditure fluctuates a lot between different years, but the amounts are sometimes large (US$5 billion in 2008). These payments are crop specific and depend on current receipts, justifying notification under the Amber box.

Taken together, this multiple layer of programs that compensate farmers for adverse situations involve considerable amounts at certain periods (see Figure 46). Some programs are inactive in the context of recent world prices but they might generate large budget expenditure in a situation of falling world prices.

Figure 46. Expenditure under the various schemes that compensate farmers for losses



Source: Authors' calculation using USDA-ERS data.

Environmental payments. Agricultural support in the US also takes the form of payments whose primary objective is to support environmental conservation. The US environmental policy is described extensively in a European Parliament report EP (2008, section 3.5; and Diakosavvas 2011). It consists mostly in:

- The CRP (Conservation Reserve Program) whose initial objective was to limit erosion, but which also plays an important role in the preservation of biodiversity. Farmers set aside land for conservation programs for 10 to 15 years, and receive an annual payment. In 2009-2010, these payments led to budget expenditure of US$ 2.5 billion a year.
- A program of conservation of wetlands (US$ 0.5 billion)
- The EQUIP (Environmental Quality Incentives Program) that promotes environmentally friendly practices (US$1 billion).

While these programs involve large budgets, their decoupled nature is unquestioned. Indeed, they are strongly linked to a concept of conservation that relies on the notion of "land sparing" rather than the EU notion of "land sharing". In the EU, environmental payments compensate farmers for actions that are compatible with (potentially reduced) production, and in some cases, generate windfall gains. By contrast, the production effects of US payments which require giving up production are less questionable than those from EU Agri Environmental Schemes or environmental measures under Article 68.

5.1.3. Total PSE and the changes in income

While the OECD dataset has no equivalent and provides an excellent source of information, the OECD classification of the various forms of support does not provide an accurate image of the nature of US support, in particular regarding the countercyclical and therefore market distorting nature of the support. Indeed, such payments are classified with

payments that do not generate distortions by the OECD, whose classification is based on the criteria for allocating payments rather than on their distorting nature, while they are rightly treated as distorting payments in the WTO classification.

Figure 47 shows the evolution of the PSE according to the nomenclature of the OECD and in a hybrid nomenclature taking into account the objectives of U.S. policy. This hybrid classification uses a combination of the USDA-ERS classification and the WTO classification of the various forms of support. It distinguishes the following types of support: (i) Payments directly linked to actual outputs, including compensatory payments before 1996 ; (ii) The various schemes that provide insurance against variations in farm receipts; (iii) Decoupled payments, including payments for cessation of production; (iv) Environmental payments;[29] (v). Other payments to inputs.

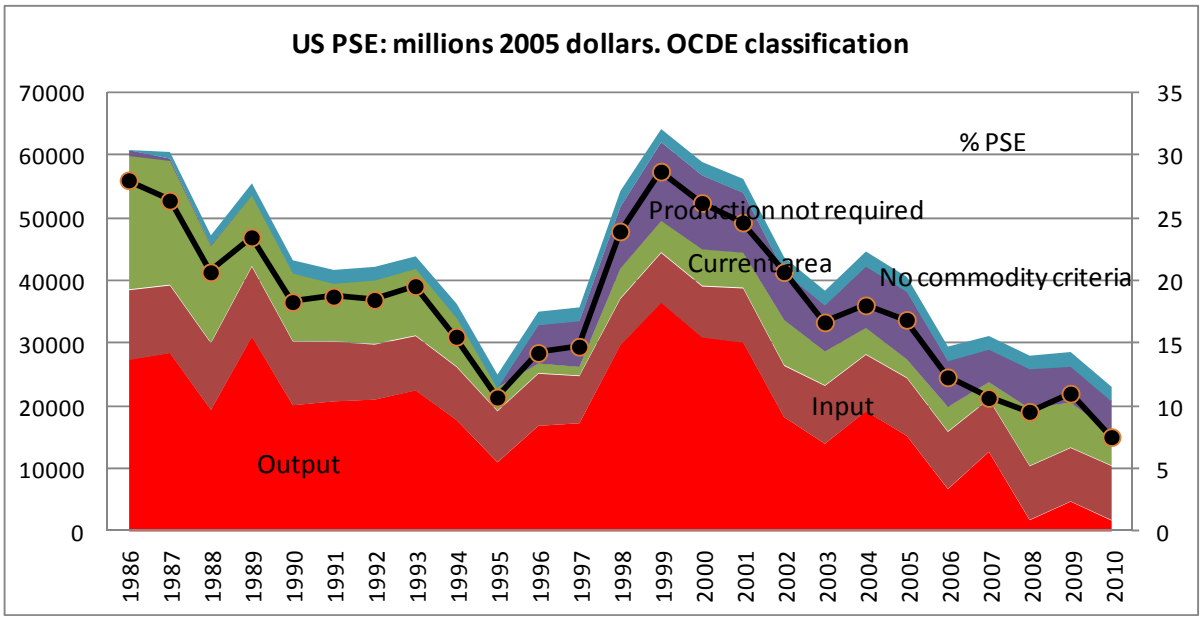
From 1986 to 2010 the PSE increased from US$38 to US$25 billion in the US in nominal terms, which corresponds, in real terms a reduction of over 60%. The share of PSE in revenue went down from 28 to 8% (Figure 47).

During the recent period, there has been a clear shift from direct support to production towards support that addresses income variability. The recent raise in world prices and the depreciation of the US dollar against major currencies explain that these schemes have been rather inactive at the end of the period, compared to the level reached at the end of the 1990s (Figure 47). While this shows the flexibility of the US agricultural support and its adaptation to market conditions, it is noteworthy that under more adverse price and exchange rate situation, US payments to farmers would increase. In addition, it shows that support that isolate producers from market signals and that tends to transfer the cost of market fluctuations on third countries are an important part of US farm policy (see the item "PV" in Figure 48 which shows that the payments indexed on market situation and farm receipts can vary a lot from one year to another. Variations might even be larger with the instruments such as the ACRE program that were implemented in 2008 (See EP, 2008 for an assessment of the possible magnitude of the ACRE and SURE payments).

The steady growth in the volume of agricultural production also explains that, when expressed as a percentage of production, the PSE tends to go down. Figure 49 shows that market receipts have grown much more than payments to farmers over the last period. Market price support now represents only a tiny share of farm receipts. Net agricultural income, as defined by the US Department of agriculture, is more volatile, but it also tends to increase towards the end of the period considered (Figure 50). In recent years farm income therefore benefits less from public payments in the US than in the EU.

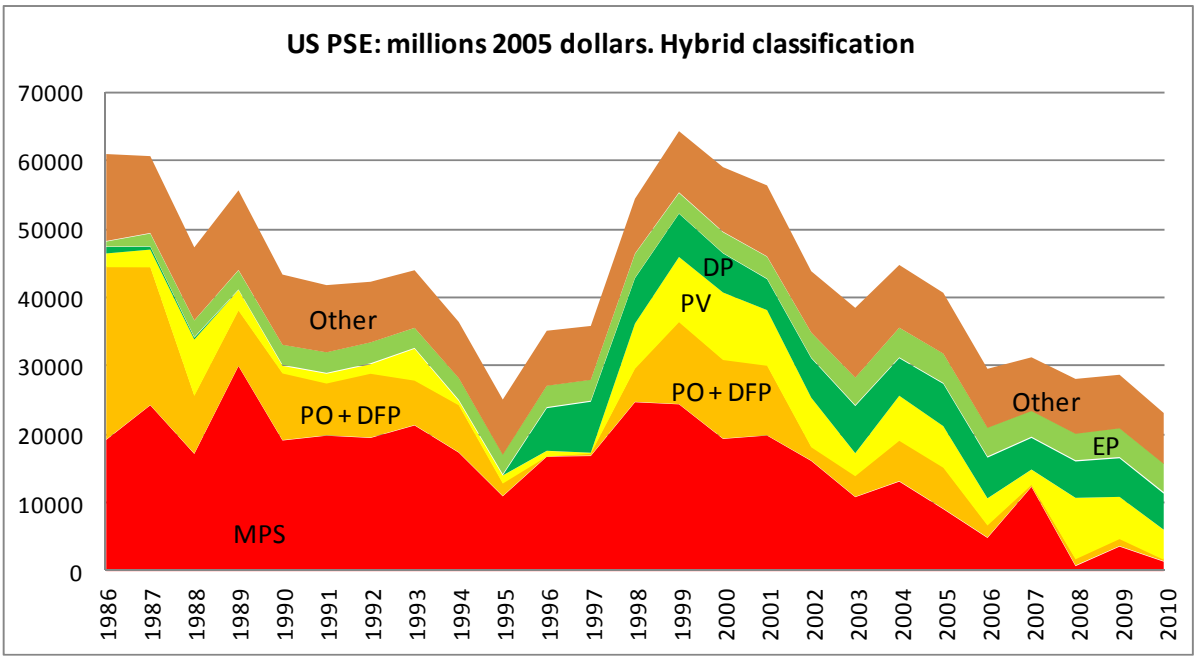
[29] It is noteworthy that in the USDA database, the level of these payments is lower than in the WTO and OECD dataset due to the fact that technical assistance to farmers is included in the latter.

Figure 47. Changes in the composition of US support to agriculture, OECD classification, 1986-2010



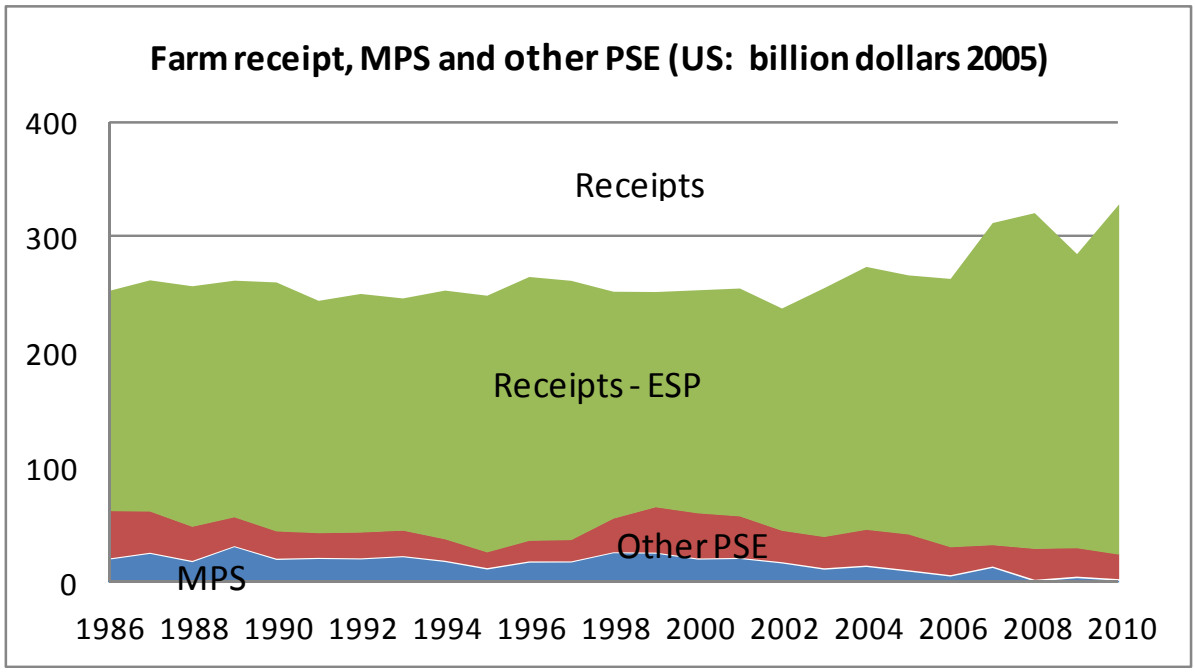
Source: Authors' calculation using the OECD dataset. The percentage PSE is indicated by the black line.

Figure 48. The use of an ad hoc classification of payments. Changes in the composition of US support to agriculture, 1986-2010



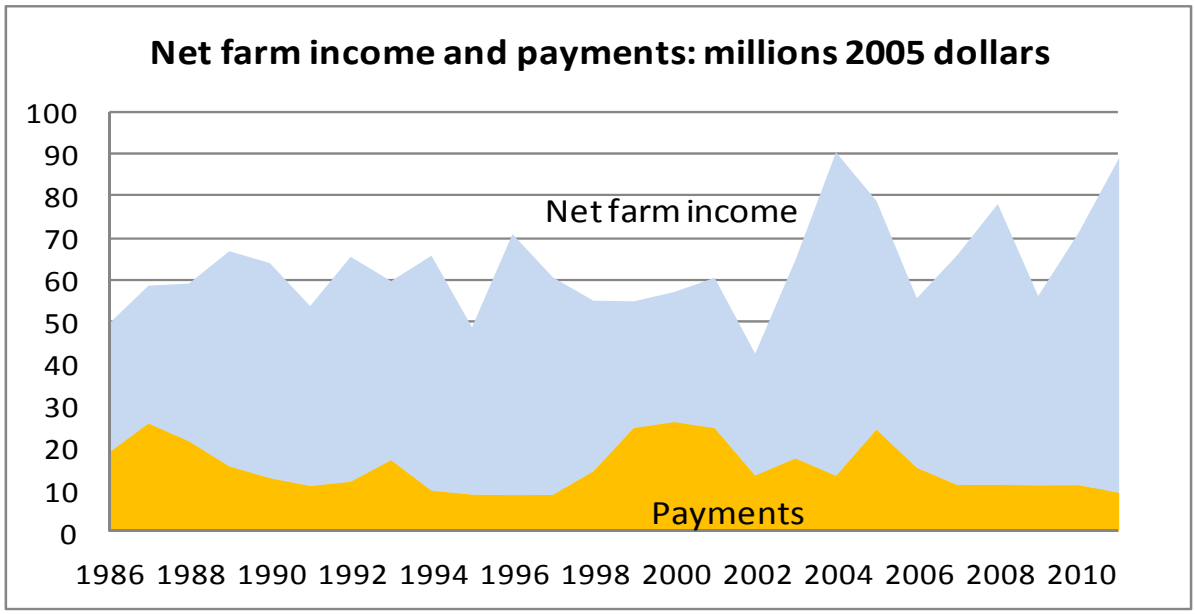
Source: Authors' calculation using the OECD dataset. PO + DFP: payment on output and deficiency payments before 1996. PV: payments indexed on market situation and farm receipts. DP: decoupled payments. EP: environment payments.

Figure 49. Farm receipts and the level of the US PSE, 1986-2010



Source: Authors' calculation using the OECD dataset.

Figure 50. Changes in the US net farm income and total payments, 1986-2010



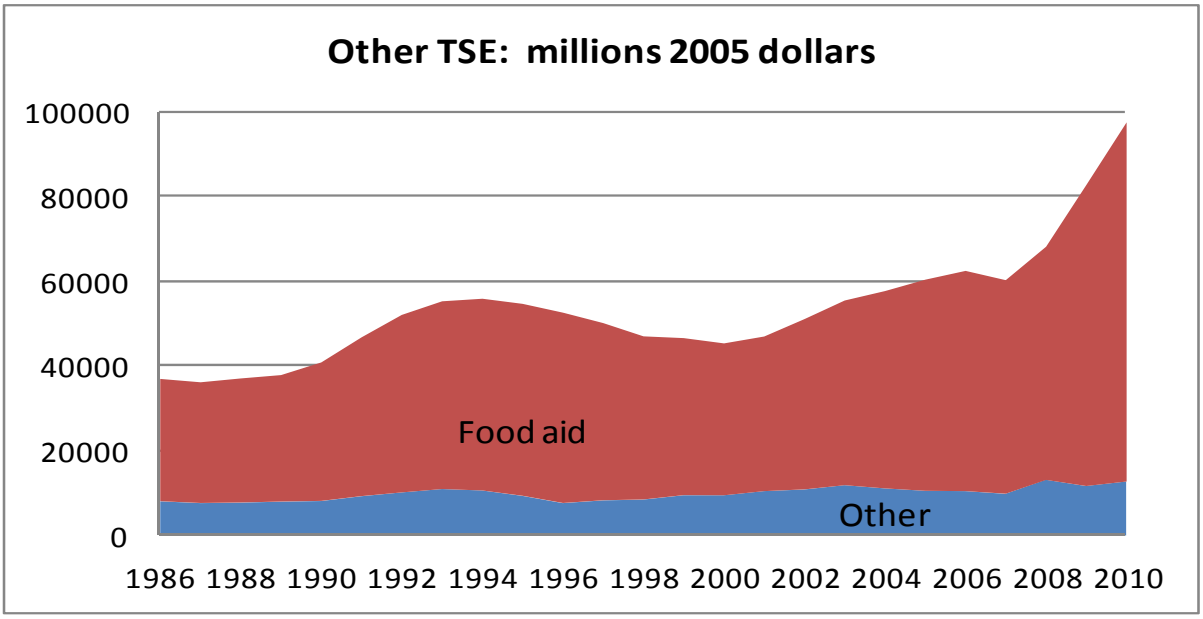
Source: Authors' calculation using USDA-ERS data.

