

Revisited framework of agricultural domestic support for CGE modelling

The case of the European Union

WORK IN PROGRESS

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Abstract.

A comprehensive database on domestic support is key for any meaningful agri-food policy computable general equilibrium (CGE) analysis. In the GTAP database – the main data source used for global CGE analysis – domestic support levels are calculated from the OECD Producer Support Estimate (PSE). The GTAP database version 9, released in 2015, includes a new representation for the European Union (EU) which combines the strengths of two datasets, i.e. the PSE and the Clearance Audit Trail System (CATS) database from the European Commission. This paper compares the version 9 approach with an alternative one that makes the representation of EU expenditures more transparent and inclusive. It clearly highlights that this later includes more payments than the traditional methodology. Indeed an accurate classification shall embrace domestic support going beyond the PSE, being defined as General Services Support Estimate (GSSE) or Consumer Support Estimate (CSE) by the OECD. Accordingly any change in the accounting convention for the EU domestic support can only have a comparative significance if other countries also follow.

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Preliminary draft: July 30, 2015

I. Introduction

The GTAP database is the main data source used for global applied trade analysis, especially with computable general equilibrium (CGE) modelling. In its new incarnation (GTAP data version 9) it contains complete gross bilateral trade, transport and protection data for 140 regions and 57 sectors (3 reference years: 2004, 2007 and 2011). A novelty of the representation of the European Union (EU) domestic support in version 9 relies on the combination of the strengths of two datasets, i.e. the Producer Support Estimate (PSE) from the OECD, and the Clearance Audit Trail System (CATS) database from the European Commission. Section 2 discusses both datasets. Section 3 explains how both CATS and PSE data are combined to calculate EU agricultural domestic support for the year 2011 and to calibrate into the GTAP database version 9. As a result, the procedure broadly follows that developed by Jensen (2010, 2011) for previous GTAP database releases. Then, section 4 presents and discusses an alternative approach to represent EU agricultural domestic support based on previous research at JRC IPTS (Boulanger and Philippidis, 2014, 2015). Finally, section 5 concludes and put the EU case within a comparative framework.

II. Domestic support data: PSE and CATS

In the GTAP database domestic support relies on the Producer Support Estimate (PSE), one of the indicators developed by the OECD to evaluate and monitor agricultural policies. While initially calculated for OECD countries, these estimates have also been performed for some non-OECD countries, i.e. Brazil, China, Indonesia, Kazakhstan, Russia, South Africa, and Ukraine. The EU is treated as a single region.

The PSE measure is further disaggregated into four groups of support, namely Single Commodity Transfers (SCT); Group Commodity Transfers (GCT); All Commodity Transfers (ACT); and Other Transfers to Producers (OTP) (see Box 1). In addition, policy measures (budgetary transfers) are classified into seven broad categories linked to the transfer basis of the policy, i.e. whether the basis is current or non-current (i.e. the amount is explicitly linked – or not – to current per unit of output, input, area, animal number, etc.) and whether production is a requisite for receiving the payment (OECD, 2008). It should be mentioned that in the context of this work, we exclude market price support (A1) in order to avoid double counting with tariffs in the GTAP database:

- A2. Payments based on output
- B. Payments based on input use (*B.1. Variable input use – B.2. Fixed capital formation – B.3. On-farm services*)
- C. Payments based on current Area (A), Animal Numbers (AN), Receipts (R) or Income (I), production required
- D. Payments based on non-current A/AN/R/I, production required
- E. Payments based on non-current A/AN/R/I, production not required
- F. Payments based on non-commodity criteria
- G. Miscellaneous

Using a standard formula applied to all regions in the GTAP database, the above PSE categories are linked to the GTAP support categories as follows:

- Output payments: A2
- Intermediate input payments: B1, B3
- Land-based payments: C, D
- Capital-based payments: B2, C, D
- Labour-based payments: C, D
- All factors: E
- Not allocated in GTAP database: A1, F, G

Because the EU is treated as a single region in the PSE, data for the EU is further disaggregated for the 27 individual member states. OECD secretariat provides such a disaggregation for national payments upon request.

