

# Analysis of Milk Supply and Trade Balance in the EU-27

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## Abstract

The purpose of the paper is the analysis of the EU-27 milk supply balance and milk trade balance in order to present the largest milk producers, exporters and importers and the coverage degree of milk supply by production, imports, exports and stock changes, using the data provided by FAO Stat, 2009-2010 for the reference period 2003-2005. The EU-27 milk supply balance accounted for 116,229 thou tons of which 54.5 % is assured by Germany, France, Italy, United Kingdom, Poland, Netherlands and Romania. A number of 22 EU countries registered a self sufficiency degree higher than 100 %, at the EU-27 level its performance being 132 %. About 67 % milk it achieved in Germany, France, United Kingdom, Poland, Italy and Netherlands, which are the EU largest milk producers. The EU-27 trade balance is a positive one, exports exceeding imports by 10,448 thou tons milk. The main EU milk exporters are France, Germany, Ireland, Netherlands, Denmark and Poland. The main EU milk importers are Germany, Italy, Netherlands, United Kingdom, Belgium, Spain and France. The EU production is enough for covering milk demand and export the surplus to other countries.

**Key words:** analysis, EU-27, milk supply, trade balance.

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## 1. Introduction

Food Supply Balance is an economic tool whose purpose is to reflect food origin and evaluate the amounts available for domestic uses.

Milk Supply Balance Sheet presents the statement of production, Imports, Exports, Changes in stocks and domestic uses (animal feed, processing, lasses, human consumption and per capita in kg according to FAO procedure [ 1].

The amounts of milk exceeding domestic uses could be exported. But at international level, there are three state categories: exporters, importers and both exporters and importers depending on their milk production and correlation to milk consumption, advantages coming from milk selling on various external markets as discussed by Popescu Agatha [2].<sup>1</sup>

Milk foreign trade is reflected by Milk Trade Balance and various specific efficiency indicators

as discussed by Popescu Agatha [ 2], Ipache Lelio and all [ 3] and Verbecke N. [ 4].

In this context, the aim of the papers is to analyze milk supply balance and milk trade balance in the EU-27, taking into account that the EU member states play an important part in the world milk production and trade.

## 2. Materials and methods

The data concerning milk production, exports, imports, changes in stocks and domestic uses have been collected from FAO Stat 2009-2010 for all the 27 EU member states for the period 2003-2005.

According to FAO methodology, the formula of milk supply balance is:

**Milk Supply Balance=Production+Imports-Exports±Changes in Stocks**

Milk Production consists of usable milk production.

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Milk Imports includes commercial trade, milk aid granted on specific terms, donated amounts and estimated of unrecorded milk trade.

Milk Exports includes all movements of milk out of country during the reference period.

Changes in stocks comprises stock changes occurring during the reference period at all levels from production to the retail stage (government stocks, in stocks with milk processors, importers, exporters, either whole sale and retail merchants, transport and storage enterprises).

Supply for domestic utilization results from production + imports – exports and changes in stocks (increases or decreases).

The data have been processed and the following indicators have been calculated:

*The share of each EU country's milk production into the EU-27 milk production according to the formula:*

$$S\% = \frac{X_i}{\sum_{i=1}^n X_i}$$

*The share of Milk Exports by country in the EU-27 into the EU-27 Milk Exports, according to a similar formula;*

*The share of milk imports by country in the EU-27 into the EU-27 milk imports, using the formula mentioned above;*

*The shares of changes in milk stocks by country into the EU-27 stock changes, using the some formula;*

*The share of milk supply balance by country into the EU-27 milk supply balance, based on the same formula;*

*The degree of milk supply coverage by production, exports, imports and stock changes, according to the following formulas:*

$MSC_p = P/MS$ , where:  $MSC_p$  = degree of milk supply coverage by production;

$MSC_E = E/MS$ , where:  $MSC_E$  = degree of milk supply coverage by exports

$MSC_I = I/MS$ , where:  $MSC_I$  = degree of milk supply coverage by imports

$MSC_{SC} = SC/MS$ , where:  $MSC_{SC}$  = degree of milk supply coverage by stock changes

*Self-Sufficiency, SS, according to the formula:*

$SS = \text{Usable production} / \text{Domestic uses}$

*Milk Trade Balance (MTB) by country according to the formula:*

$MTB = E - I$ , where E = exports, I = imports

*Milk Trade Efficiency reflected by important indicators:*

*-Degree of production coverage by exports (E-P Ratio), according to the formula:*

$E-P \text{ Ratio} = \text{Exports} / \text{Production}$

*-Degree of import coverage by exports (E-I Ratio), according to the formula:*

$E-I \text{ Ratio} = \text{Exports} / \text{Imports}$

### 3. Results and discussion

**Milk Supply Balance.** In the period 2003-2005, EU-27 milk supply was 116,229 thousand tons determined by 154,236 thou tons milk production, 41,955 thou tons imports, 52,403 thou tons exports and 27,559 thou tons changes in milk stocks (Table 1).