5.1.4. Other transfers and food aid expenditure

When one wants to estimate the amount of the other transfers to agriculture in the US, the result is highly dependent on the treatment of the food aid program. Figure 51 shows that most of this component of the TSE is actually composed of the food aid payments which have increased in 2010. Food aid drives prices up, by generating a demand for food products. Hence, it is an indirect way to support farmers. However, other programs in other countries, from standard welfare payments to biofuel mandates, also boost demand. As we

explained in Section 2, the classification of the US$94 billion of the "Food Stamp" program (now called "Supplemental Nutrition Assistance Program" since 2009) in "General services" by the OECD and its inclusion in the US Total Support Estimate is debatable. The inclusion of the food stamps program expenditure in agricultural support would need to be backed by compelling studies that estimate its effect on farmer's welfare or on production.

Figure 51. The general services component of the TSE, US, 1986-2010



Source: Authors' calculation using the OECD dataset.

5.1.5. Conclusion

A synthetic vision of US agricultural support. If we consider the main forms of agricultural support, it is possible to have a synthetic view of the US policies to support farmers using OECD data

Table 9 provides a ranking of the ten largest payments in 2009 and 2010. These payments represent 85% and 89% of total payments, respectively. Hence, they give a synthetic but rather complete picture of the various forms of support in the US for the recent years (note that if world market conditions deteriorated, the image would change considerably due to the countercyclical nature of the instruments used in the US agricultural policy).

There has been little change in the ranking of the various instruments in terms of cost between 2009 and 2010. While this might not be the case in previous years, the direct payment, the crop insurance payments, some countercyclical milk payments are among the main expenditures. Four large categories are the energy subsidies, technical assistance operations, control of animal and plant health. In the years 1986-2000, an important expenditure was devoted to investment aid payments to farms but these have subsequently disappeared. In 2009 and 2010, a buyout of tobacco producers for them to quit producing also resulted in large expenditure, after similar programs on peanuts.

Table 9. Major forms of support in US agriculture, 2009 and 2010

2009	US$ MILLIONS	%	SUM %	2010	US$ MILLIONS	%	SUM %
Crop insurance	5 418	19,7	19,7	Direct payments	4 898	20,4	20,4
Direct payments	5 222	19,0	38,7	Crop insurance	4 694	19,5	39,9
Conservation Reserve Program	2 718	9,9	57,2	Conservation Reserve Program	2 575	10,7	50,6
Energy subsidies	2 385	8,7	47,3	Energy subsidies	2 385	9,9	60,5
State technical assistance	2 151	7,8	65,0	State technical assistance	2 151	8,9	69,5
Income tax concessions	1 344	4,9	69,9	Animal & plant health inspection service	1 197	5,0	74,5
Environmental Quality Incentives Program (EQIP)	1 337	4,9	79,1	Environmental Quality Incentives Program (EQIP)	1 174	4,9	79,3
Animal & plant health inspection service	1 183	4,3	74,2	Tobacco quota buy out	954	4,0	83,3
Tobacco quota buy out	953	3,5	82,5	Income tax concessions	780	3,2	86,6
Dairy market loss payments (MILC program)	757	2,8	85,3	Wetland Reserve Program (WRP)	567	2,4	88,9

Source: Authors' calculation using the OECD dataset.

A lower level of support than in the EU, but which relies more on distorting instruments. While the EU has moved towards a rather simple and flat form of decoupled support[30], the US has combined multiple layers of support, many of them aiming at protecting and compensating producers from adverse harvest or price situations. As a result, the overall US support may be more distorting than the support provided by the EU Single Farm Payment and other elements of the CAP.

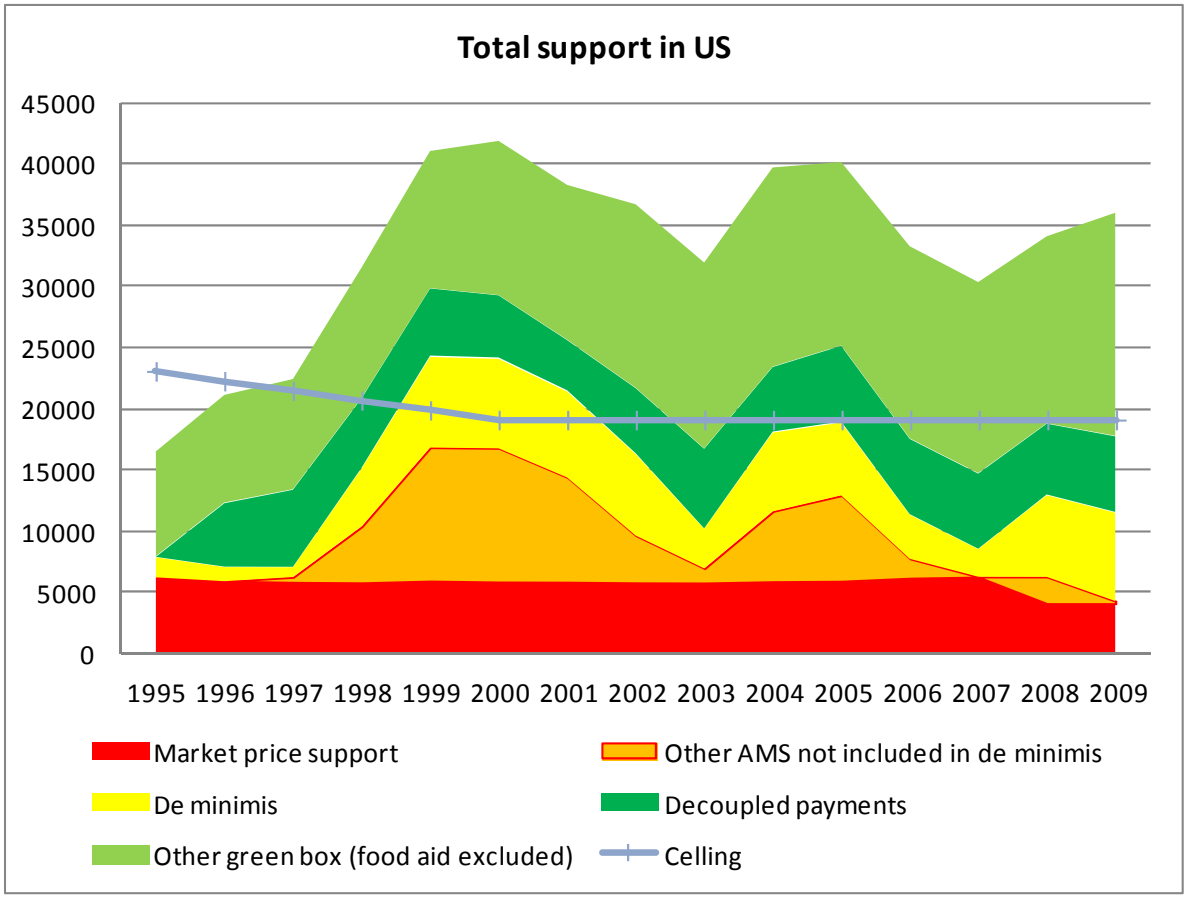
The contra-cyclical nature of these payments is such that their importance is easily underestimated during the last years. Indeed, the OECD concludes to a strong reduction of US support. Amber box support does not hit the WTO ceiling for the Aggregate Measure of Support (US$19 billion). However, the instruments are in place and payments could increase dramatically if market conditions changed. Many of these payments are linked to market conditions and should therefore fall under the Amber Box. It is noteworthy that the US would have exceeded its AMS ceiling in 1999 and 2001 if it had not counted large amounts of support under the *de mininis* exemption (see EP 2008 for a complete analysis and see Appendix 5.3. for an update). The US AMS has close to this ceiling in 2005 (Figure 52).

The PSE figures, and the share of public support in farm receipts show that the US support is lower in absolute terms as well as in percent of production value than in the EU. The figures are looking different if we considered the level of support per farmer or per ha. A major difference between the US support and the EU one is that the US one focuses more on protecting farmers from variations in income. The EU one, by providing larger amounts of flat payments, also play this role, and leaves to farmer the role of smoothing income variations by saving some of the payments for bad years.

[30] At least if we ignore the Member States arrangements that can make the Single Farm Payments rather complicated to manage, in particular by setting individual historical references.

Overall, in spite of the higher level of agricultural support in the EU than in the US, the economic distortions of the US system are likely to be large. Gohin (2006) concluded that the impact of the US schemes on world markets was larger, and that the US instruments were more distorting than the EU ones. Diakosavvas (2011) suggests that there has been some reduction in these distortions over the recent period. However, unlike the EU, which has played much the multilateral game and has shifted to less distorting forms of support, the US has shown little sign of turning towards flatter, lump sum payments to farmers since 2002.

Figure 52. Distorting support and maximum WTO ceiling, US, 1995-2009



Source: Authors' calculation using USDA-ERS and WTO data.

5.2. Agricultural support in Canada

Canada is a major agricultural exporter. In the WTO framework, as one of the "Cairns group"' countries, Canada has argued for a liberalization of agricultural markets. This does not mean that there is no agricultural support in Canada. Some high tariffs and some public intervention protect and support particular sectors such as dairy and, to a lesser extent poultry. State trading entities, such as marketing boards, still contribute to market regulation, even though the Canadian government is in the process of attempting to dismantle the Canadian Wheat Board (as in February 2012 the corresponding Act still faces legal challenges), after removing price support and transportation subsidies in the 1990s (see Stogstad 2011 for details).

The main orientations of the Canadian agricultural policy are defined every five years at the federal level. The most recent framework of strategic orientations was defined for the 2008-2013 period. The various Canadian provinces have a large degree of latitude for defining specific measures.

The largest share of public expenditure for agriculture goes to income stabilisation and support to investment. A difference with the US is that countercyclical policies are notified under the Green Box in the WTO (even though there seem to be few reasons to consider these payments are more decoupled than the US ones).

The gap between domestic and world prices has progressively been reduced since 1986. The reason is less the high level of world prices during the recent period than the reforms that have taken place in the 1990s. The NPC, i.e. the ratio between the average price received by producers at farm gate (including payments per tonne of current output), and the border price has gone down. It was 1.45 in 1986 and only 1.17 in 1996. It reached 1.02 in 2007 (Figure 53). This gap went up, however, in 2009 when world prices went down. Because support to cereals was largely dismantled in the 1990s, the remaining price support that explains the NPC is caused by the system of guaranteed price and quotas in the dairy sector.

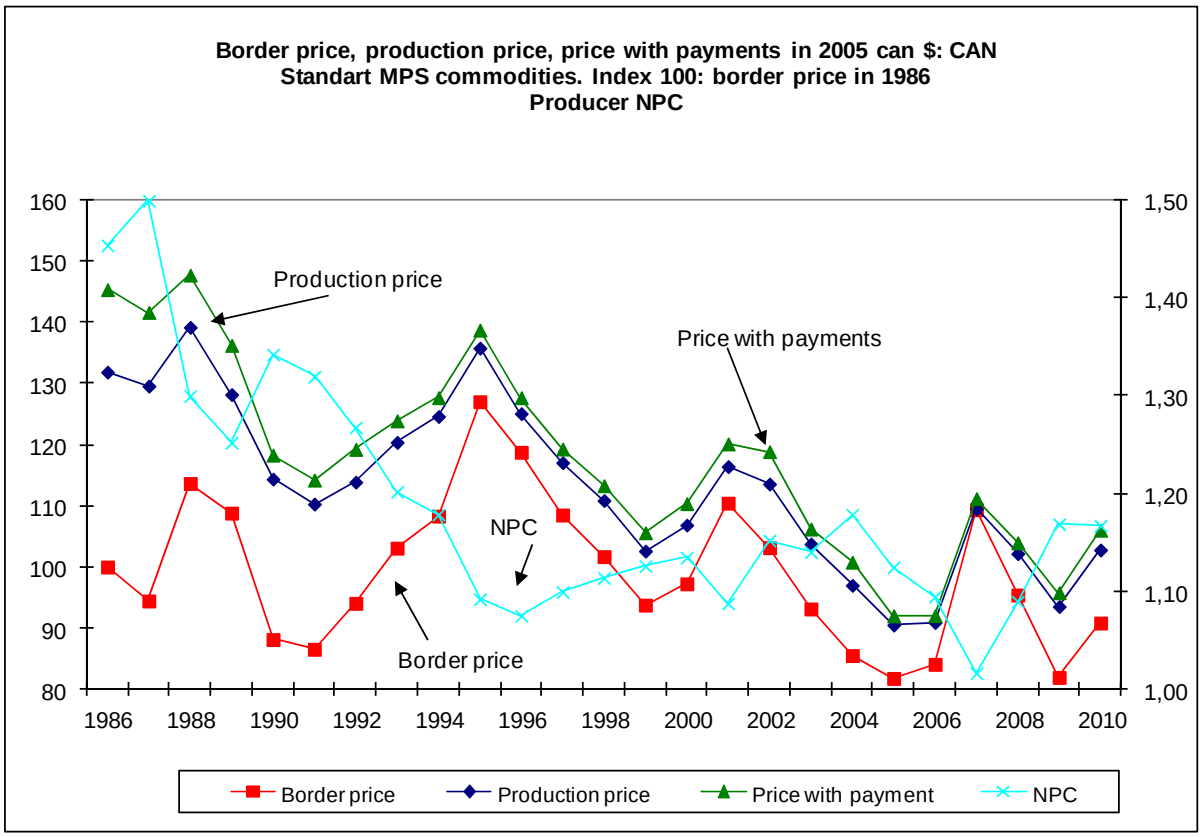
The end of the transport subsidies, which was presented as a way to compensate farmers of central and Western prairies from the remoteness of export facilities, had a significant impact on the agricultural support as measured by the OECD, since these subsidies represented a large component of the PSE (Figure 54). It took place when the Canadian dollar went down, which offset some of the effect of the high prices in the mid 1990s, and made it worse when prices went down at the end of the 1990s. The cut in support was compensated by temporary direct payments, which made transition easier (Figure 55). Dairy production quotas have nevertheless been maintained and they are managed by each Province. The supported price for milk relies on a high tariff protection and strict import quotas. Supply control has also persisted for poultry and eggs. Overall, support to agricultural products (i.e. coupled support) has remained stable in the 2000s, except in situations of high world prices where it has gone down. Three quarters of the total support correspond to dairy (Figure 55). It is noteworthy, though that the system of production quota is such that it limits the expansion of the main supported commodity, hence limiting the distortions in world markets and the externalities for third countries.

The real PSE, expressed in constant 2005 C$ reaches C$ 6.9 billion in 2010. The percentage PSE is therefore 17% when expressed as a ration to the value of production.

Out of these 17% it is noteworthy that 12% correspond to specific commodity transfers, mostly to dairy.