A novelty of the EU domestic support in the GTAP database version 9 relies on the combination of the strengths of the PSE and the Clearance Audit Trail System (CATS) database. The CATS is an internal European Commission dataset gathering details of all CAP payments made to the recipients of the EAGF (European Agricultural Guarantee Fund) and EAFRD (European Agricultural Fund for Rural Development). These data are provided by the EU member states to the European Commission on an annual basis for the purposes of carrying out the clearance of accounts, monitoring developments and providing forecasts in the agricultural sector (European Commission, 2013). Recently the CATS database has been used by the European Commission to perform the impact assessment accompanying the 2013 CAP reform proposals known as "CAP towards 2020" (European Commission, 2011).

Box 1. OECD indicators of agricultural support to Producers, Consumers and general services

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.

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.

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.

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.

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 payments to individual producers.

Source: OECD (2008)

A significant advantage of the PSE data is the good coverage of national agricultural payments in each of the EU member states. It should be made clear that these national payments do not figure as part of the CAP budget framework (i.e. are not co-funded pillar 2 support), but rather reflect individual member state decisions, e.g. on fiscal policy (mostly fuel tax rebates), insurance or irrigation subsidies. In 2011, these payments totalled 9.5 billion euros. The advantage of CATS

payments relies on the comprehensiveness of the payments, by budget lines and member state (primary data), for the purpose of the clearance of the accounts of the EAGF and EAFRD. In other words, PSE data are the most appropriate figures for national measures (no-cofunded by the EU budget) while those from CATS are the finest for EU budget related figures, i.e. pillar 1 and pillar 2 payments.

To maintain consistency with the previous GTAP database release, EU domestic support in version 9 employs the CATS data for payments exclusively managed by the European Commission (pillar 1 payments or "market measures and direct payment" funded by the EAGF). On the other hand, those payments under shared management (pillar 2 payments or "rural development measures" co-funded by the EAFRD) and those purely national expenditures, the PSE database is used.

III. Data work – traditional approach

In line with Jensen (2009, 2010) and OECD (2014), PSE and CATS expenditures are allocated to one of the four OECD indicators of agricultural support (i.e. SCT, GCT, ACT, OTP), then linked to the five GTAP support categories (i.e. output payments, intermediate input payments, land-based payments, capital-based payments or labour-based payments).

In the case of SCT payments, support is allocated to one of the 12 GTAP primary agricultural sectors, and (in very few cases) the forestry sector. In case of GCT, support is allocated to relevant groups of GTAP primary agricultural sectors (Table 1). Lastly, ACT and OTP payments are allocated uniformly across GTAP primary agricultural sectors. Tables A, B and C in appendix provide concise information of support allocation by member state.

III.a Pillar 1

These data are taken from the CATS database and are allocated as in Jensen (2010) with the few exceptions mentioned below.

Payments for restructuring, conversion or support to vineyards are treated as SCT payments to OCR sector, split equally between land and capital. A similar rule is applied for **payments to olive groves**, i.e. SCT payments to OSD sector, split equally between land and capital.

Interestingly, CATS database provides detailed information by member state on the allocation of specific coupled support payments under the auspices of **articles 69 and 72**. These are allocated to relevant GTAP primary agricultural sector (payments classified as SCT) or to relevant GTAP groups of sectors (payments classified as GCT). When no sector is mentioned (i.e., for some article 69 and 72 payments, the denominated recipient is "all products", "environment", "quality", "specified disadvantages"), the support is treated as an ACT to capital.² When "animal welfare" is mentioned, support is allocated to GCT7 sector's usage of (reproductive) capital.

The bulk of pillar 1 support remains decoupled payments (37,666 million euros, out of a total support amounting 66,530 million euros) and gathers both single payment scheme (SPS) and single area payment scheme (SAPS). It is assumed falling in OTP category and is exclusively allocated to the land factor. Clearly, if GTAP users wish to deviate from this assumption, they can employ data recalibration tools to adjust the data to their liking.³ Thus these payments are uniformly allocated across sectors.

² Indeed, allocating articles 69/72 payments to ACT (land) would cancel any distortive effect of these payments since they would be treated as decoupled payments.

³ See Urban et al (2014).

