# « The food Euro ». Distribution of value added in the food chain from 1995 to 2010 and prospects for 2013.

BOYER, Philippe

May 2014

# « The food Euro ».
# Distribution of value added in the food chain from 1995 to 2010 and prospects for 2013

Philippe Boyer

As supplement to its sector-based studies, about the costs in the main sectors of food chain (agriculture, food industry and trade), the Observatory operates a macroeconomic analysis which decomposes the food expense into remunerations in every industry group of the national economy. This issue completes and updates the results presented for the first time in 2013 in The Letter of the OBSERVATORY n°2. The analysis uses the data of the input-output matrix of the national accounts from 1995 to 2010[1].

## The food consumption is here the subject of two analyses.

The first analysis in terms of "agriculture and post-farm share in food demand" identifies the following parts in the value of the food expenses:

- The value of the domestic agricultural production involved: non-processed food (fruits and vegetables, for instance), raw commodities for food processing (wheat for bread, for instance) and other agricultural inputs of the food chain (plant productions which give the fuel consumed for the transportation of food, for instance),

- The value of the importations of food products: non- processed food (imported fresh fruits and vegetables, for instance) or processed products from foreign food industry,

- The value created in all post-farm industries, by food processing industry, transport, trade of domestic or imported agricultural and food products.

Taxes on products are added to these components, in the consumers' food expense.

The second analysis in terms of "values added in food demand", more complete, is based on the existence two global macroeconomic balances:

- production is distributed between final demand and intermediate consumption,

- value added is equal to production minus intermediate consumptions.

Thus, final demand is equal to value added, and this global equality can be declined for every group of goods of the final demand, of which food consumption.

So, food consumption can be decomposed into values added created in each of all the industry groups of economy, importations and taxes on products finally paid by the consumers.

Besides, the value added being the resource which is distributed between labour and capital incomes, the decomposition of food consumption can be continued until these payments for primary factors.

## Agriculture and post-farm shares in food demand

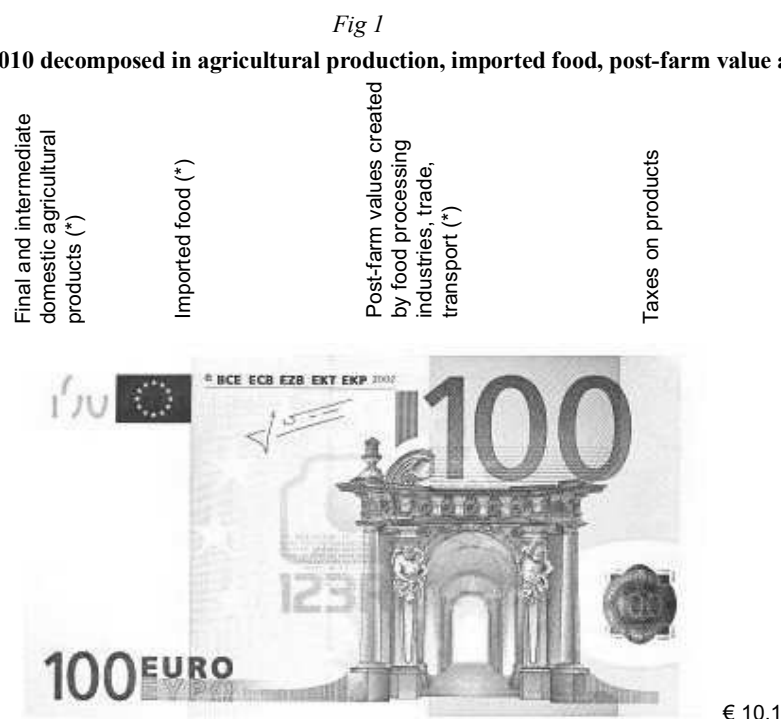In this first analysis, the food consumption is decomposed as follows:

Final food consumption (food demand)[2]

= Domestic agricultural products for final consumption and for intermediate consumption (raw commodities for food processing and other agricultural products used as inputs in the food chain)

+ Final consumption of imported food

+ Post-farm created value

+ Taxes

---

[1] Important: under constraint of nomenclature of industry groups in the IOM, the food expense considered here is the one realized in the retail trade and does not include restaurants, food to take away and food services as meals delivery. See bibliography for presentation of the method.

[2] Unless otherwise mentioned, we call "agricultural products" the products of this branch sensu stricto, plus those of fishery and aquaculture (3 p.c. of total production of agriculture, fishery and aquaculture in 2010).

1

Philippe Boyer. « The food Euro ». Distribution of value added in the food chain from 1995 to 2010 and prospects for 2013.
*The Letter of the Observatory on formation of prices and margins of food products (may 2014).*

## Agricultural and post-farm shares in 2010

The result of this first decomposition for 2010 (year of the more recent data available) is represented on the figure 1.