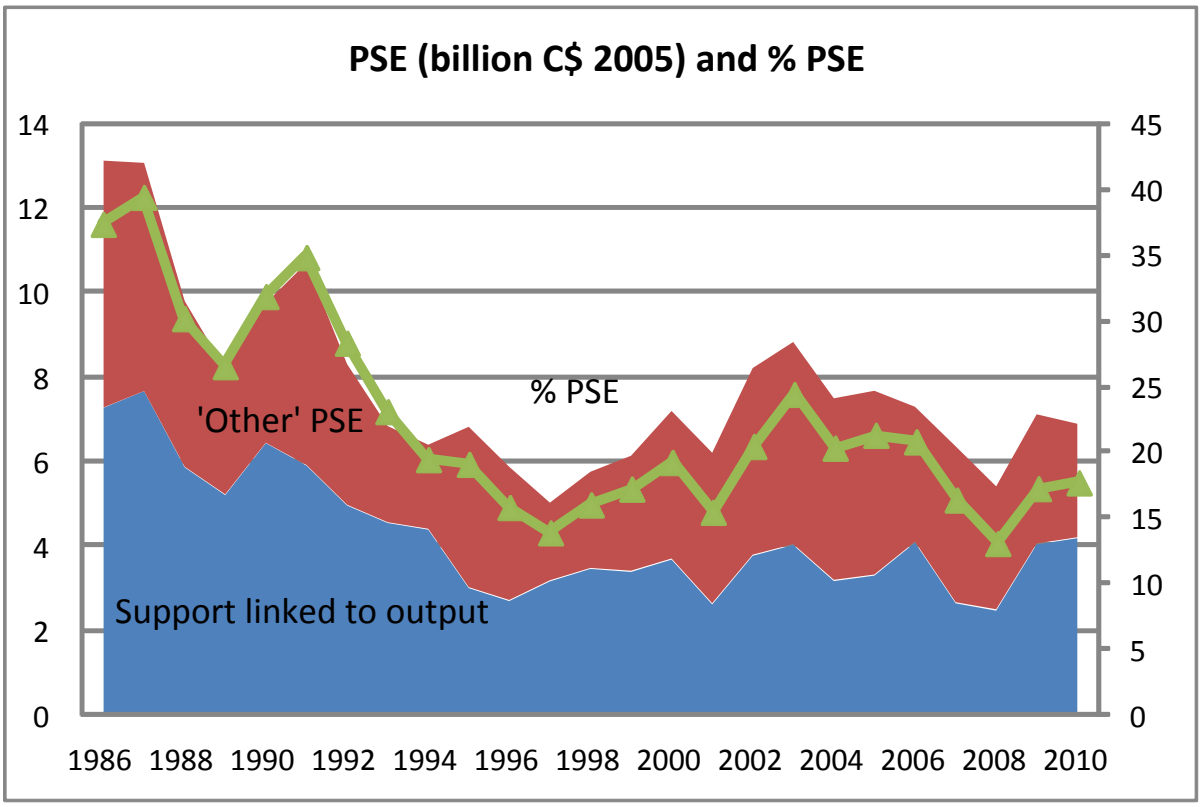
While the "other" component of the PSE that is not commodity specific is less important, it is noteworthy that a part is based on current area or number of animals, and is therefore rather distorting compared to more lump sum payments (Figure 56) .

Figure 53. Evolution of price support over time in Canada, 1986-2010



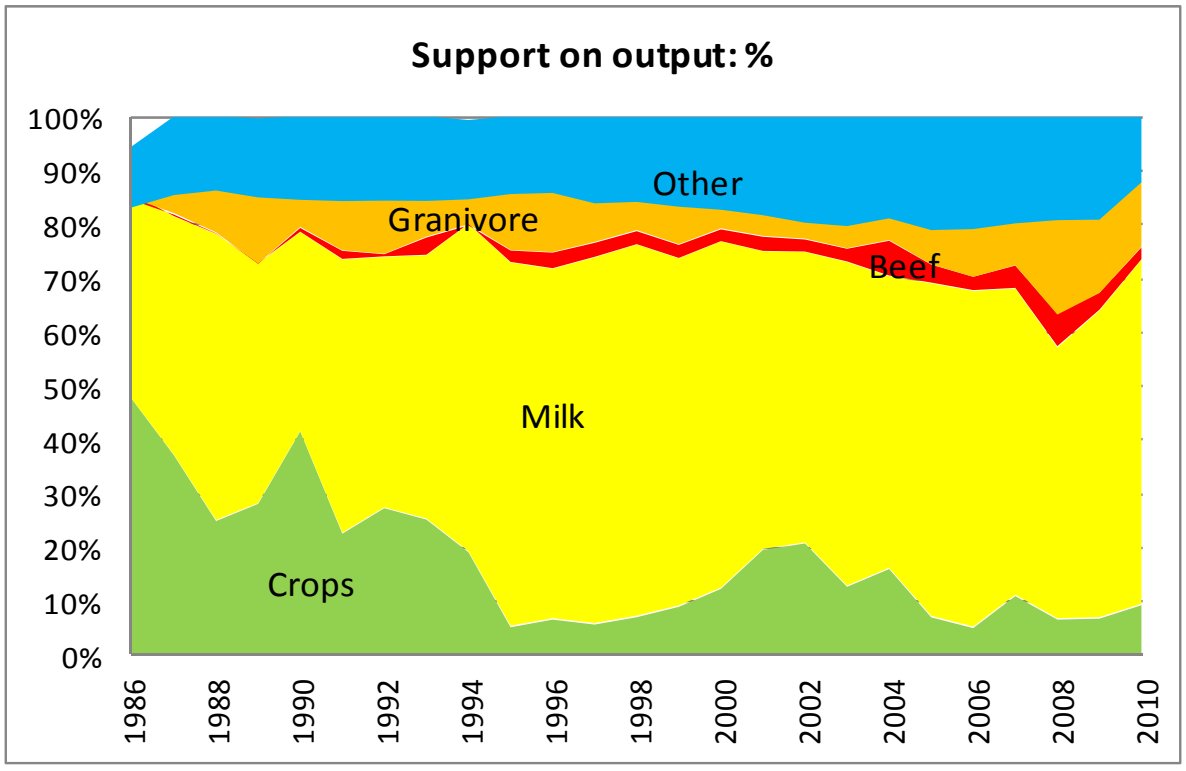
Source: Authors' calculation using the OECD dataset.

Figure 54. PSE and percentage PSE in Canada, 1986-2010



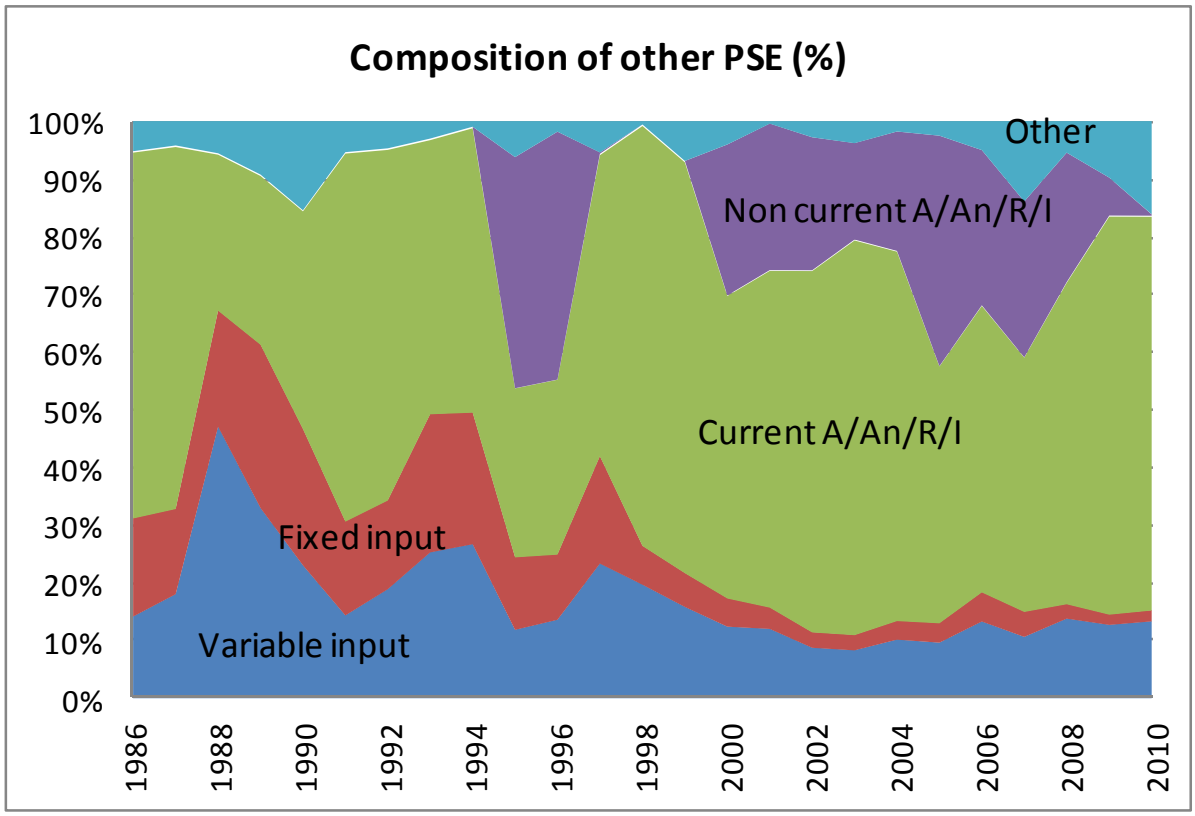
Source: Authors' calculation using the OECD dataset. 'Other' PSE refers to non commodity specific support.

Figure 55. Agricultural support as a percentage of farm receipts, Canada, 1986-2010



Source: Authors' calculation using the OECD dataset.

Figure 56. Composition of non commodity specific support, Canada, 1986-2010



Source: Authors' calculation using the OECD dataset. The categories refer to the OECD classification of the payments and price support. Those linked to variable inputs; to fixed inputs; Payments based on area, animal numbers, receipts or income current or noncurrent.

5.2.1. Income stabilisation schemes

After the reforms of the mid 1990s, a large share of the federal and provincial agricultural budgets have been devoted to income stabilisation programmes (Table 10). In 2009 and 2010, three programmes involve particularly significant levels of support:

- The income stabilisation programme under which payments are triggered when producer's income is below 85% of a reference payment calculated on the previous 5 years. This program is also linked to another investment aid program.
- Federal subsidies cover part of the voluntary scheme under which farmers get insurance covering risk of poor yields.
- A specific program in Quebec covers losses, calculated as the difference between a reference price and market prices, subject to a ceiling as far as the amount of output is concerned.

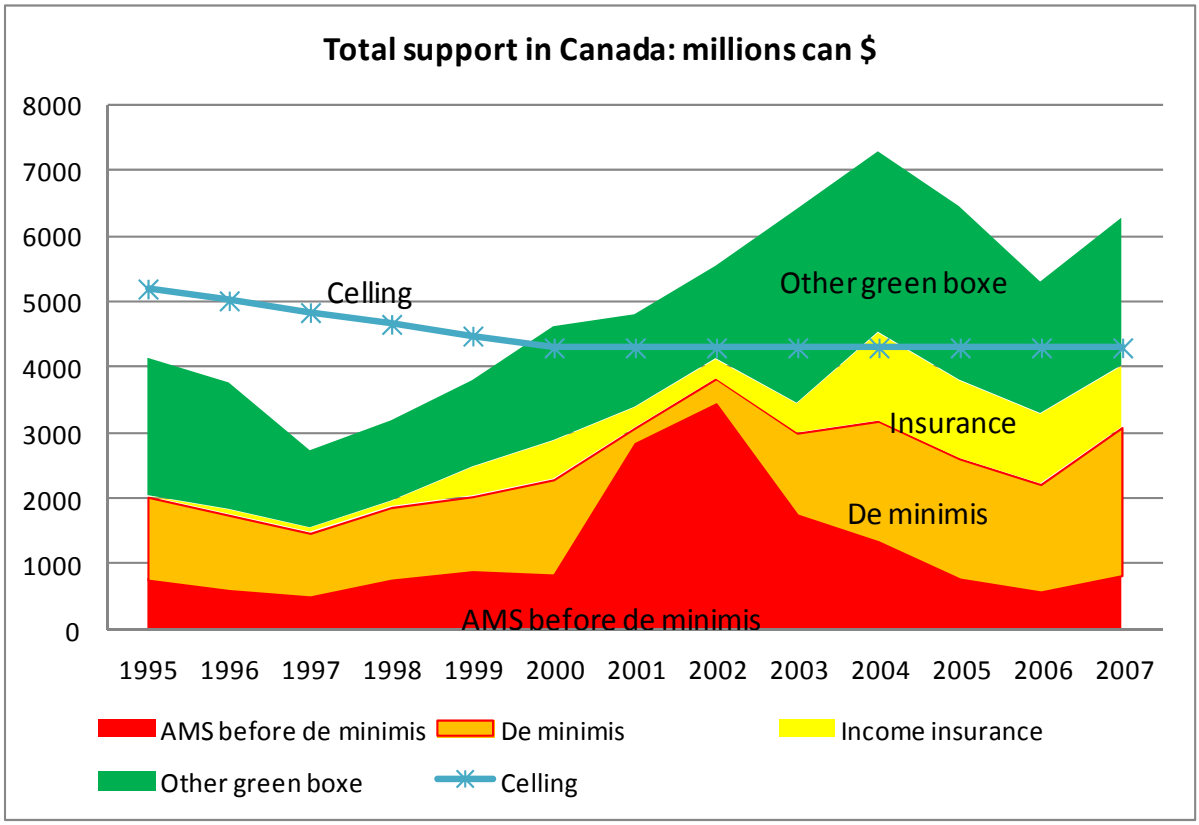
In addition to these standard programs, public authorities also intervene to compensate, at last partially natural disasters, such as the 2010 floods. Some forms of support also result in payments to farmers so that they stop production in times of crises (2009 for tobacco, 2010 for pork).

Regarding the efficiency of these programs, some authors have argued that some of these income stabilisation schemes were redundant and resulted in double payments (Antón et al

2011). In addition, they tend to generate moral hazard, since compensation seems to benefit farmers who take most risk, and to squeeze out private mechanisms (Thibodeau et al. 2009; Antón et al 2011). Overall, the uneven distribution of payments, is also criticized (Thomson 2011).

In spite of the fixed or historical references for granting payments, it is unclear whether these income stabilisation schemes are actually decoupled from production. Bakhshi et al (2010) and Thompson (2011) consider that the actual consequences on production is limited. The OECD classifies these payments are requiring production, i.e. implicitly as generating market distortions. Canada notifies part of the payments under the stabilisation scheme under the Green Box, even though, by some aspects they appear more coupled to production than the US ones, being linked to actual output, while even the US countercyclical payments have a historical basis. Canada uses the *de minimis* provision in the WTO notifications in order to exclude other income stabilisation payments from the calculation of the Aggregate Measure of Support. The Canadian AMS has therefore remained consistently below the ceiling. However, it is noteworthy that with a tightened WTO discipline (i.e. stricter rules for eligibility of the income stabilisation schemes and no de minimis provision), the AMS ceiling would have been reached (Figure 57).

Figure 57. Changes in total support according to WTO notifications, Canada 1995-2007



Source: Authors' calculation using the OECD dataset.

5.2.2. Conclusion

Canada has experienced an impressive growth in the volume of agricultural production, with a 2.3% average annual growth rate over the 1986-2010 period, one of the highest in the OECD. At the same time, price support has decreased significantly, and the ratio of

domestic to world prices indexes shows that this form of support now only plays a role for a few animal products.