Table 1. Allocation of GTAP sectors to commodity groups

	GCT1	GCT2	GCT3	GCT4	GCT5	GCT6	GCT7	GCT8	GCT9	GCT10	GCT11	GCT12
pdr												
wht												
gro												
v_f												
osd												
c_b												
pfb												
ocr												
ctl												
oap												
rmk												
wol												

12 GTAP primary agricultural sectors + forestry	pdr	Paddy Rice: rice, husked and unhusked
	wht	Wheat: wheat and meslin
	gro	Other Grains: maize (corn), barley, rye, oats, other cereals
	v_f	Veg & Fruit: vegetables, fruitvegetables, fruit and nuts, potatoes, cassava, truffles,
	osd	Oil Seeds: oil seeds and oleaginous fruit; soy beans, copra
	c_b	Cane & Beet: sugar cane and sugar beet
	pfb	Plant Fibres: cotton, flax, hemp, sisal and other raw vegetable materials used in textiles
	ocr	Other Crops: live plants; cut flowers and flower buds; flower seeds and fruit seeds; vegetable seeds, beverage and spice crops, unmanufactured tobacco, cereal straw and husks, unprepared, whether or not chopped, ground, pressed or in the form of pellets; swedes, mangolds, fodder roots, hay, lucerne (alfalfa), clover, sainfoin, forage kale, lupines, vetches and similar forage products, whether or not in the form of pellets, plants and parts of plants used primarily in perfumery, in pharmacy, or for insecticidal, fungicidal or similar purposes, sugar beet seed and seeds of forage plants, other raw vegetable materials
	ctl	Cattle: cattle, sheep, goats, horses, asses, mules, and hinnies; and semen thereof
	oap	Other Animal Products: swine, poultry and other live animals; eggs, in shell (fresh or cooked), natural honey, snails (fresh or preserved) except sea snails; frogs' legs, edible products of animal origin n.e.c., hides, skins and furskins, raw , insect waxes and spermaceti, whether or not refined or coloured
rmk	Raw milk	
wol	Wool: wool, silk, and other raw animal materials used in textile	
frs	Forestry: forestry, logging and related service activitie	
12 Group Commodity Transfers	GCT1	All crops
	GCT2	All arable crops
	GCT3	Grains
	GCT4	Oilseeds
	GCT5	Other crops
	GCT6	All fruits and vegetables
	GCT7	All livestock
	GCT8	Ruminants
	GCT9	Non-ruminants
	GCT10	Protein crops
	GCT11	Cereals, oilseeds and protein crops
	GCT12	Milk and beef

Source: Elaboration from Narayanan et al. (2012) and Urban et al. (2014).

III.b Pillar 2

Broadly defined as rural development measures from the common agricultural policy, these data are taken from the PSE database and distributed as Jensen (2010) except:

- **Afforestation payments:** now a SCT payment to capital in the forestry sector (previously was not included)
- **Payments for integrated production of wine:** now a SCT payment to the OCR sector, split equally between land and capital (previously was all on land)
- **Preservation of biodiversity:** now an ACT payment, split equally between land and capital (previously was not included)
- **Landscape payments:** now an ACT payment on land (previously was not included)
- **Participation of farmers in food quality schemes:** now an ACT intermediate input payment to the OBS sector⁴ (previously was not included)
- **Amenities – Terraces, stone walls, hedges, shelter belts, buffer strips:** now an ACT payment to land (previously was not included)
- **Meeting standards based on Community legislation:** now an ACT intermediate input payment to the OBS sector (previously was not included)
- **Meeting standard – manure handling:** now a GCT7 intermediate input payment to the OBS sector (previously treated as a GCT7 sectors payment to capital)
- **Meeting standard – all:** now an ACT intermediate input payment to the OBS sector (previously treated as an ACT payment to capital)).

In the PSE, the distribution of pillar 2 payments by member states is only identified for the national co-funded part (transmitted to the OECD secretariat by individual member state). We then assume that payments which come from the EU budget follow the same distribution, despite differences in co-funding rates by measure and member state area. This approach differs from previous releases in which the split of these payments was based on each countries' relative share of total rural development payments and on total national agro-environment co-financed expenditures Jensen (2010).