*Fig 1*

**Food Euro in 2010 decomposed in agricultural production, imported food, post-farm value and taxes**



Final and intermediate domestic agricultural products (*)

Imported food (*)

Post-farm values created by food processing industries, trade, transport (*)

Taxes on products

€ 10.1

(*) amounts before taxes and without subsidies to products.

Source: INSEE, Eurostat, calculation FranceAgriMer – OFPM from INRA

So, in 2010, for 100 € of food demand, there is an amount of € 19.3 of production from domestic agriculture, as final goods (non-processed food) or intermediate consumption (commodities for food processing and others ingredients or inputs in the food chain).

An amount of € 13 of imported food is added; it does not include the imported inputs, of which values are included in agricultural production, and in the following aggregate: the value created in the post-farm industry groups: food processing industry, trade and transport.

This last aggregate represents, with € 57.6 for € 100 of food consumption, the biggest part of the value of food consumption. And € 10.1 of taxes on products (VAT, taxes on alcoholic beverage and fuels…) are finally paid by the consumers.

## Evolution from 1995 to 2010 of the composition of the "food Euro" in terms of agriculture and post-farm shares

Domestic agricultural production (fishery and aquaculture included) represented 23 p.c. of food final consumption in 1995 and 19 p.c. in 2010 (graph 1); that is 4 points less.

At the same time, the share of imported food increases little, and that of the taxes is almost flat. Thus, the post-farm share increases of 4 points in the value of food consumption.

The variation of the share of agricultural production in food expense is due to effects of prices and of volumes, illustrated by the graph 2. The decrease of agricultural relative prices – due in particular to the CAP reforms since 1993 – leads to a diminution of the part of agriculture industry in the "food Euro".
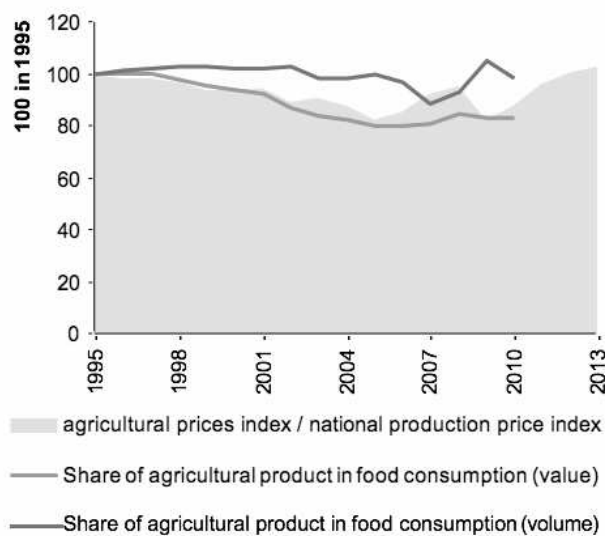
*Graph 1*

**Food Euro decomposed into agriculture, imported food, post- farm value and taxes from 1995 to 2010**
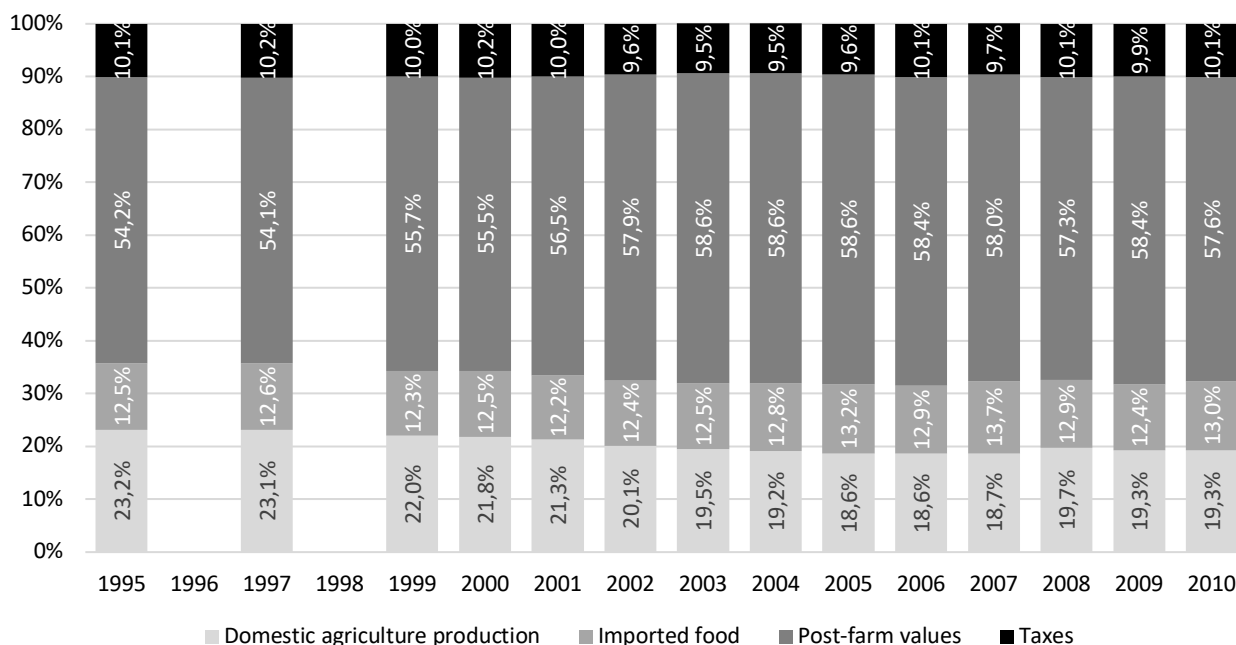