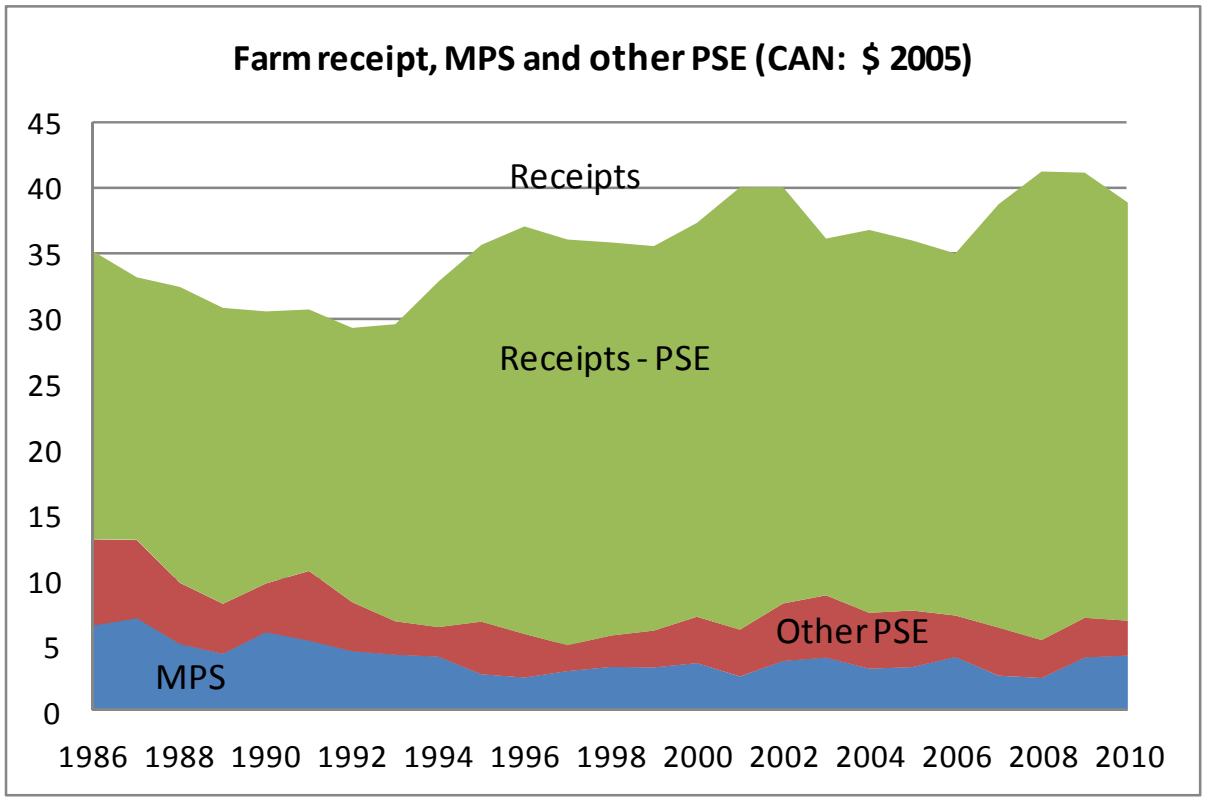
Agricultural support only represents a limited fraction of the total receipts of Canadian agriculture (Figure 58, which shows the changes in real receipts and the composition of these receipts between price support, other PSEs and the market based component). Calculations of real PSEs and PSE as a percentage of production nevertheless show that Canada supports its agriculture at levels that are comparable to the EU (the percentage PSE is 18% compared to 20% in the EU for 2010). Most of the support goes to dairy production. In addition, while the EU support mostly relies on a system of direct payments that are fixed and decoupled, Canada has implemented programs that tend to insure producers against income fluctuations. Thomson (2010) shows that between 2003 and 2007, government payments exceeded the net market cash income, so that most of the income came from government support. This illustrates the protection of farmers granted by the Canadian system, and the fact that when prices and market receipts are low, payments increase to maintain farm income. In terms of support, the high world prices during the recent period hide the fact that income stabilisation schemes could represent higher expenditure in case of more adverse market situations.

Table 10. Major forms of agricultural support, Canada

2009	CAN $ MIL	% SUM	2010	CAN $ MIL	% SUM
AgriStabilty program	1 092	33.0%	AgriStabilty program	804	26.9%
Crop insurance	518	48.7%	Crop insurance	594	46.8%
Stablity on income (Quebec)	453	62.4%	Fuel tax rebates	354	58.6%
Fuel tax rebates	345	72.8%	Special aid on prairie in 2010	310	69.0%
Tobacco transition program	285	81.4%	Stablity on income (Quebec)	310	79.3%
Provincial special aid on animal in 2009	130	85.3%	Agriinvest program	289	89.0%
Agriinvest program	119	88.9%	Hog farm transition program	57	90.9%

Source: Authors' calculation using the OECD dataset.

Figure 58. Support and farm receipts, Canada, 1986-2010



Source: Authors' calculation using the OECD dataset.

5.3. Agricultural support in Switzerland

With a large share of its territory in mountain areas, Switzerland has little comparative advantage in the production of bulk commodities. It has nevertheless maintained a rather high level of self sufficiency as part of a national strategy (overall up to 60% of the domestic consumption of agricultural products is produced locally). The instruments to do so include a high level of border protection and some local incentive to produce, in particular with market intervention. With a strategy that focuses on product differentiation and quality, but also with some export subsidies, Switzerland managed to become a net exporter of some agricultural products such as dairy.

Following the Uruguay Round Agreement and several trade arrangements with the EU, Switzerland went through a comprehensive reform of its agricultural policy, introducing mechanisms for lowering the prices of major agricultural products and the introduction of direct payments to compensate farmers for losses of income. The 1999 law led to a reduction in price support and a greater reliance on direct payments (OFAG 2002). Some of these payments have been decoupled from production (OFAG 2009, Kroll et al. 2010). Payments have been subject to a stricter environmental conditionality, with environmental constraints that go beyond the ones imposed to EU farmers for being eligible to the Single Farm Payment. A series of more specific environmental programmes has been implemented.

The multifunctional nature of agriculture is mentioned in the Swiss constitution, after a public vote in 1996. Among the public goods and services that agriculture is expected to provide are listed food security, conservation of natural resources, and a form of rural

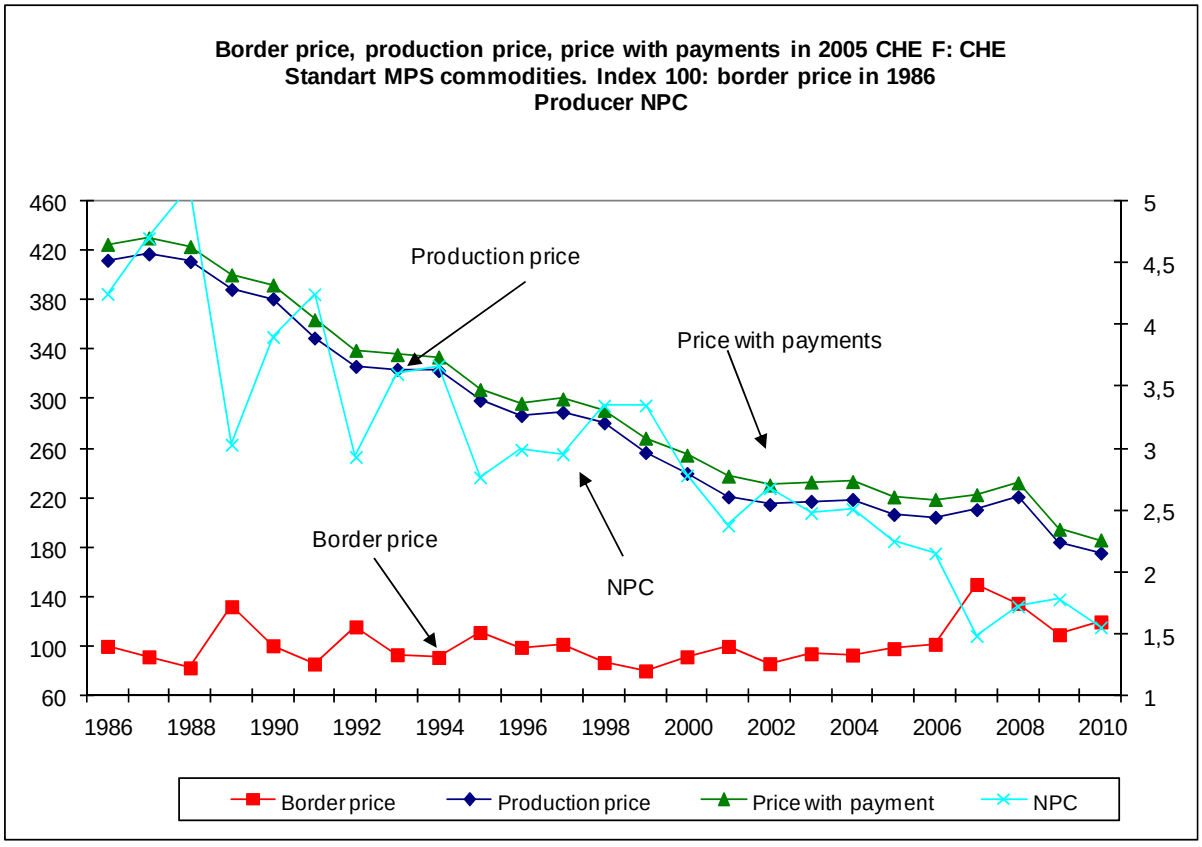
vitality through a decentralized utilisation of the territory. Swiss agricultural policy is defined under four year programmes.

5.3.1. A lower market price support

Figure 59 shows that at the beginning of the 1986-2010 period, domestic prices for the commodities covered by the PSE dataset were on average four times higher than border prices. While the price of most products was supported, dairy represented a large share of the total market price support (Figure 60).

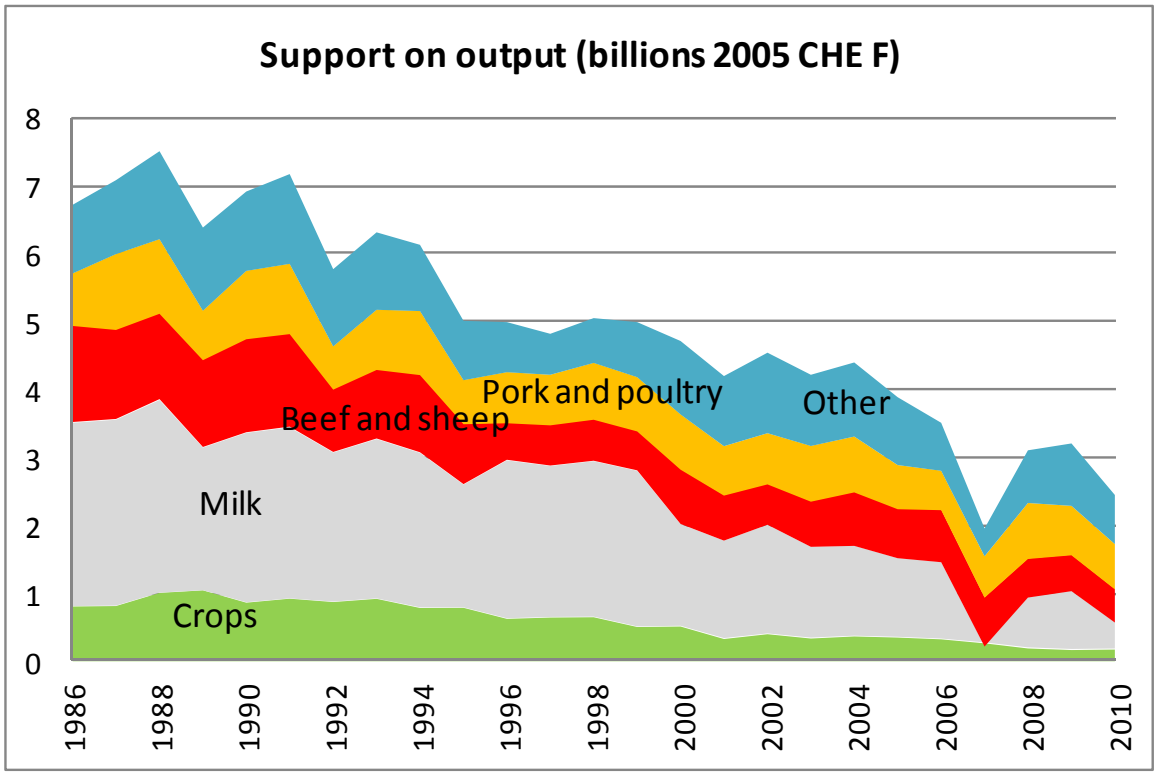
Coupled support to the various agricultural productions has been divided by three since the early 1990s. This reduction in price support can be observed for all products, but coupled support to dairy was particularly cut, and was reduced by a factor of seven. The gradual reduction in guaranteed prices was followed by the dismantling of the quota regime in 2009, after a three year transition period. However, dairy products are still supported by high tariffs on imports.

Figure 59. Evolution of price support over time in Switzerland, 1986-2010



Source: Authors, using OECD data.

Figure 60. Coupled support, selected outputs, Switzerland, 1986-2010



Source: Authors, using OECD data.

5.3.2. Direct payments and the need to deliver public goods

A distinction is made between general and ecological direct payments (the latter similar to agri-environmental payments in the EU). General direct payments are compensation for the basic tasks, as set out in the constitution, of ensuring food supplies, maintaining the landscape and helping to preserve social structures in rural areas. They are made up of a sum based on the area of the farm plus a sum for grazing animals. The area payment per hectare of agricultural land is granted independent of any requirement to produce particular crops. The payments are subject to an income and asset ceiling and are differentiated by farm size. In upland and mountain areas additional sums are paid out to allow for the more difficult farming conditions.

Eligibility for the general direct payment is dependent on farmers proving that they comply with a set of minimum rules; the so-called "proof of ecological performance" (Prestations écologiques requises – PER). The key elements of proof of ecological performance are an appropriate proportion of ecological compensation areas, rational use of fertilisers, crop rotation, soil protection, economic and specific use of plant treatment products and animal welfare measures.

In addition to the general direct payment system, farmers can also enrol in a voluntary agri-environment scheme which remunerates particular services separately through ecological direct payments. Among other things, the farmer receives additional payment for extensive meadow-land, reed-beds, natural field margins, permanent flowery meadows and rotated fallow fields, hedges, copses and wooded river banks and standard fruit trees. Farmers who wish to increase their ecological compensation areas beyond the minimum

7% required for cross-compliance receive additional payments under this scheme. Organic farming is also subsidised.

It should be noted that in the OECD dataset, a decrease in environmental payments is observed in 1999, while payments with compulsory conditions increase. This reflects the shift from voluntary measures to cross compliance of the direct payments to environmental conditions. Nowadays, all direct payments are conditional to the "proof of ecological performance". This means that direct payments are only granted if farmers meet a number of environmental conditions. These conditions appear more stringent than the conditionality to a set of directives and good agricultural and environmental conditions in the EU.

Ecological compensation, one of the requirements for direct payments, involves that a farm can chose between 17 types of compensatory areas (e.g. low intensity meadows, extensive pasture, buffer strips, hedges, traditional orchards, wetlands, set aside land, etc.). Farmers must devote at least 7% of the agricultural area to such uses that promote natural or semi natural habitats, farmed in an extensive manner, or left to include characteristic elements of rural landscape (dry stone walls, isolated trees, etc.). The implementation of ecological compensation areas intends to preserve or create some natural or semi natural areas, maintain and develop diversity of flora and fauna on agricultural areas, maintain typical elements of rural landscape, and protect natural resources (interdiction of fertilizer and pesticides on ecological compensation areas). The results of this policy in terms of biodiversity are quoted as one of the few successes in Europe (see section 6.2.3).

In addition, ecological direct payments represent 20% of direct aid payments in 2010, according to the Swiss Ministry of agriculture. These payments are paid to farmers willing to implement even more stringent agricultural practices with regard to environmental standards. In 2010, they included schemes for extensive livestock production respectful of animal welfare (40% of payments, requiring to take animals out regularly, to have them graze in the summertime), 20% to extra ecological compensation (extensive meadows, hedges).

If one accounts for other environmental programmes that complement the requirement of ecological compensation for obtaining the direct payments, surfaces devoted to such an ecological focus account for an impressive 145 000 ha i.e. 13.6% of Swiss agricultural area (Trometter et al 2008).