III.c National payments

Those payments originating from national governments (i.e., not expenditures in a context of shared management between the member states and the European Commission) are taken from the PSE database, by member state, and distributed as in Jensen (2010). As mentioned above, these national payments do not figure as part of the CAP budget framework and reflect purely national support to agricultural sector such as fuel tax rebates (about one third of total national payments in 2011) or interest concessions on loans to farmers other than those co-financed from pillar 2. In 2011, these payments totalled 9.5 billion euros. Table 2 summarises the classification explained above by OECD category and policy framework.⁵

⁴ OBS refers to the sector "other business services" in the GTAP database, including business activities and farm service input.

⁵ PSE raw data for the EU27 and by EU member states have been provided to the authors by the OECD secretariat on October 7, 2013. The classification and treatment are purely those of the authors based on their policy expertise and the OECD estimates of support to agriculture's definitions and sources (OECD, 2014). Full set of data is available upon request.

Table 2. Distribution of total EU domestic support by OECD category (SCT, GCT, ACT, OTP) and policy framework, million euros, 2011

	SCT	GCT	ACT	OTP	Total
Pillar1	2538.7	53.4	1211.1	37665.8	41469.0
Pillar2	463.8	1848	13218.4	0	15530.2
National	1499.9	1567.3	6216.9	246.5	9530.6
Total	4502.4	3468.6	20646.3	37912.2	66529.5

Note: GTAP v.9 data are preliminary data, i.e. not validated by the GTAP consortium by the time of writing the paper.

IV. Data work – Alternative approach

Previous research (Boulanger and Philippidis, 2014, 2015) showed that when comparing with CATS database, GTAP database version 8 was incomplete, particularly in its representation of CAP based rural development payments. Table 3 presents the EU domestic support in 2007 (pillar 1 and pillar 2) extracted from the GTAP database version 8 and from the CATS database. In other words, the former corresponds to the "traditional" approach as in Jensen (2009, 2010); the latter to an "alternative" treatment which gathers most of pillar 2 measures (Table 4).

Table 3. Comparing EU domestic support under shared management (Pillar 1 and 2) – traditional vs. alternative approach, million euros, 2007

Approach	traditional	alternative
Data source	GTAP v.8	CATS
PILLAR 1		
<i>Market measures (05_02)</i>	729.5	729.5
<i>Decoupled direct payments (05_03_01)</i>	31527.0	31527.0
<i>Coupled direct payments (05_03_02)</i>	5510.7	5510.7
<i>Additional direct payments (05_03_03)</i>	533.9	533.9
<i>Other EAGF</i>	245.9	245.9
<i>Agri-monetary</i>	-14.5	-14.5
1. Total Pillar 1	38532.5	38532.5
PILLAR 2 (EU sourced)		
<i>Investment in physical capital</i>	1338.5	872.8
<i>Investment in human capacity</i>	31.6	686.7
<i>Wider rural development</i>	0.0	337.9
<i>LFAs</i>	1169.6	2010.5
<i>Agri-environmental measures</i>	1574.5	2823.6
2. Sub-total	4114.2	6731.5
PILLAR 2 (Nationally sourced)		
<i>Investment in physical capital</i>	1977.8	1600.3
<i>Investment in human capacity</i>	1090.0	1077.2
<i>Wider rural development</i>	0.0	519.8
<i>LFAs</i>	1596.4	3369.2
<i>Agri-environmental measures</i>	2731.6	4871.8
3. Sub-total	7395.7	11438.4
4. Total Pillar 2	11509.9	18169.9
Total CAP expenditures (1 + 4)	50042.5	56702.4

Note: National payments are not included. In 2007 they amount to 10446 million euros. Extracted from the PSE they remain in both traditional and alternative approaches.

Table 4. Alternative approach – Treatment of pillar 2 measures by GTAP subsidy wedges and payment classifications