Source: INSEE, Eurostat, calculation FranceAgriMer – OFPM from INRA

*Graph 2*

**Agricultural production in the food expense**



Source: INSEE, Eurostat, calculation FranceAgriMer – OFPM from INRA

## Values added in food demand

In this second analysis, agriculture and post-farm shares of food demand are completely decomposed into values added and imported intermediate consumption, plus imported food and taxes already calculated in the previous decomposition.

**The 2010 "food Euro" in values added, importations and taxes**

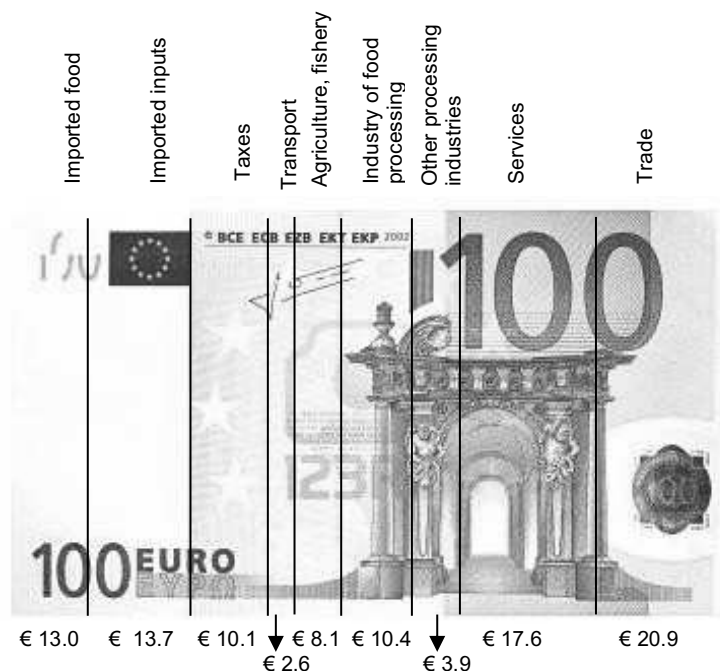In 2010, the structure of the "food Euro" is the following, represented on figure 3.
For € 100 of food consumption in 2010: € 26.7 pay for imported food and imported intermediate goods, € 10.1 are taxes on products (VAT, taxes on alcoholic beverage, on fuels, etc.).

The rest, equal to € 63.2, is composed of values added provided by food expense in the national economy branches, with an important share for services (€ 17.6) and trade (€ 20.9).

The structural causes of this distribution of value added of food consumption between branches were developed in The Letter of the OBSERVATORY n°2.

Remember that the relatively little share of agriculture industry in food demand (8.1 p.c.) is due, on one hand and in the long term, to the food processing and the increasing incorporation of services in the food supply chain, and on the other hand – and first, at least in the short and medium term, to prices ratio between agricultural products and general production. The relative agricultural prices were reduced by the successive CAP reforms from 1993, replacing price support by direct subsidies.

*Fig 2*

**The 2010 "food Euro" decomposed into values added, importations and taxes**



| Imported food | Imported inputs | Taxes | Transport | Agriculture, fishery | Industry of food processing | Other processing industries | Services | Trade |

€ 13.0   € 13.7   € 10.1   € 8.1   € 10.4   € 17.6   € 20.9
€ 2.6   € 3.9

Source: INSEE, Eurostat, calculation FranceAgriMer – OFPM from INRA

**From value added to salaries and gross operating surplus provided by food demand in 2010**

The available data give the distribution of value added of each industry group into salaries and gross operating surplus (GOS). Thus, it is possible to distribute the value added of the "food Euro" between these two gross incomes of primary factors (labour, capital), provided by the food demand in every industry group.

The result is shown on the figure 3 (next page).

*Gross operating surplus provided by food demand*

(Graph 3 next page). Due to the weakness of salaried labour in agriculture, in spite of the low share of this industry in the added value of the food euro, its share in the total surplus provided by the food demand is high, with 22 p.c. in 2010 (figure 5). Note that the agricultural GOS is a « mixed income » of labour (non- salaried) and capital.