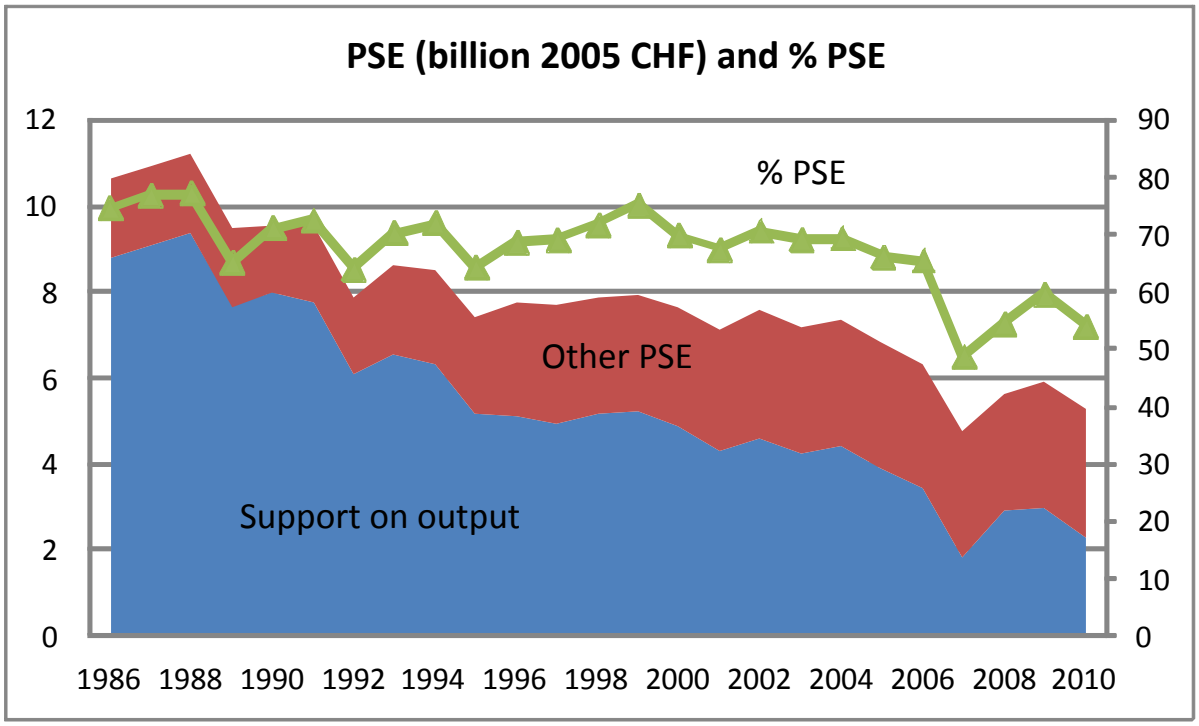
5.3.3. A decrease in support as well as farm income

When expressed in real value, the Swiss PSE has decreased by half since 1986. However, because of the shift from consumer based support to taxpayer based support, prices have gone down. The share of the PSE in total receipts is nevertheless close to 50% in 2010.

Direct payments have only compensated partially the fall in producer prices. In real values, farm receipts have decreased by a third since 1986. The volume of production has nevertheless remained rather stable since the late 1990s (Figure 62).

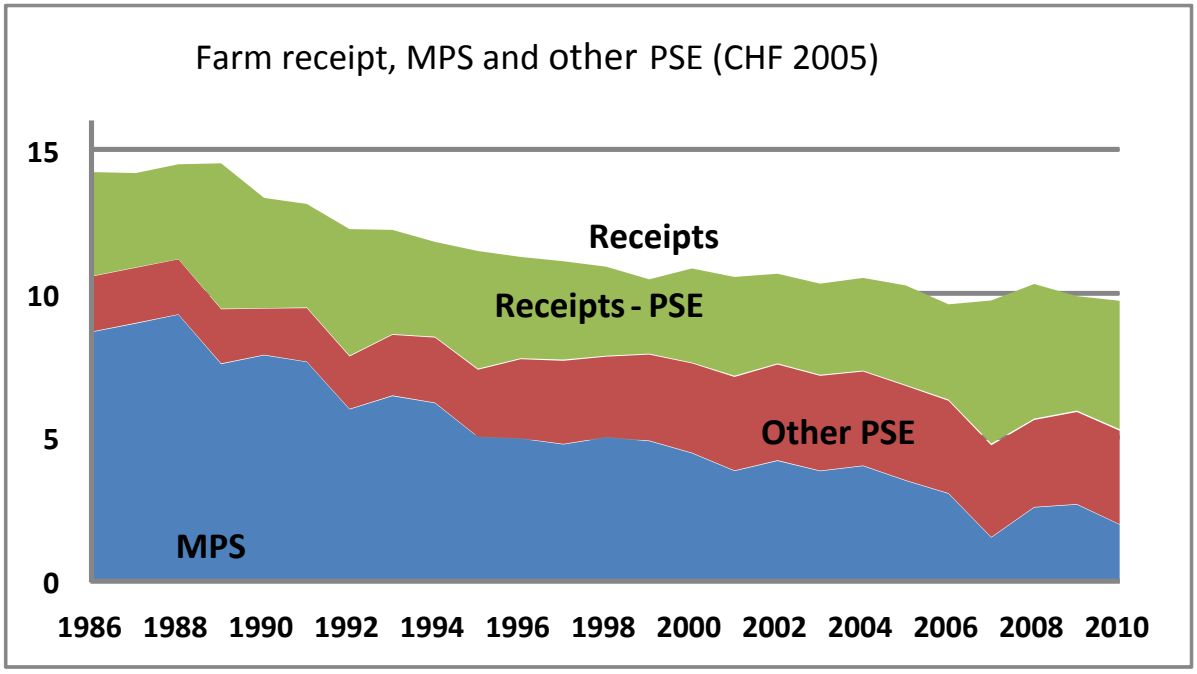
According to the macroeconomic accounts, the net income in the agricultural branch has decreased by half between 1986 and 2000 (Figure 63). Since 2000, both subsidies and incomes expressed in real values have remained stable. Currently agricultural subsidies account for roughly 100% of the net farm income.

Figure 61. Evolution of PSE, Switzerland, 1986-2010



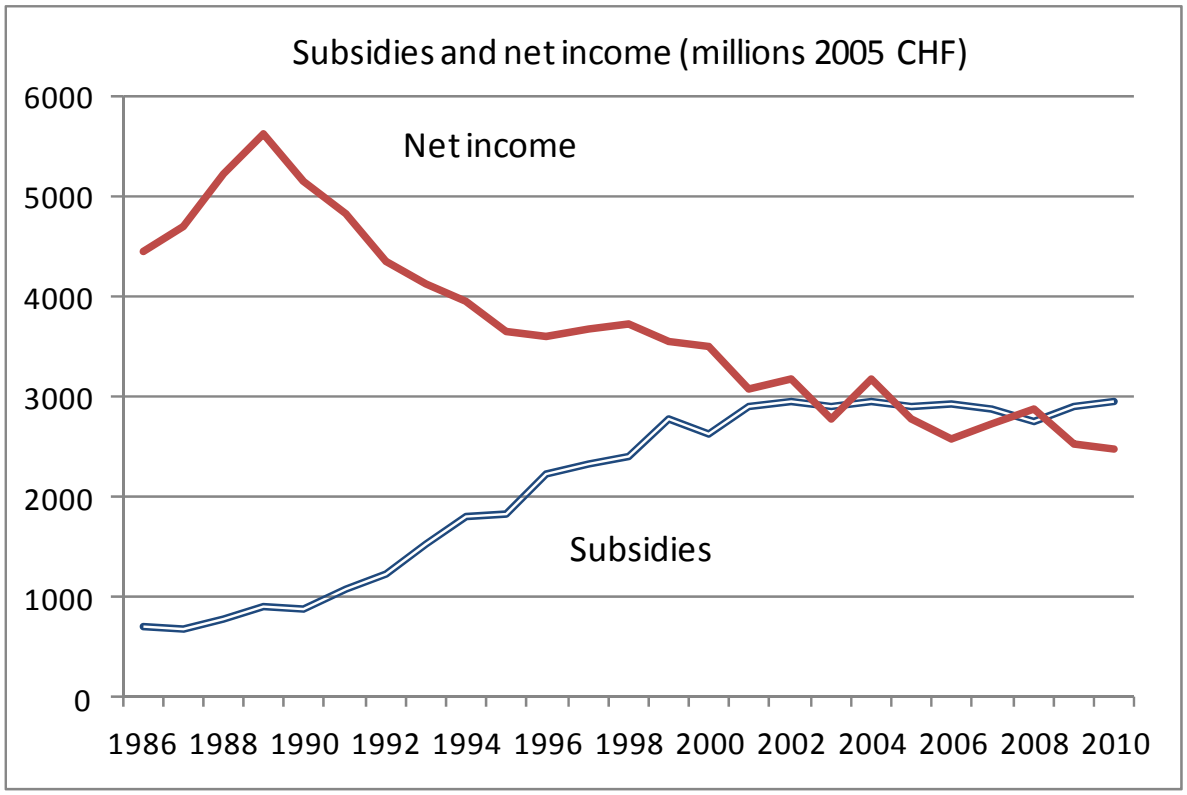
Source: Authors, using OCDE data and PPP data.

Figure 62. Agricultural support as a share of farm receipts, Switzerland, 1986-2010



Source: OCDE data.

Figure 63. Agricultural income and support, Switzerland, 1986-2010



Source: Data from Office fédéral de la statistique suisse.

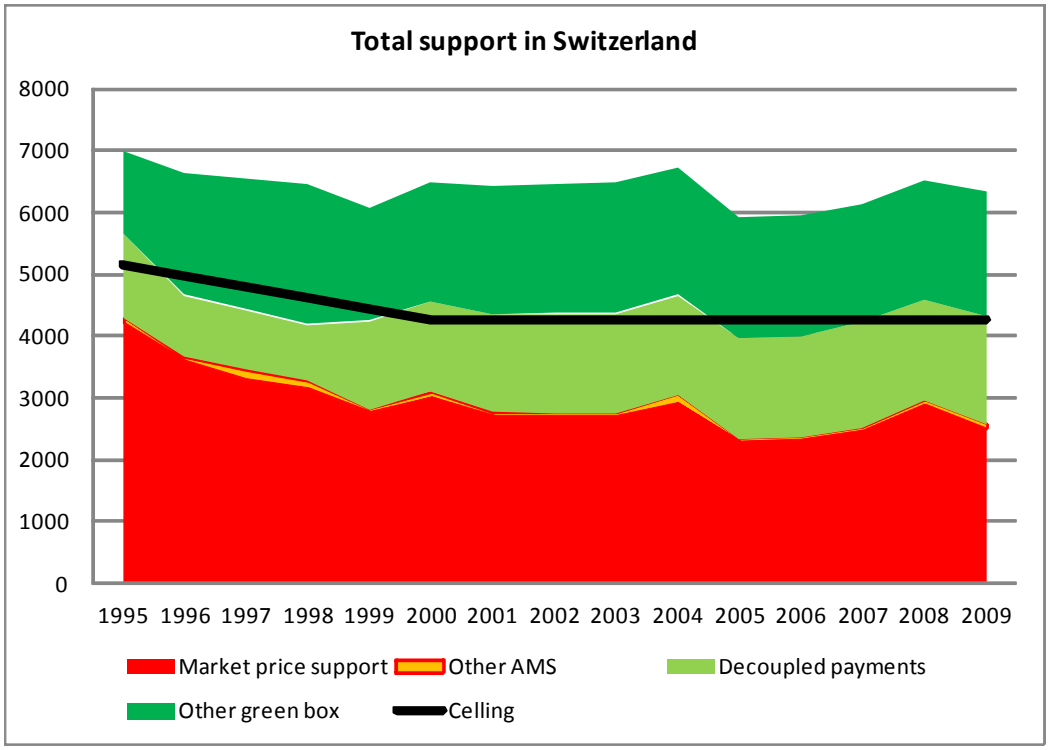
5.3.4. Swiss agricultural support and WTO commitments

WTO notifications show that agricultural support under the amber box was large in 1995 in Switzerland and has been reduced only to some extent (Figure 64). The shift to direct payments and the progressive conditionality of these payments to strict environmental conditions results in a limited fall in the AMS. Switzerland's AMS remains to roughly 60% of the WTO ceiling (Figure 64). Distorting support within the AMS is entirely market price support, which is calculated as the difference between domestic and a fixed border price according to the WTO methodology. [31]

Green box payments amount to CHF 3.1 billion in 2009, a figure close to the one in the OECD dataset (CHF 3.4 billion). The case of Switzerland nevertheless illustrates the inconsistency between the WTO and the OECD methodology, since in the WTO notifications, all Swiss payments are classified under the Green Box, while they correspond to very different categories in the OECD dataset (Table 11). In particular, it is noteworthy that the Switzerland notifies under the Green box some payments that are classified as production subsidies by the OECD, such as a subsidy to milk for cheese processing.

[31] In spite of the large differences in the methodology, it is noteworthy that the measures of market price support on the basis of the OECD and the WTO are rather similar, which is not the case in most countries.

Figure 64. Changes in total support according to WTO notifications, Switzerland 1995-2007



Source: WTO notifications.

Table 11 Swiss payments, OECD and WTO classification

	OECD							WTO	
			Current A/An/R/I	Non Current	Non Current	Other			
	Output	Input	Prod required	Prod required	Prod no req			Amber	Green
Area payment	-	-	-	-	1226	-		-	1226
Payment for the Holding of Roughage Eating Farm Animals	-	-	509	-	-	-		-	510
Payments for the Holding of Livestock in difficult conditions	-	-	352	-	-	-		-	353
Milk Price Supplement for Cheese Production	248		-	-	-	-		-	248
Payments for Regularly Keeping Animals Outdoors	-	-	163	-	-	-		-	
Cantonal net budgetary expenditure	-	-	-	-	-	155		-	
Interest concessions	-	104	-	-	-	-		-	
Payments for Farming on Steep Slopes	-	-	90	-	-	-		-	103
Payments for Summer Pasturing	-	-	-	98	-	-		-	
Other environment	-	-	-	-	-	-		-	468
Total (General service excluded)	280	207	1287	98	1226	340		0	3122

Source: Authors' calculation using OECD and WTO data.

5.3.5. Conclusion

Switzerland is still one of the countries granting most generous supports to farmers. Agricultural support as measured by the PSE is still around 50% of farm receipts. And agricultural subsidies account for basically the entire net farm income since 2001. In the EU this was so far only the case in 2009.

Switzerland has followed a path rather similar to the EU one, with a significant shift from market price support to a system of direct payments over time, a large cut in the overall amount of support granted to farmers. However, Switzerland has gone further than the EU in reorienting farm support towards remuneration for the provision of public goods. In particular, Table 12 shows that a number of agri-environmental payments and payments for less favoured areas rank high in the list of instruments providing support to farmers. In addition, cross compliance is more developed than in the EU and direct payments, on a per hectare basis are now conditioned to stricter environmental and animal welfare constraints than in the EU. The obligation of devoting a significant percentage of total area to ecological compensation can be seen as the implementation of a more ambitious version of the Commission's proposal for introducing a condition to "ecological focus" on a fraction of the EU single farm payments. The positive evaluations of these programmes from a biodiversity suggest that this policy is successful, even though more economic evaluation of the costs and benefits of such programmes would be needed.

Table 12. Main support instruments, Switzerland, 2010

	CHF MILLION	CUMULATIVE %
Area payment	1205	34.7%
Payment for the Holding of Roughage Eating Farm Animals	522	49.7%
Payments for the Holding of Livestock in difficult conditions	360	60.1%
Milk Price Supplement for Cheese Production	256	67.5%
Payments for Regularly Keeping Animals Outdoors	160	72.1%
Cantonal net budgetary expenditure	155	76.6%
Interest concessions	106	79.6%
Payments for Farming on Steep Slopes	103	82.6%
Payments for Summer Pasturing	101	85.5%

Source: OCDE data.

5.4. Conclusion

The international comparisons of support as the one carried out in section 5 makes it possible to shed light on the situation of the EU in terms of agricultural support.

The measures of farm support that are used in this study, in particular the real PSE expressed in 2005 PPP, show that the EU supports its farmers more than most of the countries in the sample. However, these measures, and this is also the case of the OECD and WTO indicators, should not hide the role played by current market situation.

Over the recent period, some countries such as the US and Canada appear as providing a rather limited amount of support to their farmers (with the exclusion of dairy producers in Canada). This is partly due to the high level of world prices. Because these countries have implemented a system of support that is dependent on market conditions (without being

fully coupled to production), some of their major support instruments are inactive. The instruments are nevertheless still in place and could potentially lead to very high level of support should less favourable market conditions come back.

Switzerland is a particular case where agricultural support remains high, thanks to high tariffs and generous direct payments, even though the country has reduced market price support significantly over time. However, it is an example of a considerable reorientation of support towards the provision of public goods.