Rural development measures	Payment type			
	SCT	GCT	ACT	OTP
111. Vocational training and information actions			OBS	
112. Setting up of young farmers			labour	
113. Early retirement				land
114. Use of advisory services			OBS	
115. Setting up of management, relief and advisory services			OBS	
121. Modernisation of agricultural holdings			capital	
122. Improvement of the economic value of forests	capital F			
123. Adding value to agricultural and forestry products			capital F+PA	
124. Cooperation for development of new products, processes and technologies in the agriculture and food sector and the forestry sector			capital F+PA	
125. Infrastructure related to the development and adaptation of agriculture and forestry			capital F+PA	
126. Restoring agricultural production potential damaged by natural disasters and introducing appropriate prevention actions			capital	
131. Meeting standards based on Community legislation			OBS	
132. Participation of farmers in food quality schemes			OBS	
133. Information and promotion activities			OBS	
141. Semi-subsistence farming				land
142. Producer groups				land
143. Provision of farm advisory and extension services in Bulgaria and Romania			OBS	
144. Holdings undergoing restructuring due to a reform of a common market organisation			capital	
211. Natural handicap payments to farmers in mountain areas				land
212. Payments to farmers in areas with handicaps, other than mountain areas				land
213. Natura 2000 payments and payments linked to Directive 2000/60/EC (WFD)				land
214. Agri-environment payments				land
215. Animal welfare payments		capital		
216. Non-productive investments				land
221. First afforestation of agricultural land	capital F			
222. First establishment of agroforestry systems on agricultural land	capital PA			
223. First afforestation of non-agricultural land	capital F			
224. Natura 2000 payments	capital F			
225. Forest-environment payments	capital F			
226. Restoring forestry potential and introducing prevention actions	capital F			
227. Non-productive investments	capital F			
311. Diversification into non-agricultural activities				land
411. Implementing local development strategies. Competitiveness			mix	
412. Implementing local development strategies. Environment/land management			mix	
413. Implementing local development strategies. Quality of life/diversification			mix	
611. Complement to direct payment				land

Notes: (1) In the white cells are the measures partially included in the GTAP database version 9. In the grey cells are the measures not included in the GTAP database version 9. (2) F stands for Forestry sector. PA stands for Primary Agricultural sector (e.g. measure #123 is allocated to capital of both forestry and primary agricultural sectors). (3) OBS refers to the sector "other business services". (4) For measures #411 #412 #413 (LEADER measures or support granted to Local Action Groups to implement local development strategies), expenditures are redistributed to other measures between #111 and #311, weighted by measure expenditures.

Applying the alternative classification to 2011 pillar 2 payments (treatment of pillar 1 and national payments remaining unchanged), the total amount of EU domestic support would correspond to 79,373 million euros, a 20% increase by contrast to the traditional approach.

Table 5. Comparing pillar 2 payments – traditional vs. alternative approach, million euros, 2007, 2011

	traditional approach	alternative approach	traditional approach	alternative approach
Year	2007	2007	2011	2011
Data source	GTAP v.8	CATS	GTAP v.9	CATS
TOTAL PILLAR 2	11509.9	18169.9	15530.2	28373.7

Note: GTAP v.9 data are preliminary data, i.e. not validated by the GTAP consortium by the time of writing the paper.

Three remarks emerge from the comparison of pillar 2 total amounts under both approaches in 2007 and 2011 (Table 5). Firstly, it should be highlighted that the preparatory work required for implementing 2007-2013 rural development programmes explains the increase of spending between 2007 and 2011. Indeed, if some payments are paid on the basis of existing contracts or with a roughly continuous character (e.g., some agri-environment measures), other require preparatory work and implementation procedures (e.g., some investment/modernisation measures) delaying the execution. In addition, if some member states got previous experience in measure implementation (e.g., those member states that already set up implementation procedures in the 2000-2006 programmes that could be reused for the 2007-2013 programmes), others member states have less experience in programme implementation (e.g., some member states that acceded the EU in 2004 or 2007) delaying the execution, therefore the payment.