Furthermore, GOS provided by consumers demand do not include subsidies (provided by tax-payers).

GOS is a gross income which is distributed into incomes to the owners of capital (among which, dividends to the shareholders), interest, transfer operations (in which, insurances) 3, income taxes and saving[3]. As a guide only, the graph 4 represents the distribution of GOS in 2010 for all non-financial companies, as a whole because no equivalent data exist for each industry group.

---

[3] In the french national accounts system, the credit and insurance services are counted as intermediate consumptions for the part of the amount of interests and premiums corresponding only to the cost of these services ; the other part is counted as an use of the GOS which remunerates the owners of the capital of the financial services industry (Malherbe F., 2012).
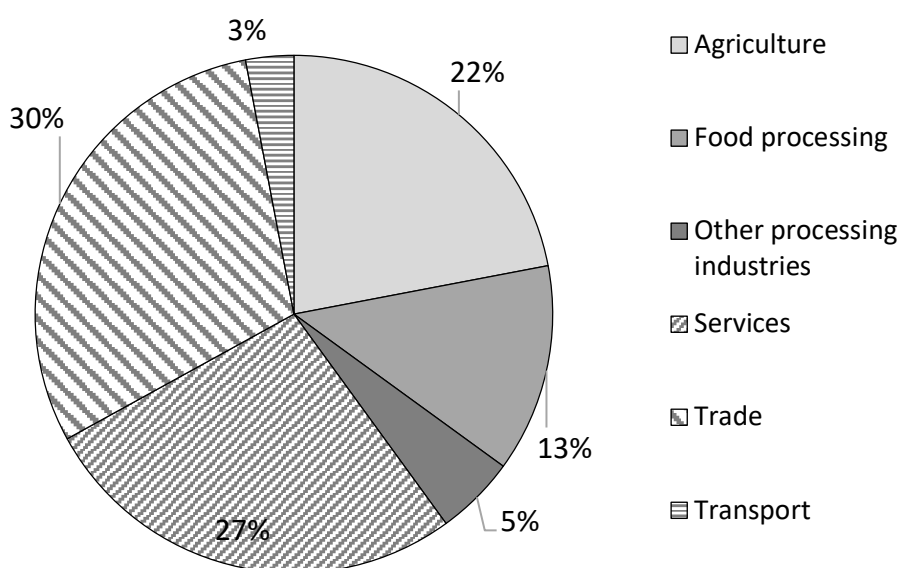
*Fig 3*

**The 2010 "food Euro" decomposed into salaries and GOS, importations and taxes**



Source: INSEE, Eurostat, calculation FranceAgriMer – OFPM from INRA

*Graph 3*

**Distribution by industry group of gross operating surplus provided by food demand in 2010**
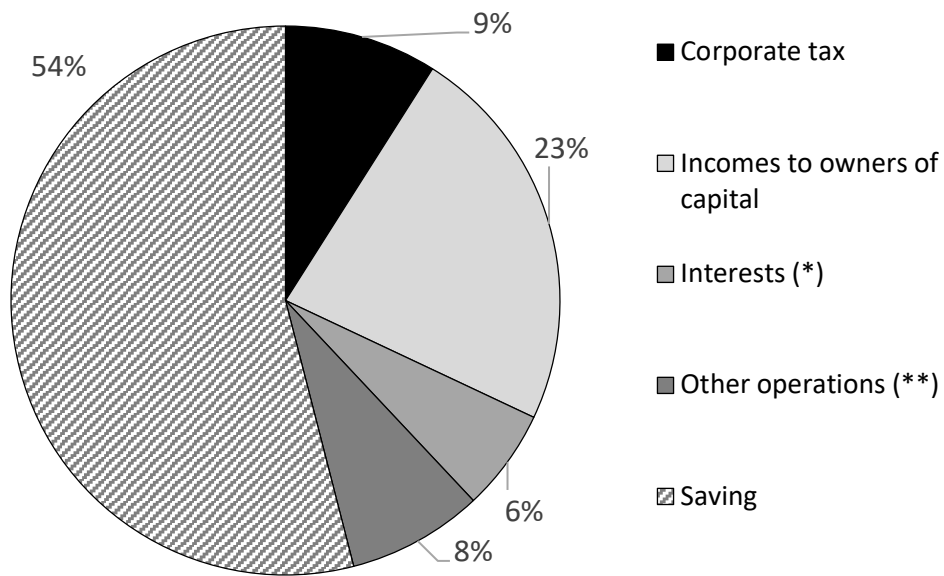


Source: INSEE, Eurostat, calculation FranceAgriMer – OFPM from INRA

*Salaries provided by food expense*

In 2010, food demand provides € 63.2 billions of gross salaries (gross : i.e. including social transfers), that is to say 6 p.c. of the total of salaries paid in national economy.
The share of salaries provided by food demand is higher in trade sector (35 p.c.), followed by services (29 p.c.) and food processing industry (19 p.c.).