6. EU SUPPORT IN THE FUTURE

KEY FINDINGS

- The EU has largely shifted to **production neutral instruments** and provides fixed and decoupled payments to farmers. The comparison of support with the other countries helps exploring some of the issues discussed regarding the post 2013 CAP.
- Compare to the EU, the US support still focuses on instruments that depend on market conditions and protect producers from market downturns. Canadian support focuses more on risk management. **However, making EU payments more countercyclical would generate many unwanted and unproductive effects.** And the poor transfer efficiency of US and Canadian **insurance** schemes calls for more investigation before developing further EU instruments.
- The success of the Swiss policy suggests that the "**ecological focus" proposed by the Commission could have a positive impact on biodiversity erosion**. However, the Swiss policy is more ambitious than the EU one in this area and the costs and benefits of such a similar policy in the EU should be assessed more thoroughly.
- Agricultural support in emerging countries is growing rapidly and targets some strategic objectives. The **development of support to research, innovation and infrastructure in Brazil contrasts with support in the EU that tends to target mostly farmers' income.**

6.1. The future CAP

6.1.1. The Commission proposals

Since the 2008 declaration of the Presidency of the Council on the future of the Common Agricultural Policy, there has been an intensive debate about the definition of a CAP for the post 2013 period. The debates have been presented extensively in another publication of the European Parliament (see EP, 2010, section 2 in particular). After consultation with stakeholders, the Council and the Parliament, the Commission released two documents that can be used to assess what the future CAP might look like. The first one is the Commission's proposal on the EU budget 2014-2020, released on June 29 2011. The second one is the legal proposal for the CAP, released on October 12 2011.

The framework set out in the proposal for the Multiannual Financial Framework (MFF) proposal foresees that the CAP should maintain its two pillar structure with the budget for each pillar maintained in nominal terms at its 2013 level. Direct payments should promote sustainable production by assigning 30% of their budgetary envelope to mandatory measures that are beneficial to climate and the environment. Payment levels should progressively converge and payments to large beneficiaries be subject to progressive capping. Rural development should be included in a Common Strategic Framework with other EU shared management funds with a reinforced outcome-orientated approach and subject to clearer, improved ex-ante conditionalities. The financing of the CAP should be reinforced with two instruments outside the MFF: 1) an emergency reserve to react to crisis situations and 2) the extension of the scope of the European Globalization Adjustment Fund.

The Commission has proposed an adaptation of the CAP that aims to reduce some of the existing inefficiencies. The main elements of the Commission's proposal from October 2011 regarding market measures and agricultural support are presented in Box 6.1.

Relying on European Parliament's reports, The Commission drafted a legislative proposal attempting to reduce the inefficiencies as well as to address the questionable distribution issues of the current CAP. Should the proposal be adopted by the Council and the Parliament, the unequal distribution of the single farm payments would be reformed by shifting away from historical references, capping of payments, and with a more even rate of payments between Member States. The Commission's proposal would narrow the definition of "active farmers". The proposed reform of the payments introduces several layers targeting particular functions like environmental effort (green payment) or rural vitality in less favoured areas (payment for areas with natural constraints). Market intervention will also be streamlined including the removal of the sugar quotas and a single common market organisation with more flexibility as well as a package of instruments to deal with economic crises in a particular sector. The strengthening of the producers' organisations is intended to give farmers a bargaining position more balanced with the largely oligopolistic downstream sector. The negative side of the past reforms, in particular the fact that farmers now face more price volatility is addressed through risk management instruments (see Box 6.1).

6.1.2. Budget proposal and the level of support

If we consider the amounts foreseen in the MFF proposals of June 29 2011 and the CAP reform proposal of October 12 2011, direct aids and market related expenditure would increase from €45.6 billion in 2013 to €46.2 billion in 2020 in nominal terms, i.e. a decrease in real terms. Rural Development measures would basically remain unaffected at €14.6 billion in 2020. In addition, the budget for most deprived person would reach €0.4 billion in 2020. The CAP would also benefit from payments from Agricultural research and innovation, which would reach €0.8 billion (these amounts can be seen as roundfencing a share of the existing R&D budget) and a €0.5 billion as part of European Globalisation Fund available for agriculture in 2020.

Compared to the expected 2013 expenditure, the Commission estimate is that the reform would lead to save some €1.2 billion in 2020. Altogether, the main consequences of the reform would be a minor increase in the payments for rural development purposes. Because of the capping of the direct payments, some of the budget would indeed be recycled in pillar 2 (the estimated amount is €0.19 billion in the Commission's proposal). Market related expenditure would be reduced by €0.6 billion, but it is necessary to add the financing need for support measures that might be required due to market disturbance or crises, which are covered by a reserve for agricultural crises.

6.1.3. How the EU AMS would be affected by the reform?

Market management and support. As far as the AMS is concerned, the proposal of the Commission would have limited impact. The Commission estimates suggest a reduction in market-related expenditure of roughly €0.4 billion a year.[32] Given that a new flexible instrument to deal with crises would be implemented, it would imply expenditure that is likely to be distorting and part of the Amber Box. The amounts that might be spent on crises are obviously unknown at this stage, but the reserve should reach €3.5 billion.

[32] Appendix of the document Brussels, 12.10.2011 COM(2011) 625 final, 2011/0280 (COD).

The changes in public intervention are limited. In the proposal, public intervention is to cover common wheat, barley, maize, paddy rice, beef and veal, butter and skimmed milk powder. The rules for wheat are unchanged (€101/ tonne, limited to 3 million tonnes a year). For butter and skimmed milk powder, the ceilings are respectively 30,000 tonnes and 109,000 tonnes. Barley, maize, paddy rice as well as beef and veal are subject to a tendering process only, which should not lead to the calculation of a "Market Price support" under the WTO "Product-Specific Aggregate Measurements of Support".

The elimination of the quotas on domestic sugar production and exports after September 2015 should affect the calculation of the AMS. Currently, in spite of the quota, sugar price support is counted in the Amber Box. In the most recent notifications, sugar accounts for €3.5 billion AMS, due to the calculation of a market price support between the EU administered price (€433.2/tonne) and a reference price (€193.8/tonne).[33] Should the guaranteed price be eliminated after 2015, this would automatically lead to a reduction in the corresponding AMS.

Direct payments. One question that arises is whether the set of payments included in the Commission proposal would affect the EU support as measured by the AMS.

The redistribution of direct payments between Member States and farmers should not affect the classification of EU support under WTO as long as effect on production level is avoided.

Payments to young farmers granted by EU Member States are currently notified under the Green Box. The proposed scheme (Article 36 of the Commission's proposal)[34] relies on entitlements that need to be activated, as it is currently the case for the Single Farm Payment. One may consider that such payments satisfy the criteria for being exempted from AMS calculation. The scheme would involve a maximum of €0.9 billion annually if these payments are capped at 2% of the national Pillar 1 envelope.

Payments in areas with natural constraints, albeit in Pillar 1, would rely on the same mechanisms as the current Single Farm Payment (i.e. activation of payment entitlements). One may also consider that these payments would be exempted from AMS calculation.

Things are perhaps more complex for the basic payment (Article 18-28) and the green component (Articles 29-33) of the proposed scheme. The Commission's impact assessment states that eligibility criteria could be designed such that these payments are eligible to the Green Box, at least as long as the current eligibility criteria to the Green Box are not strengthened. The elements used to define an "active farmer" would need to respect WTO green box criteria, and in particular they cannot imply an obligation to produce. However, Swinbank (2012) argues that the Commission’s greening proposals could be in danger of infringing the green box requirement that no production is required to qualify for payment. Nor would the greening component appear to fit within the green box exemption for payments under environmental programmes. Swinbank also warns that if the green payment were reported as a decoupled income support payment, it might breach the conditions set out in the Agreement on Agriculture, due in particular to the obligation of

[33] This figure corresponds to the EU notifications for the marketing year 2007/2008. G/AG/N/EEC/68 24 January 2011.

[34] In this section, the Articles quoted refer to the October 2011 proposal, i.e. COM(2011)625 final, 2011/0280(COD), Brussels, 12.10.2011 document.

crop rotation, which involves growing three crops.[35] Swinbank also questions the measures regarding permanent pasture that targets a specific type of land.

There are thus dangers that the Commission's proposals could risk that the green payment would not be considered a green box payment. Swinbank also raises the possibility that, if the basic payment can only be claimed if the greening conditions are met, then it could put even the basic payment at risk as a green box measure: If greening involves one payment, not two (i.e. the basic and green components of the same payment), then the whole of the payment could be ineligible for the Green Box.

One may argue that there are current provisions in Member States GAEC requirements that already condition the current Single Farm Payment to growing three crops, and that the eligibility of such payments to the Green Box has not been challenged. And that permanent pasture is not necessarily used for production. More generally, it is hard to imagine that greening conditions imposed on the current direct payments make them more distorting. However, from a legalistic point of view, eligibility to the Green Box of close to 80% of the Pillar one payment would therefore be at risk.

Coupled payments. The possibility for Member States to use part of their national ceiling for direct payments for coupled support in certain sectors in clearly defined cases has perhaps more impact on the EU Amber Box than what the Commission's impact assessment of the proposal suggests.[36] Indeed, the proposal includes that the resources may be used for any coupled support, granted in specific regions facing particular situations where specific types of farming or specific agricultural sectors particularly important for economic, environmental and /or social reasons. This corresponds to an extension of the existing coupled aid schemes for cotton, sheepmeat and beef to any "sensitive" sector. The amounts could be significant. In the proposal of October 12 2011, Member States would be allowed to use up to 5% of their national ceilings for this support (or 10% in case their level of coupled support in at least one of the years of the period 2010-2013 exceeded 5%). In duly justified cases where certain needs in a region are demonstrated, Member states would be allowed to use more than 10% of their national ceiling. Potentially, if all Member states used the maximum recoupling, a 5% ceiling would involve a 2.1 billion budget.

In the Commission's proposal the 'voluntary coupled support' scheme would de facto replace coupled payments under Article 68 of Regulation 73/2009. That is, the overall impact on the AMS would be limited. However, the current Article 68, includes a ceiling that limits the possible budgetary outlays in a more stringent way than the scheme included in the October 12 2011 proposal.[37] Indeed, the reference to a 3.5% of the national ceiling of

[35] Paragraph 6 of Annex 2 of the Agreement on Agriculture addresses the conditions necessary for a payment to qualify as decoupled income support. Of particular relevance is sub-paragraph (b): The amount of such payment in any given year shall not be related to, or based on, the type or volume of production (including livestock units) undertaken by the producer in any year after the base period.

[36] The impact assessment remains rather vague regarding this issue. It states that "care should be exercised in rewarding specific types of production e.g. through a grassland premium, and certainly not production per se". (Document 20.10.2011 SEC(2011) 1153 final/2, page 72). However if payments intend to promote particular productions, it is likely that their Green Box status might be challenged.

[37] The 2003 regulation allowed Member States to earmark up to 10% of their respective national subsidy ceilings for "specific supports to farming" in their national territories. This principle was extended in articles 68 and 69 of Regulation 73/2009, which provided a wider range of objectives which can be used for granting specific support and eased the conditions attached. However, within the overall restriction of 10% of national ceilings, there are further limitations; i.e. that the coupled subsidies are limited collectively to 3.5% of the national ceiling [Article 69(4)]; and the support provided for economically vulnerable farming [under 68 (1) (b) of Regulation 73/2009] shall be limited to that required to maintain (i.e. no increase) existing production.

the Article 69 of Regulation 73/2009 does not seem to be maintained in the proposal. However, Article 39 (4) of the proposal refers to the setting of a ceiling that is decided by the Commission on a yearly basis. In addition, because of the requirement to motivate the need for coupled support, and the approval procedure by the Commission (all of which refers to a rather complex set of criteria under Articles 39,40,41 of the proposal) the budgetary amounts should be more limited than the proposed 5% of the ceiling. At this stage, it is difficult to assess how much the coupled payment proposed by the Commission might lead to increase the EU AMS.

Pillar 2 measures. The provisions regarding rural development in the Commission's proposal would not affect the eligibility of these programmes for the Green Box, as long as the eligibility criteria are not strengthened. Extra subsidies for rural development would mostly come from the capping of direct payments (also in the Green Box). New expenditure for food safety measures, agricultural research and innovation, schemes for most deprived person would be either matched by savings or would be transferred from existing budgets under other policies.

Insurance. Another potential impact on the AMS is the introduction of a new income insurance scheme in Pillar 2, that might generate a form of support that, in the WTO, might be seen as coupled to production. Indeed, currently, most insurance subsidies are notified in the Amber Box and counted as non product specific AMS. Only a small fraction of them are counted in the Green Box.

Given the opposition of some Member States to a EU wide funded insurance scheme, the Commission has proposed that this instrument be part of Pillar 2. That is, cofinancing from Member States would be required. Overall, the combination of the measures is such that for every euro paid into the mutual fund by farmers, an additional €0.65 would be topped from Pillar 2. The New tool would see 70% of farmers' losses reimbursed by a mutual fund if income drops by at least 30% below a three year average figure. The conditions set out in Articles 38-41 of the proposal on Rural Development[38] suggest that the EU subsidies to insurances schemes might be eligible to the Green Box. [39]

Conclusion. Given the current AMS ceilings, and the limited risk that any WTO member mounts a successful challenge of the green component of the Pillar 1 payments proposed by the Commission, the questionable Green Box compatibility of the proposed scheme is hardly a problem. The issue would only become relevant if a Doha Agreement was reached. However, Commission's proposal could potentially change the overall level of the EU AMS.

BOX 6.1. THE FUTURE ORIENTATION OF THE CAP?

The Commission's proposal for a Post 2013 CAP, released on October 12 2011 includes a significant reorientation of the direct payments, new instruments for managing markets, and more focus on environmental issues. The main provisions are the following.

[38] Brussels, 12.10.2011 COM(2011) 627 final 2011/0282 (COD)

[39] WTO rules consider disaster relief as non trade distorting if: (i) there is a formal recognition by government authorities that a natural or other event, including a disease outbreak, is a disaster; (ii) the event results in a production loss that exceeds 30% of the average of production in the preceding three-year period or a three-year average based on the preceding five-year period, excluding the highest and the lowest entry; (iii) the payments apply only in respect of losses of income, livestock, land or other production factors due to the natural disaster in question.

The proposal builds on the budget proposal released earlier, for the multi annual financial framework. Overall, spending on Pillar 1 would total to €312 billion for the 2014-2020 period, and an extra €101 billion would be allocated to Pillar 2. This funding would be complemented by extra budget coming from other programmes, in particular €5.1 billion for research and innovation; €2.5 billion for food safety; €2.8 billion for food support to deprived persons; €3.9 billion for the new reserve for crises in the agricultural sector; €2.8 billion in the European Globalization Adjustment Fund.

Market management. The intervention would remain in place for wheat (limited to 3 million tonnes a year), butter (capped a 30 000 tonnes), skimmed milk powder (capped at 109 000 tonne). A tendering process, rather than automatic buy in would be in place for barley, maize, paddy rice, beef and veal. A private storage aid would cover sugar (after the end of the quotas, which would take place in 2015), olive oil, flax, beef, butter, skimmed milk powder, pig meat and sheep meat. The aid to dispose surplus of milk powder and casein would be abolished. The recognition of producers' organisations would be extended to all sectors. Public intervention, private storage and export returns would be funded from a €3.5 billion "crisis reserve" separate from the CAP and Multi Annual Financial Framework.

Direct payments. A "Basic Payment" scheme would replace the current Single Farm Payment and the Simplified Area Payment Scheme. All EU member states would have to move towards a uniform payment per hectare at the regional level by 2019. National envelopes for direct payments would be adjusted so that those that receive less than 90% of EU average payment per hectare will receive more, so that the gap will be reduced by one third by 2018. Direct payments in excess of €150 000 would be capped at progressive rates with an absolute ceiling of €300 000 (exclusive of the greening component). A simplified flat rate system would be introduced for small farms, which would be also exempted from greening requirements.

A greening element would be introduced. Some 30% of direct payments would be conditional to three measures, crop diversification (arable farmers would have to cultivate at least 3 crops a year, none accounting for more than 70% of the surface and each at least for 5%); devote 7% of land as an ecological focus area; maintain permanent pasture. The remaining payments (i.e. 70% of the envelope) would continue to be based on cross-compliance, but with simplified requirements. Two extra layers of payments would be allowed, one for areas with natural constraints (in addition to the Less Favoured Areas payments under Pillar 2), the other for young farmers, both subject to limitations (a maximum of respectively 5% of national envelope and 2% of Pillar 1 national envelopes). New criteria would be introduced for receiving direct payments, that the farmer must be "active", i.e. receiving at least 5% of beneficiary earnings from agriculture (exemption for small farmers).