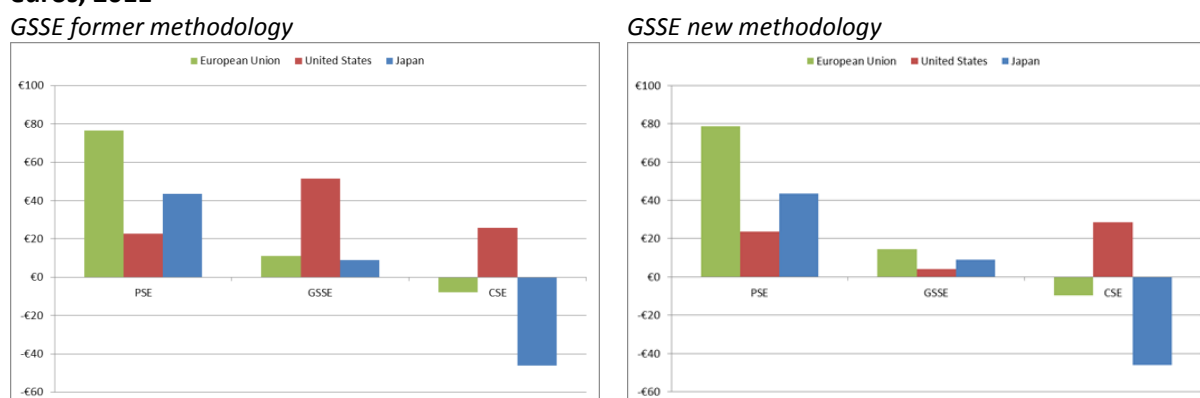
Secondly, the alternative approach includes payments currently defined as General Services Support Estimate (GSSE) by the OECD, whose definition and content varies from those of the PSE (see box 1). Pillar 2 measures labelled as GSSE transfers include payments on early retirement (rural development measure #113), setting up of management, relief and advisory services (rural development measure #115), adding value to agricultural and forestry products (rural development measure #123), cooperation for development of new products, processes and technologies in the agriculture and food sector and the forestry sector (rural development measure #124), Information and promotion activities (rural development measure #133) producer groups (rural development measure #142), provision of farm advisory and extension services in Bulgaria and Romania (rural development measure #143), diversification into non-agricultural activities (rural development measure #311). It seems that these payments from EAFRD (and respective national co-funding contributions) are intrinsically an EU domestic support.

Thirdly, differences for the same measure in PSE and CATS databases require better understandings. As an illustration of these dissimilarities in 2011, payments to semi-subsistence farms (rural development measure #141) amount to 81 million euros in the PSE database compared with 137 million euros in the CATS database. As a further example, payments on investment/modernisation in agricultural holdings (rural development measure #121) amount to 3,435 million euros in the PSE database compared with 4,297 million euros in the CATS database.

V. Concluding remarks

The EU domestic support in GTAP version 9 relies largely on the traditional approach developed by Jensen (2009, 2010). For the year 2011, employing the strength of both OECD and European Commission data reveals total CAP and nationally sourced expenditures of 66,530 million euros. A proposed alternative approach aiming at a more transparent and comprehensive representation of the CAP expenditures would increase the total EU support by about 20%. It should however be noted that the proposed change in the accounting convention for the EU domestic support can only have a comparative significance if other countries also follow. Indeed, this effort would require a strict scrutiny of the agricultural support incorporation and labelling for every GTAP country/region.

Figure 1. OECD indicators of agricultural support (PSE, GSSE, CSE) for the EU, US and Japan, billion euros, 2011



Notes: (1) Interestingly, support for general services to agriculture (GSSE) increased from 23% of total support in 1986-88 to 51% in 2010-12; mainly due to the increase in the Supplemental Nutrition Assistance Program (SNAP, formerly food stamps). (2) Next to the new GSSE counting methodology, the drop for the US originates from the removal of the SNAP expenditures attributable to the food supply chain beyond the farm on the one hand, the removal of the expenditures on international food assistance on the other hand. Under previous GSSE methodology, both was included as "Marketing and Promotion". (3) when negative (EU and Japan), the Consumer Support Estimate (CSE) indicates an implicit tax that supports agricultural prices. Sources: Elaboration from OECD (2013) and OECD (2015).

As an illustration, Figure 1 compares the OECD indicators of agricultural support to Producers, Consumers and general services for the EU, US and Japan. There have been recent and major changes in the GSSE methodology, so both classifications are presented. Considering that only the PSE is included so far in the GTAP agricultural support, some programmes are already missing such as the US Supplemental Nutrition Assistance Program (SNAP, former *food stamps*) which is included in the CSE. In addition, introducing agricultural support of some emergent counties whose support is not covered by the OECD estimators, such as India, appears crucial. Lastly, a careful knowledge of the elements included in every Social Accounting Matrix (SAM) is required in order to avoid double counting of support. Nevertheless, it seems patent that the domestic support which affects production of agricultural commodities goes beyond the sole PSE, thus is partially captured by the support levels of the GTAP database.

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