---

*Graph 4*
**Distribution of the non-financial companies GOS in 2010**



9%

54%

23%

6%

8%

- Corporate tax
- Incomes to owners of capital
- Interests (*)
- Other operations (**)
- Saving

(*) : Interest paid minus collected.

(**): Social benefits paid minus contributions, insurances premiums paid minus insurances claims, other nets transfers.

Source: INSEE: input-output matrices

Graph 5

**Distribution by branch of gross salaries provided by the food demand in 2010**



5%

6%

35%

19%

6%

29%

- Agriculture
- Food processing
- Other processing industries
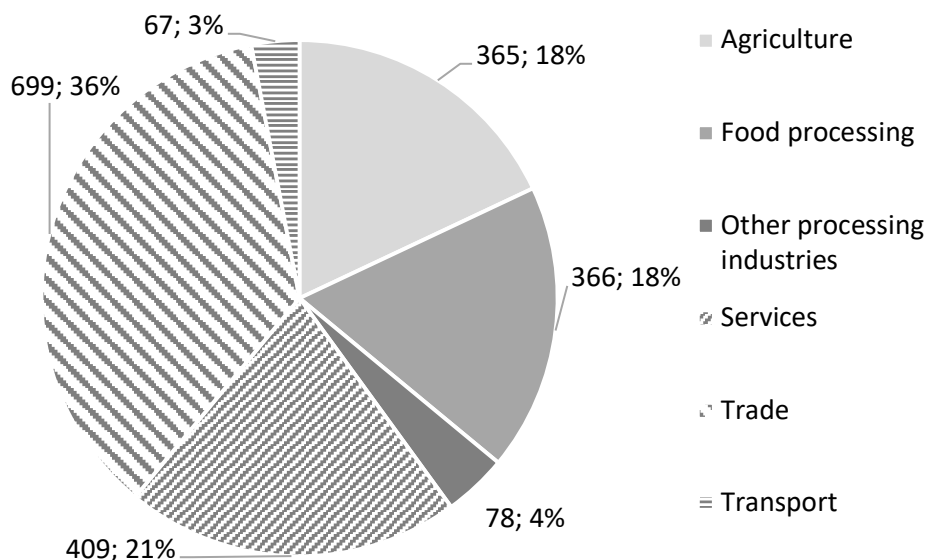- Services
- Trade
- Transport
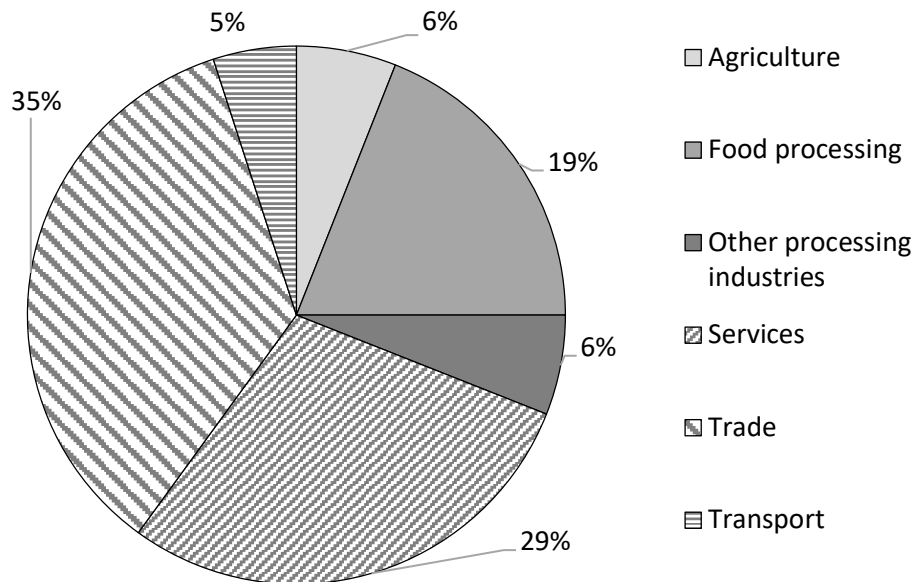
Source: INSEE, Eurostat, calculation FranceAgriMer – OFPM from INRA

# Employment resulting from food demand

Food demand concerns about 2 million of employments (salaried and non-salaried) in 2010, more of the third in trade sector and near of 60 p.c. distributed in similar proportions between agriculture (18 p.c.), food processing industry (18 p.c.) and services (21 p.c.).