Rural development would be reformed significantly, with new priorities. At least 25% of pillar 2 envelopes would be devoted to climate change mitigation and adaptation and land management measure (including organic farming). A new insurance scheme would see 70% of farmers' losses reimbursed by a mutual insurance fund if income falls below a certain threshold. Pillar 2 would fund partially this mutual fund, in addition to farmers' contributions. The rates of financing of some Pillar 2 measures by the EU budget would also be revised upwards (LEADER projects, innovation and knowledge transfers, etc.).

6.2. Alternative ways for the post 2013 CAP

The October 12, 2011 Commission proposal has triggered several reactions from Member States as well as Members of the European Parliament. Drawing up a list of the various positions and criticisms is outside the scope of this report, but some of them relate to the differences between instruments to support farmers used by the EU and those used by other countries. For selected issues the comparison carried out in Section 5 could shed some light.

6.2.1. Making support more countercyclical?

The examination of both the US and Canadian agricultural support shows that these countries have designed farm support instruments that protect farmers from adverse market as well as weather situations to a much larger extent than the EU. Indeed, while EU support now relies mainly on fixed and decoupled payments, these countries have implemented schemes under which payments are triggered in cases of poor harvest or low prices. The US, in particular, relies more than the EU on countercyclical measures.

In the EU, several stakeholders criticized the Commission's proposal as failing to protect farmers in low price periods such as the year 2009. The idea of adjusting payments to market conditions, i.e. turning the SPS into a countercyclical payment scheme, has been recently backed by some farmers' organizations and cooperatives in particular (see EP, 2010 for a review of the stakeholders 'positions). They have quoted openly the US model as an example.

Should the US policy be a source of inspiration for the EU? Adjusting the EU payments downwards when market conditions are good and upwards when farm incomes are low is would help smoothing farm income variations. It might also make the current system more acceptable to the public opinion (for example, grain producers enjoyed both very high prices and direct payments in 2008 or 2011). In spite of some attractive features, making SPS payments countercyclical would have many unwanted effects as well:

First, it would raise some administrative problems regarding the EU budgetary procedure. A possibility would be to impose that a multi annual budget be spent over some years with variations over time depending on market conditions, but the operational design of such a scheme is not a trivial task. If successful, one may wonder which value added brings the countercyclical management: farmers might just as well handle the adjustment themselves with the help of the banking sector if the total value of direct payments over a period of several years is known beforehand.

Second, it would blur the signals of excess supply or excess demand to producers and thus potentially lead to market imbalances. At a time where market prices send producers the signal that stocks are low and demand is high, government intervention would introduce a rather inefficient dampening of such signals.

Third, making the payments depend on the market situation would strongly limit the ability to condition payments to GAECs or other cross compliance provisions. Incentives from cross-compliance would be weakened in times of booming markets, when they are needed most. Conversely, cross-compliance incentives would be reinforced when low prices would also operate towards less intensive production methods. 'Would-be- providers' of public

goods need to have a predictable horizon, given the sunk costs that are often necessary to shift to different production techniques. [40]

Fourth, designing the income support component of the SPS as a substitute for market regulation would be difficult to manage given that the prices of all products do not vary evenly. It would basically require a return to product specific payments, which would be a radical turnaround for the CAP. Countercyclical payments would require de facto shifting back to product-specific payments.

Finally there might be some inconsistencies with the EU multilateral commitments under the WTO framework. While such a scheme would be compatible with current multilateral commitments given the gap between current AMS and the AMS ceiling, the future limits on distorting support might be constraining in case of a Doha agreement.

Conclusion. The Commission has not proposed turning the EU Single Farm Payment into an instrument that adjusts to market conditions as it is the case with several US and Canadian schemes. Overall, the risk is that EU producers remain more exposed to variations in market conditions than the US and Canadian ones. However, because of the economic inefficiency and the distortions involved by the US schemes, the US policy hardly appears as an example that should be followed. And making EU payments countercyclical would involve a de facto recoupling of the payments to particular products. And for the EU to adopt schemes which required supplementary budgetary allocations of several billion Euro (as typical for the US), the EU budget would need to be much more flexible.

6.2.2. More risk management tools, including insurance schemes?

The US and Canada rely much more than the EU on insurance based support. In the US, public subsidies to insurance now represent a large share of the overall support to farmers (see EP, 2009 for details on the US insurance schemes, ACRE and SURE). The Commission proposal is much less ambitious in terms of income insurance in particular.

The risk management tools that are proposed by the Commission cover (i) crop, animal and plant insurance against economic losses caused by adverse climatic events and animal or plant diseases or pest infestation; (ii) mutual funds to pay financial compensations to farmers, for economic losses caused by the outbreak of an animal or plant disease or an environmental incident; (iii) an income stabilisation tool in the form of financial contributions to mutual funds, providing compensation to farmers who experience a severe drop in their income. The item (iii) is clearly an innovation, even though some schemes existed in some Member States.

Should the EU move towards a US/Canadian approach? Government intervention has a role to play in insurance, at minimum by providing transparent information allowing for private companies to supply index based weather insurance, for example. In the case of catastrophies, epizooties and other particular hazards, the need for publically-funded insurance schemes or disaster compensations is hardly questioned. However, going further than the Commission's proposal towards an EU wide income stabilisation scheme would need to be more clearly documented.

[40] In the case of payments that intend to favour the provision of public goods, one may even consider that payments should even be made procyclical rather than countercyclical in order to keep the provision of public goods attractive when market prices are high. Indeed, as farmers tend to decrease participation in agri-environmental schemes and voluntary set-aside when agricultural commodity prices are high, this should not be encouraged by reducing the environmental payments in these periods.

First, there is little European value added in insurance scheme management. Several Member States, not subsidizing their own insurance system, have repeatedly expressed their reluctance to such a scheme during the Health Check debate. Second, an EU wide insurance scheme might lead to large interannual variations in expenditure, which would require more flexibility in the EU budget. [41]

Third, evaluations of the US insurance scheme stress the cost for the public budget and the low efficiency in transfers when one compares the cost paid by the taxpayer and the government to the payments received by farmers (Glauber, 2007; Babcock and Hart 2006; Gardner 2008, Babcock 2009). Management costs, in addition to possible rents and leakages are associated to insurance schemes. From a transfer efficiency standpoint, it is unlikely that farmers would be better off-with a given budget spent for subsidizing insurance rather than a direct payment, at constant budget (under reasonable assumptions on farmers' expected utility function).

Rather than implementing an ambitious US type system of insurance and disaster payments, the Commission designed instruments (through the reserve for crises) that find some inspiration in the package of measures implemented by the Commission to cope with the dairy crisis in 2009,. Consequently, EU producers remain more exposed to adverse conditions than the US ones. However, the system of direct payments proposed by the Commission remains a more efficient way to transfer money to farmers than the costly US insurance scheme.

6.2.3. More ecological compensation areas?

The Swiss farm support policy targets the provision of public goods much more than the EU one. In particular, landscape, water management, rural vitality, and biodiversity. The degree of reorientation of the CAP budget towards the funding of such public goods has been the subject of intensive debate during the elaboration of the CAP reform proposal (see EP, 2010 for a position of the different stakeholders, and TWG3, 2011 for proposals regarding public goods). In practice, the October 12, 2011 Commission proposal has not focused as much on the provision of such public goods as environmental organisations expected.[42]

The plan to "green" CAP support by making a fraction of the payments conditional on environmental practices is perhaps the issue that has raised most criticisms after the Commission unveiled its CAP plans for post 2013. Agricultural organisations such as the COPA-COGECA, as well as some Member States and some Members of the European Parliament criticized the "ecological focus" as being de facto a "7% set-aside".[43] They claim that it would be illogical to leave land idle at times of growing world demand. At the same time, the Commission's plan has been criticized for having "weak, vague conditions"

[41] The potential magnitude of the US payments under the insurance, ACRE and SURE programs is very large. Orden et al. (2008) concluded that if the 1980s structure of prices were to happen again, ACRE payments would reach very high levels for a few years. They find it difficult to predict whether such payments will fit in a particular year. The expected amount could be included in a range of US-dollars 1 to 17 billion (see Zulauf 2008).

[42] On October 2011, environmental NGOs expressed their disappointment at the Commission's proposal accusing the Commission of watering down the plans to promote public goods so much that they amounted to "greenwashing". See the position of BirdLife Europe, Friends of the Earth Europe, WWF (Agra Europe, October 18, 2011, p. 7).

[43] Note that this claim is partly unfounded since the ecological focus area is not a compulsory set aside in the sense that all productive activity is forbidden. In addition, it is estimated that the current situation, where farmers cannot use some section of their fields, where there are hedges and bordures in addition to the buffer strips) corresponds on average to 3% to 4% of the agricultural area, meaning that the additional effort is closer to 3%.

(Greenpeace), while the WWF suggested that 100% of the subsidies rather than 30% should be subject to greening requirements.

Should the EU draw from the Swiss policy? Switzerland has developed an ambitious policy to protect biodiversity and water, which relies in particular on the cross compliance for direct payments. In this area, the Swiss experience goes beyond what the Commission proposes for the post 2013 CAP.

Ecological compensation was initiated under the agri-environmental schemes in the 1990s and has become part of the conditionality for the eligibility for direct payments in 1998. Switzerland is the first European country where cross compliance was used directly for the promotion of biodiversity, even though in the 1990s and 2000s, the EU also conditioned direct payments to set-aside land, which had some ecological interest (at the time requirements allowed for set-aside to be rotational, i.e. with more limited benefits for flora and fauna than the Swiss schemes). In Switzerland, in order to receive direct payments, farmers must manage at least 7% of their land as an ecological compensation surface. It is estimated that roughly 88% of farmers, accounting for 97% of total agricultural area in Switzerland meet these conditions. If one accounts for other environmental programmes that complement the requirement of ecological compensation for obtaining the direct payments, surfaces devoted to such an ecological use account for 13.6% of Swiss agricultural area according to Trometter et al. (2008).

Environmental assessments of the different agri-environmental programs conclude that generally positive effects occur, but the magnitude of these effects differs. Lebeau and Righetti (2008) conclude that the positive effects on the quality of biodiversity have been rather modest. Aviron et al. (2009) monitored the effectiveness of cross compliance in promoting biodiversity on grassland and on arable land over an eight-year period in Switzerland. They observed measurable benefits for flora, butterflies, ground beetles, and spiders, in terms of species numbers and/or community composition, but little benefit for some threatened species. Some other estimates put Switzerland at the highest rank in terms of the effectiveness of agro-environmental policies to preserve biodiversity. While in most cases the impact of the Agri-Environmental Schemes in the EU is either uncertain or disappointing, in Switzerland results appear more convincing (Herzog and Walter 2005; Albrecht et al. 2007). According to Trometter et al. (2008) Switzerland appears as the only European country where agri-environmental measures involve a significant positive impact on biodiversity erosion.

Such erosion is dramatic and has accelerated over time in the EU.[44] (see BirdLife 2011; Jiguet 2011). The scientific assessments are perhaps not consistent enough to conclude that the ecological compensation surface explains the better performance of the Swiss conservation policy compared to the EU schemes. Should further scientific results conclude in this direction, then this should be a source of inspiration for the EU. Indeed, the Commission's proposal of conditioning 30% of the direct payments to a series of constraints including an "ecological focus area" would draw the CAP closer to the Swiss policy.

[44] The Pan-European Common Bird Monitoring Scheme has compiled population figures for 145 common and widespread bird species in 25 European countries between 1980 and 2009. Amongst those species covered, farmland birds are the most threatened group, with 20 out of 36 species in decline, and overall numbers at an all-time low, down by 48% since 1980. Some of the species that have declined the most over the last three decades include familiar farmland birds like Grey Partridge *Perdix perdix* (–82%), Skylark *Alauda arvensis* (–46%), Linnet *Carduelis cannab*ina (–62%) and Corn Bunting *Miliaria calandra* (–66%). Figures from national inventories, in particular the STOC data in France, show very large decreases too, including such as for skylark with a decline of 71% over the last 20 years.

Introducing some ecological conservation areas would also rebalance the EU environmental policy towards a "land sparing" option, while the EU rural development has traditionally relied on "land sharing", i.e. putting the farm system at the core of the provision of ecosystem services. Recent findings in ecology suggest that the land sparing option is an option that deserves consideration in the EU.

However, the current proposal for an ecological focus involves economic costs. Its ability to make a significant difference in the dramatic erosion of biodiversity deserves more scientific assessments, in particular regarding the linkages of the conservation areas and the existence of threshold effects.

6.2.4. More emphasis on research and innovation?

The growth in agricultural output for selected emerging countries has been much higher than in the EU on over the last decade. Brazil, in particular, had a growth rate of production exceeding 5% per year since 1995. One explanation is the priority that Brazil, as well as other leading emerging countries, has given to agricultural research and innovation as well as infrastructure. According to OECD figures, Brazil's public expenditure on agricultural research and development has tripled between 2007 and 2010, from 7% of General Services Support Estimates to 17%, i.e. US$0.4 billion in 2010. The Agricultural Science and Technology Indicators, while giving much larger figures, confirm that public agricultural R&D spending has increased substantially in recent years due to the renewed commitment on the part of the Brazilian government.[45] In spite of the uncertainty on the actual figures, both sources converge to indicate that Brazil has taken agricultural research and innovation as a priority in its farm support policy (Beinteima et al. 2010).

Research and innovation have never been formally part of the CAP. However, the Commission's proposal for the post 2013 CAP stresses the need for a major increase in research and innovation to address the urgent social challenges of providing more food in an environment of increasing land use competition and pressures on resources and the environment.

Given the recent trends in EU yields whose growth has been declining for crops such as wheat, the question is whether the post 2013 CAP does enough to promote innovation (Chavas, 2011). Three instruments are envisaged in the Commission's CAP reform proposals to support this agenda: (i) Continued support in the Rural Development Pillar 2 for investment in physical assets, business development, cooperation for the development of new products, processes and technologies in the agriculture and food sector as well as a revamping of farmer advisory services to broaden their scope and improve their effectiveness. (ii) A new European Innovation Partnership (EIP) instrument for agricultural productivity and sustainability also in the Rural Development Pillar; (iii) Increased funding for agricultural and food research under the Commission's Horizon 2020 research programme (Matthews, 2012).

The main role of the future EIP 'Agricultural Productivity and Sustainability' would be to look at the whole innovation cycle from R&D all the way to products or services on the market and enhance the effectiveness and the integration of innovation instruments.

[45] Brazilian Agricultural Research Corporation (Embrapa)'s 2009 spending, for example, was 28% higher than its 2008 spending (adjusted for inflation), its highest level, since inauguration. It is noteworthy that the progression of public agricultural R&D expenditure in China is even more impressive according to Beintema and Stads (2010).

Actions would include cooperation, pilot-projects, knowledge transfer, advisory services, and dissemination. The objective is to put together a functioning network filling the current gap between farmers, rural enterprises, and advisors, on the one hand, and science on the other to allow the sector to take full advantage of innovation.

In the Commission's proposal on the multi-annual financial framework for 2014-2020, funding for the next EU research programme increases from less than €2 billion to €5.1 billion.[46] It is instructive to realise that the sum of all national and EU outlays for research in agriculture and related biology, the maximum figure reaches €4.2 billion per year for EU public R&D funding (2008 figures). This can be compared to some degree with the €43 billion provided as direct payments to EU farmers in 2008, or the €90.3 billion of transfers to farmers as measured as the OECD PSE. Even if the €5.1 billion EIP is passed, it is important to view this in the context of the proposed total CAP budget of €387 billion.

The Commission's proposal EU is increasing its budget on public agricultural R&D. However, observers have pointed out that the shift of EU expenditure away from farm income support to agricultural innovation is limited. IPC (2011) questions the persisting priority given to supporting farmers' income rather than investing in the future of the sector, given the challenges that agriculture faces.

[46] On an annual basis, IPC (2011) estimates that funding for Food, Agriculture and Technology under the "Cooperation" item accounts for less than €300 million, out of the total R&D budget of roughly €8 billion per year. If one includes other programs such as capacity building, mobility of researchers, technology platforms, total Community support, agricultural R&D efforts may reach €500 million. Member states also provide outlays on agricultural R&D, amounting to €3.7 billion in 2008.