Graph 6

**Distribution by industry group of the number of employments provided by food demand in 2010**
(thousands of employments; p.c. of all)



Source: INSEE, Eurostat, calculation FranceAgriMer – OFPM from INRA

The number of employments in agriculture industry resulting from food demand (about 365,000) is much lower than the total number of employments in the sector: it seems normal because only the employments in the production of goods for domestic consumption are involved here, i.e. without exportations and non-food agricultural productions. Moreover, note that due to nomenclature constraints of IOM, restaurants or prepared food to take away are not considered[4], and this also minimize our estimation of the number of employments in agriculture resulting from food demand, only based on the food expense in the retail shops.

# Evolution of the components of the "food Euro" from 1999 to 2010

The main long-term trends, already described in The Letter of the OBSERVATORY n°2, are briefly only reminded below:

- strong growth of the share of services in the food demand value, as their share in the value of the national production;
- diminution of the share of agriculture industry, coherent with the decrease of relative agricultural prices;
- increase of the share of importations, especially of intermediate consumptions, linked to the increase of energy prices and, more recently, of agricultural commodities prices.

The year 2010 presents some breaks compared with the previous evolutions:
- the agriculture share raises, due to the increase of agricultural prices, after the fall of 2009;
- the share of final and intermediate importations raises too, due to the evolution of commodities world prices;
- due to partial transmission of the prices increase of its ingredients and inputs, food processing industry loses in 2010 more than one point in this distribution of the value added.

---

[4] It will be the case in next issues of the food euro.

The latest IOM available are the ones of the year 2010; so, later evolutions can only be estimated, knowing that the evolution of the share of agricultural value added into the "food Euro" is largely determined by the ratio of "value added on production" of the sector, as shown on graph 8.

So, it is anticipated that in 2011 and 2012, the share of agricultural value added into the "food Euro" should not vary a lot, compared with 2010, but it could fall in 2013.

Graph 7

**Evolution of the food Euro components**
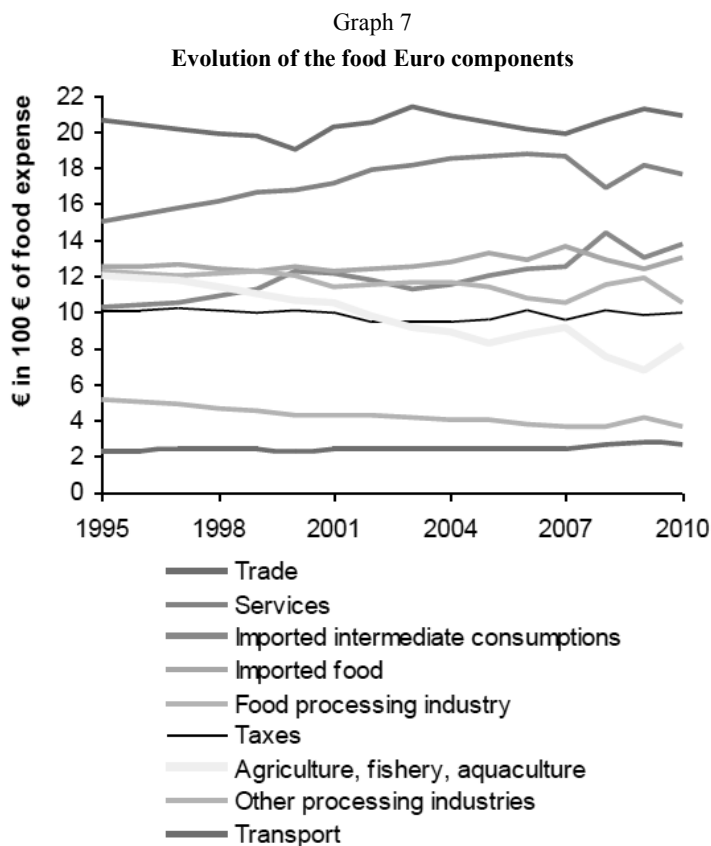


Source: INSEE, Eurostat, calculation FranceAgriMer – OFPM from INRA

Graph 8

**Compared evolution of the value-added ratio in agriculture branch and the share of the agricultural value added in the food Euro**
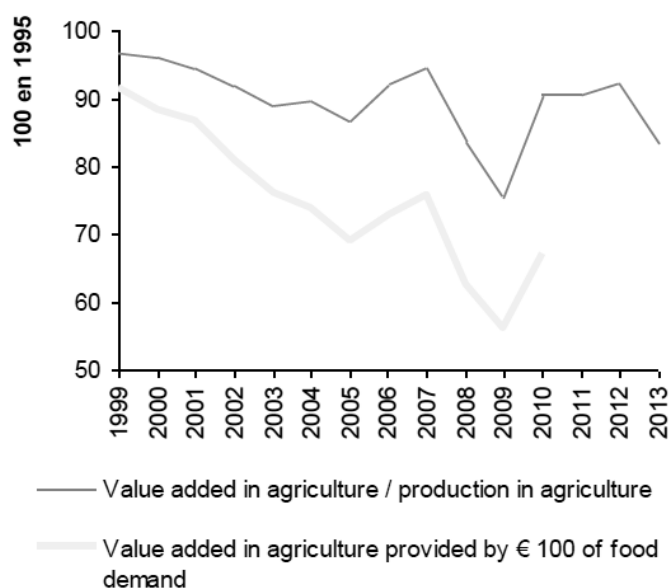


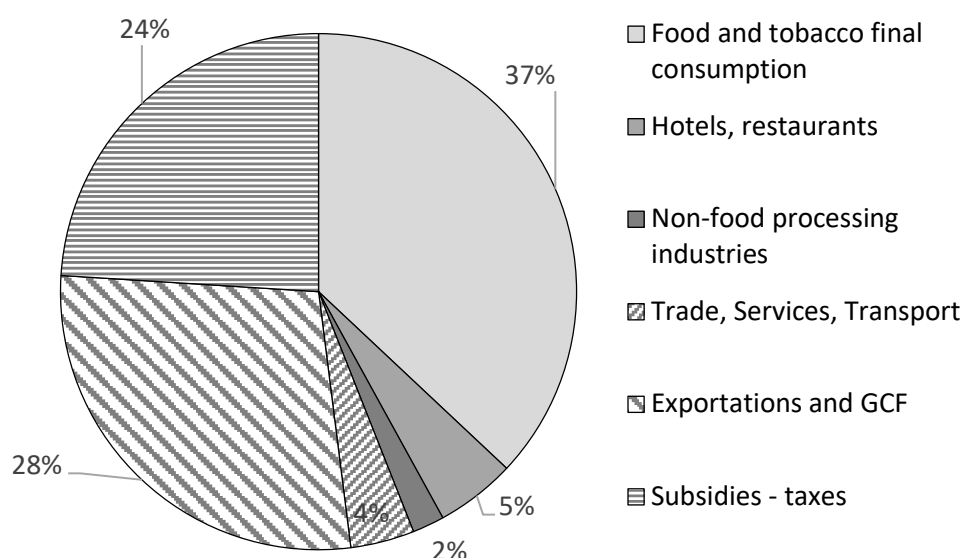Source: INSEE, Eurostat, calculation FranceAgriMer – OFPM from INRA

# Contributions of various final demands to the formation of the value added in agriculture

In the foregoing analysis, the subject was the decomposition of food demand into values added in the various industry groups. In a way, it is the opposite approach which is realized in what follows: we calculate the contribution of each group of domestic final demand (food, other goods…) and exportations to the formation of the value added of a given industry group (here, agriculture).

In the perspective to analyze the formation of the income of agriculture industry (here in the strict sense, without fishery and aquaculture), we consider subsidies in the value added. The results for 2010 are represented on graph 9.

Graph 9

**Contributions of various final demands and subsidies to the formation of value added in agriculture**



Source: INSEE, Eurostat, calculation FranceAgriMer – OFPM from INRA

In 2010, the value added (including subsidies) of agriculture industry comes from domestic food (and tobacco) demand for 37 p.c. The contribution of the demand for « exportations and gross capital formation (GCF) »[5] is high, with 28 p.c.

The impact on agricultural value added of the final demand for products of non-food processing industry (biofuels, for example) is thin: 2 p.c. The value added provided in agriculture industry by the final demand for hotels and restaurants services is higher (5 p.c.). The final demand in others sectors (principally, services) reaches 4 p.c.

These proportions have been little modified since 1995, the most perceptible change concerns the shares of food consumption, which decreases by 3 points, and subsidies, increasing of 5 points, under the influence of the reforms of the CAP.

Salaried labour is modest in agriculture industry, so, the contributions of final demands to the formation of value added or to the formation of GOS (graph 10) are similar.

---

[5] The aggregate « exportations and GCF » is the accounting difference between the final demand for products of agriculture and food processing industries, and final consumption (i.e. food demand or food consumption) for these same products ; the exportations are dominant in this amount (97 p.c.).