7. CONCLUSION

The EU has carried out reforms that have made farm support more efficient in the sense that more of the transfers from taxpayers and consumers now reach the farmers' pockets. Leakages were larger with former policies such as price support and export subsidies. The EU support now generates much less distortion in world markets. The EU also has a large degree of freedom regarding its international commitments, which focus on coupled and trade distorting forms of support. Regarding the levels of support, the PSE relative to production shows that the EU is in the average OECD countries, at levels close to Russia, China and of Canada. It is still double of the support in the US on the basis of the percentage PSE.

In many other OECD countries, the evolution of farm support has followed a rather similar path to the EU one. Switzerland went further in shifting support towards the provision of public goods. Compared to the EU, the US and to some extent Canada, have maintained instruments that protect producers from market fluctuations. The US support is lower than the EU one, but part of the difference is explained by the current high level of world prices. Indeed, the US support relies more on countercyclical instruments than the EU. These instruments are not dismantled, they are simply inactive. This is an important difference with the EU support which relies on instruments that generate less market distortions.

Agricultural support in emerging countries has not evolved in the same way as in developed countries. In Russia and China, there has been a strong growth in the volume of support (in particular in China). Both countries support their agriculture in proportions that are similar to the EU one, and higher if one accounts for the public support to general services. In addition, agricultural policies rely primarily on coupled support in these countries. While most OECD countries, and in particular the EU, have played by the rules regarding the WTO discipline, it is possible that in some emerging countries, which lag behind in their reporting, the level of distorting support measured by the AMS is now beyond their international commitments, but delays in the notifications do not allow to conclude. Finally, the analysis of the general services shows that emerging countries such as Brazil and China invest heavily in research. The progression of the R&D expenditure in these countries dwarfs the efforts of the EU to increased public research budgets. As noted by several observers, the EU and US policies seem to keep focusing more on supporting farmers' income than investing in innovation.

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ANNEXES

Annex 1. The OECD indicators

Producer Support Estimate (PSE): the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, measured at the farm-gate level, arising from policy measures that support agriculture, regardless of their nature, objectives or impacts on farm production or income. ***Percentage PSE (%PSE):*** PSE as a share of gross farm receipts (including support). ***Producer Nominal Assistance Coefficient (producer NAC):*** the ratio between the value of gross farm receipts (including support) and gross farm receipts valued at border prices (measured at farm gate). ***Producer Nominal Protection Coefficient (producer NPC):*** the ratio between the average price received by producers at farm gate (including payments per tonne of current output), and the border price (measured at farm gate). ***Producer Single Commodity Transfers (producer SCT):*** the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, measured at the farm gate level, arising from policy measures directly linked to the production of a single commodity such that the producer must produce the designated commodity in order to receive the transfer. ***Producer Percentage Single Commodity Transfers (producer %SCT):*** the commodity SCT as a share of gross farm receipts for the specific commodity. ***Group Commodity Transfers (GCT):*** the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, measured at the farm gate level, arising from policy measures whose payments are made on the basis that one or more of a designated list of commodities is produced, i.e. a producer may produce from a set of allowable commodities and receive a transfer that does not vary with respect to this decision. ***All Commodity Transfers (ACT***): the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, measured at the farm gate level, arising from policy measures that place no restrictions on the commodity produced but require the recipient to produce some commodity of their choice. ***Other Transfers to Producers (OTP***): the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, measured at the farm gate level, arising from policy measures that do not require any commodity production at all. General Services ***Support Estimate (GSSE):*** the annual monetary value of gross transfers to general services provided to agricultural producers collectively (such as research, development, training, inspection, marketing and promotion), arising from policy measures that support agriculture regardless of their nature, objectives and impacts on farm production, income, or consumption. The GSSE does not include any transfers to individual producers. ***Percentage GSSE (%GSSE):*** GSSE as a share of Total Support Estimate (TSE). ***Consumer Support Estimate (CSE):*** the annual monetary value of gross transfers from (to) consumers of agricultural commodities, measured at the farm gate level, arising from policy measures that support agriculture, regardless of their nature, objectives or impacts on consumption of farm products. ***Percentage CSE (%CSE):*** CSE as a share of consumption expenditure (measured at farm gate) net of taxpayer transfers to consumers. ***Consumer Nominal Assistance Coefficient (consumer NAC):*** the ratio between the value of consumption expenditure on agricultural commodities (at farm gate) and that valued at border prices (measured at farm gate). ***Consumer Nominal Protection Coefficient (consumer NPC):*** the ratio between the average price paid by consumers (at farm gate) and the border price (measured at farm gate). ***Consumer Single Commodity Transfers (consumer SCT):*** the annual monetary value of gross transfers from (to) consumers of

agricultural commodities, measured at the farm gate level, arising from policy measures directly linked to the production of a single commodity. ***Total Support Estimate (TSE):*** the annual monetary value of all gross transfers from taxpayers and consumers arising from policy measures that support agriculture, net of associated budgetary receipts, regardless of their objectives and impacts on farm production and income, or consumption of farm products. ***Percentage TSE (%TSE):*** TSE as a share of GDP

Annex 2. PSE categories and sub categories

A. Support based on commodity output

A.1. Market price support (MPS) - transfers from consumers and taxpayers to agricultural producers arising from policy measures that create a gap between domestic market prices and border prices of a specific agricultural commodity, measured at the farm gate level.

A.2. Payments based on output - transfers from taxpayers to agricultural producers from policy measures based on current output of a specific agricultural commodity.

B. Payments based on input use: transfers from taxpayers to agricultural producers arising from policy measures based on on-farm use of inputs:

B.1. Variable input use – transfers reducing the on-farm cost of a specific variable input or a mix of variable inputs.

B.2. Fixed capital formation - transfers reducing the on-farm investment cost of farm buildings, equipment, plantations, irrigation, drainage and soil improvements.

B.3. On-farm services - transfers reducing the cost of technical, accounting, commercial, sanitary and phyto-sanitary assistance, and training provided to individual farmers.

C. Payments based on current A/An/R/I [(1)]**, production required**: transfers from taxpayers to agricultural producers arising from policy measures based on current area, animal numbers, receipts or income, and requiring production. Category C is further Broken down to two sub-categories:

C.1. Based on current receipts/income – including transfers through policy measures based on receipts or income.

C.2. Based on current area/animal numbers – including transfers through policy measures based area/animal numbers.

D. Payments based on non-current A/An/R/I, production required: transfers from taxpayers to agricultural producers arising from policy measures based on non-current (i.e. historical or fixed) area, animal numbers, receipts or income, with current production of any commodity required.

E. Payments based on non-current A/An/R/I, production not required: transfers from taxpayers to agricultural producers arising from policy measures based on non-current (i.e. historical or fixed) area, animal numbers, receipts or income, with current production of any commodity not required but optional. Category E is further divided in two sub-categories according to the nature of payment rates used:

E.1. Variable rates - transfers using payment rates which vary with respect to levels of current output or input prices, or production/yields and/or area.

E.2. Fixed rates - transfers using payment rates which do not vary with respect to these parameters.

F. Payments based on non-commodity criteria: transfers from taxpayers to agricultural producers arising from policy measures based on:

F.1. Long-term resource retirement - transfers for the long-term retirement of factors of production from commodity production. The payments in this subcategory are distinguished from those requiring short-term resource retirement, which are based on commodity production criteria.

F.2. A specific non-commodity output - transfers for the use of farm resources to produce specific non-commodity outputs of goods and services, which are not required by regulations.
F.3. Other non-commodity criteria - transfers provided equally to all farmers, such as a flat-rate or lump-sum payment.
G. Miscellaneous payments: transfers from taxpayers to farmers for which there is insufficient information to allocate them to the appropriate categories.

(1). The abbreviations represent: A – Area; An – Animal numbers; R – Receipts; and I - Income

Source: OCDE PSE Manual.

Annex 3. PSE labels

With or without current commodity production limits and/or limits to payments (with/without L): defines whether or not there is a specific limitation on current commodity production (output) associated with a policy providing transfers to agriculture and whether or not there are limits to payments in the form of limits to area or animal numbers eligible for those payments. Applied in categories A – F.
With variable or fixed payment rates (with V/F rates): a payment is defined as subject to a variable rate where the formula determining the level of payment is triggered by a change in price, yield, net revenue or income or a change in production cost. Applied in categories A – E.
With or without input constraints (with/without C): defines whether or not there are specific requirements concerning farming practices related to the programme in terms of the reduction, replacement, or withdrawal in the use of inputs or a restriction of farming practices allowed. Applied in categories A – F.
– Payments conditional on compliance with basic requirements that are mandatory (with mandatory);
– Payments requiring specific practices going beyond basic requirements and voluntary (with voluntary).
Based on area, animal numbers, receipts or income (based on A/An/R/I): defines the specific attribute (i.e. area, animal numbers, receipts or income) on which the payment is based. Applied in categories C – E.
Based on a single commodity, a group of commodities or all commodities (based on SC/GC/AC): defines whether the payment is granted for production of a single commodity, a group of commodities or all commodities. Applied in categories A – D.
With or without commodity exceptions (with/without E): defines whether or not there are prohibitions upon the production of certain commodities as a condition of eligibility for payments based on non-current A/An/R/I of commodity(ies). Applied in Category E.

Source: OCDE PSE Manual.

Annex 4. The US layers of payments to farmers

Three US programs are designed to support farm incomes: direct payments, countercyclical payments and marketing loans. It relies on a complex system of several layers of payments.

Marketing loan program. The "loan rates" are actually administratively set prices for each program crop, which guarantee that unit returns for farmers will be at least as high as the corresponding loan rate. Farmers then use the loans to finance their upcoming crops, with those crops used as collateral. If the market price for the crop is above the loan rate, the producer can repay the loan and keep the balance. If the market price falls below the loan rate, there are four options for farmers to obtain the loan rate rather than the lower market price as the effective producer price. *First* the government is obliged, at the farmer's option, to receive the crops tendered as collateral into public stocks as full repayment for the loan (termed a "non recourse loan"). *Second*, the producer can choose to repay the loan at the 'loan repayment' rate. This loan repayment rate is usually set slightly below county level market prices such that producers will pay back the loan at the repayment rate and keep the difference between the market price and the loan repayment rate as an additional profit (termed 'marketing loan gain'). A *third* option for farmers at any time after harvest, if market price is below the loan rate, is to either take out a 'marketing loan' from the government or simply to take a payment equal to the product of harvested production and the difference between the loan rate and the loan repayment rate. That is as if the farmer takes out a loan at the loan rate and then immediately pays back the loan at the loan repayment rate. This payment is called a *loan deficiency payment* (LDP). If the loan repayment rate equals the local cash price, and the farmer chooses to market the crop when the LDP is received, then the farmer effectively obtains the loan rate as a market price at harvest. The *fourth* option for producers to benefit from the marketing loan program is to buy *marketing certificates* from the USDA available at a price equal to the loan repayment rate. The quantity of certificates that the producer buys is equal to the quantity that the producer placed under loan. The producer can forfeit the loan to the government and buys back the amount placed under loan with the certificates. The marketing loan program allows USDA to guarantee that farmers receive at least the loan rate as a producer price for their crop without the need for government to actually take possession of crops. This means that market prices are free to adjust downward to clear domestic and international markets.

"Direct payments". While there are other forms of direct payments (see below) this category includes transfers that are largely independent from price variations and to a large extent decoupled from production. The level of these payments is determined by multiplying a crop-specific direct payment rate by 85 percent of a farm's direct payment base acres and payment yields (the 85 percent were changed temporarily to 83.3 percent under the FCEA, i.e. until 2011). Corn, wheat, soybeans, cotton and rice account for 95 percent of all direct payments.

Countercyclical Payment Program (CCP). Payments under this program are triggered whenever the market price ("season-average" price) is less than the effective target price. Effective target prices are the difference between target prices and direct payment rates. The CCP payment rate equals the difference between the effective target price and the market price, but if market prices drop below loan rates, the latter are used to calculate payment rates. The amount of payment equals 85 percent of the product of the payment rate, a farm's program yield, and a farm's program acreage (the FCEA changes on the base acreage do not affect countercyclical payments). It is unclear to what extent these

payments, which are linked to market prices but decoupled from current production, have impact on planting.

Direct and countercyclical payments are made on the basis of each farmer's base crop area and yield, irrespective of what is actually produced on the base area. For example, a farmer with a cotton base receives direct and countercyclical payments for cotton even if he or she is producing another crop, such as soybeans, or nothing at all. The only instances when program crop farmers are precluded from receiving any program payments are if they are producing fruit, vegetables or wild rice on their program bases. That does not mean that their impact on production is zero, given some indirect effects through risk reduction, alleviation of financial constraint, etc. However, it is quite limited. Because marketing loans guarantee farmers a minimum price for all production, they have the potential to influence acreage decisions more than any other program. Whereas direct payments and countercyclical payments may create some indirect incentives to change planting decisions, a guaranteed price creates a direct incentive.

The ACRE program. A major change in the farm support with the 2008 agricultural Act is the introduction of an Average Crop Revenue Election (ACRE) program. Farmers may choose either to stay with the traditional CCP or this new revenue based ACRE option. The ACRE program is available for the same crops as traditional CCP payments, including pulses. Farmers must enter all of their eligible crops into the program, not just one or some.

To receive an ACRE payment, two triggers need to be met. First, the actual state revenue for a supported crop must be less than the state level revenue guarantee amount. Second, the farm's actual revenue for the same crop must be less than the farm's benchmark revenue. The farm revenue trigger avoids the case where a farm would receive marketing loan and counter-cyclical payments even when it has above average revenue (due to high individual farm yields). The State revenue guarantee is computed as 90 percent of the product of an average guarantee yield and a price guarantee. The state guarantee yield is an Olympic average of the most recent five years. The price guarantee is the average over the most recent two years of the market price (or 70 percent of the marketing loan rate if higher). Changes in the State revenue guarantee are limited to plus or minus 10 percent from the previous year. As regards the farm benchmark revenue, it is also included as the product of a 5 year Olympic average crop yield and the ACRE price guarantee. Actual crop insurance premiums per acre paid by the farm are also included in this farm benchmark revenue (contrary to actual farm revenue) and thus provide an incentive to buy crop insurance.

Whatever market conditions, participants in ACRE continue to receive direct payments, but with a 20 percent cut. Participants also continue to be eligible for marketing loan programs, but with a 30 percent lower loan rate. If both triggers mentioned above are met, the ACRE payment per acre will be provided, calculated as the difference between state revenue guarantee and actual state revenue or 25 percent of state revenue guarantee if lower. This per acre state payment is calculated at the farm level by applying a farm specific productivity ratio (given by a 5 year Olympic average farm crop yield per planted acre divided by the State guarantee yield). This farm level ACRE payment per acre is applied to 85 percent of farm planted acreage of the given crop. Thus ACRE payments are based on planted acres rather than base acres. However the total number of planted acres enrolled in ACRE cannot exceed the total number of base acres for all covered commodities on a farm. If planted area exceeds base area farmers may enrol that crop mix ACRE that maximises total payments in the year of entering ACRE and beyond.

The SURE program. The Supplemental Revenue Assistance program protects against crop losses resulting from adverse weather. While past disaster programs made payments based on individual crop losses and were often tied to base acres for either direct payments or countercyclical payments, SURE is a whole-farm disaster assistance program (all acres in all counties) that is tied to crop insurance coverage and farm planted. SURE covered the 2008–11 crop years. To qualify, a producer (a) must purchase insurance for insurable crops at a minimum coverage of 50 percent of yield and 55 percent of price and purchase Noninsured Crop Assistance Program (NAP) for non-insurable crops, and (b1) must farm in a county declared a disaster county or contiguous county, or (b2) has total farm production that is 50 percent or less of normal due to adverse weather. The farm-specific" program guarantee" is determined by a (complicated) formula. If SURE-computed actual revenue is below the farm specific SURE program guarantee and at least one of the two trigger events (county disaster or 50 percent farm revenue loss) has occurred, then SURE will pay out. The payments will be equal to 60 percent of the difference between the "program guarantee" and the "computed actual revenue", and capped at 90 percent of the "expected revenue".

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