Graph 10

**Contributions of various final demands and subsidies to the formation of gross operating surplus in agriculture**
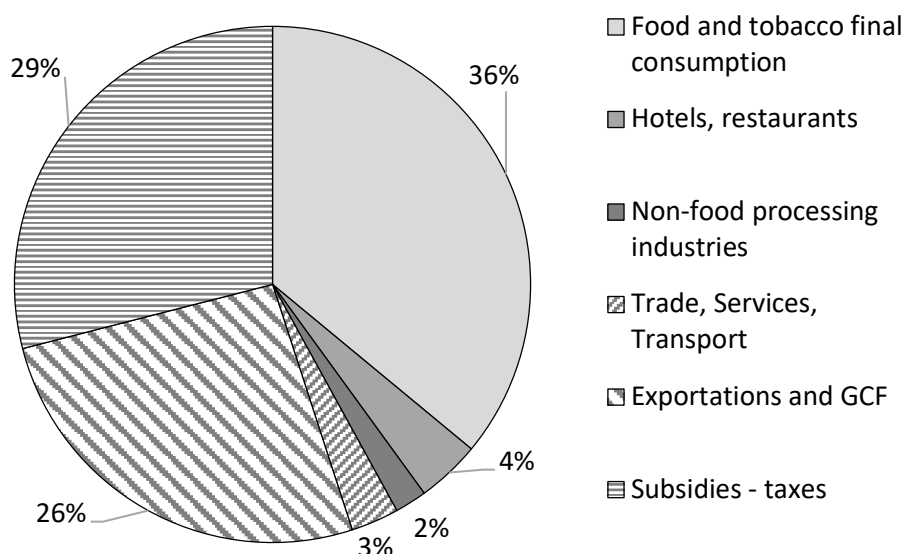


Source: INSEE, Eurostat, calculation FranceAgriMer – OFPM from INRA

# Conclusion

These macroeconomic decompositions of food demand in France report the structural trend of the increasing distance between the agricultural commodities and the food products, this distance generating incomes and employments in all the national economy, beyond the only "vertical" perimeter of the agriculture and food sectors.

However, the yearly evolution of the distribution between industry groups of incomes provided by food demand depends on the evolution of the prices ratios. It explains largely the relatively low share of agriculture industry in this distribution, due to the decrease of agricultural prices consecutive to the CAP reforms, which also explains the weight of the subsidies in the agricultural income, compared to the impact of final demands, domestic consumption, exportations, etc.

The prices pressures in 2010 cause the rise of agricultural value-added share in the food consumption.

This rise is probably temporary: the value-added ratio in agriculture is about flat in 2010-2012, and decreasing in 2013.

# For more information

Canning P. (2011). A revised and expanded food dollar series. A better understanding of food costs. Economic research report n°114, USDA. 42 pages. https://www.ers.usda.gov/publications/pub-details/?pubid=44827

Butault J.P., Boyer Ph. (2012). L'euro alimentaire en France de 1995 à 2007 et le partage des valeurs ajoutées entre branches. Communication aux 6e journées de la recherche en sciences sociales, SFER, INRA, CIRAD. Décembre. 24 pages.
http://www.sfer.asso.fr/journees_de_recherches_en_sciences_sociales/6es_jrss_2012_toulouse/programme_definitif_et_actes

Malherbe F. (2012). Comptanat.fr. http://www.comptanat.fr/principe/banquex.htm

Observatoire de la formation des prix et des marges des produits alimentaires (2013). "The food Euro" : what food expenses pay for ? The Letter of the OBSERVATORY on formation of princes and margins of food products, n°2 (january), 6 pages.
https://observatoire-prixmarges.franceagrimer.fr/sites/default/files/sauv/etudes-et-presentations/2012_12_21_lettre_2_english_v3.pdf

Boyer P., Cadilhon J., Depeyrot J.N., Ennifar M., Soler L.G. (2013). Le suivi des prix et des marges pour l'analyse de la formation des prix des produits alimentaires. Notes et études socio-économiques n°37 (janvier-juin). Centre d'études et de prospective, Service de la statistique et de la prospective, Ministère de l'agriculture, de l'agroalimentaire et de la forêt. Pages 87-126.
https://agriculture.gouv.fr/le-suivi-des-prix-et-des-marges-pour-lanalyse-de-la-formation-des-prix-au-detail-des-produits

## Abstract

In 2010, for € 100 of food domestic consumption:
- the necessary agricultural production represents € 19,
- the value created in the post-farm activities - trade, transport and industries -, approaches € 58,
- the value of the imported food is € 13,
- and the amount of the taxes is about € 10.

The decomposition of the two first aggregates above (agriculture, post-farm value) shows that food expense of € 100 generates:
- value added, for € 63, distributed in all the industry groups of the economy, of which € 8.1 in agriculture (increasing after 2009, due to the amelioration of agricultural prices), € 10 in food processing industry, € 18 in services and € 21 in trade,
- importations of intermediate consumption, for € 13.7 (increasing since 1995),
- imported food (€ 13) and taxes (€ 10), already mentioned.

In 2010 always, the gross operating surplus of the agriculture is resulting from the following demands:

the domestic demand for food in the retail trade, expressed to agriculture and food processing industry, for 36 p.c.,
- the demand expressed to the hotels and restaurants, for 5 p.c.,
- the other domestic demands (in which, agricultural commodities used in the non-food industries), for 9 p.c.,
- the exportations of agricultural products and food, for 26 p.c.,
- and from the direct subsidies, for 29 p.c.