**Table 1.** Milk Supply Balance Sheet in the EU 27 (butter excluded) quantity ('000 tons) the period 2003-2005

Country	Production	Exports	Imports	Stock changes and other uses	Milk Supply Balance
Austria	3,182	1,599	955	655	1,883
Belgium	3,162	3,908	3,912	595	2,257
Bulgaria	1,537	100	130	291	1,275
Cyprus	205	29	45	76	145
Czech Rep	2,725	720	351	347	2,009
Denmark	4,609	2,997	708	1,039	1,280
Estonia	345	251	81	140	335
Finland	2,451	671	309	295	1,795
France	25,469	8,256	3,165	4,140	16,238
Germany	28,444	11,594	7,225	3,657	20,418
Greece	2,053	158	1,442	365	2,972
Hungary	1,961	312	235	214	1,671
Ireland	5,333	3,691	716	1,176	1,181
Italy	11,994	1,707	7,030	2,406	14,860
Latvia	794	165	102	168	563
Lithuania	1,835	631	49	483	771
Luxemburg	268	250	165	46	137
Malta	45	1	63	30	77
Netherlands	10,942	7,626	4,980	2,851	5,445
Poland	11,909	2,574	905	3,178	7,062
Portugal	2,072	299	607	178	2,203
Romania	5,424	30	61	208	5,248
Slovakia	1,126	352	174	358	590
Slovenia	660	146	63	87	490
Spain	7,517	1,026	3,203	2,645	7,049
Sweden	3,245	396	622	116	3,354
United Kingdom	14,679	2,914	4,657	1,815	14,608
EU-27	154,236	52,403	41,955	27,559	116,229

Source: FAO Statistical YearBook 2009-2010

**The weight of each EU country's milk production into the EU 27 milk production is different from a country to another (Table 2).**

**Table 2.** The weight of each EU country's Milk Production into the total EU Milk Production in the period 2003-2005 (%)

Country	Milk Production Share(%)	Country	Milk Production Share(%)	Country	Milk Production Share(%)
Austria	2.06	Germany	18.44	Netherlands	7.09
Belgium	2.05	Greece	1.33	Poland	7.72
Bulgaria	0.99	Hungary	1.27	Portugal	1.34
Cyprus	0.13	Ireland	3.45	Romania	3.51
Czech Republic	1.77	Italy	7.74	Slovakia	0.73
Denmark	2.98	Latvia	0.51	Slovenia	0.42
Estonia	0.41	Lithuania	1.18	Spain	4.87
Finland	1.58	Luxemburg	0.17	Sweden	2.10
France	16.51	Malta	0.02	United Kingdom	9.51

The countries with the largest share into the EU 27 milk production are, in order: Germany 18.44 %, France 16.51 %, United Kingdom 9.51 %, Poland 7.72 %, Italy 7.74 %, Netherlands 7.09 %, which together contribute to the EU production by 67.01 % and could be considered the main milk producers.

There are also countries of less importance for the EU milk production such as: Cyprus, Luxemburg, Estonia, Slovenia, Slovakia.

Romania's contribution to the EU Milk production is 3.51 % reflecting a middle production performance .

**The weight of each EU country's milk export into the EU 27 milk exports** also varied from a state to another. The main milk exporters with the largest share into the EU-27 milk exports are: Germany 22.12 %, France 15.75 %, Netherlands 14.55 %, Belgium 7.45 %, Ireland 7.04 %, Denmark 5.71 % and U. Kingdom 5.56 %. All these 7 countries are responsible for 78.18 % of the EU milk exports and are considered the largest milk exporters (Table 3).

**Table 3.** Exports Weight by country in the EU-27 Milk Exports in the period 2003-2005 (%)

Country	Milk Export Share (%)	Country	Milk Export Share (%)	Country	Milk Export Share (%)
Austria	3.05	Germany	22.12	Netherlands	14.55
Belgium	7.45	Greece	0.30	Poland	4.91
Bulgaria	0.19	Hungary	0.59	Portugal	0.57
Cyprus	0.05	Ireland	7.04	Romania	0.05
Czech Republic	1.37	Italy	3.25	Slovakia	0.67
Denmark	5.71	Latvia	0.31	Slovenia	0.27
Estonia	0.47	Lithuania	1.20	Spain	1.95
Finland	1.28	Luxemburg	0.47	Sweden	0.76
France	15.75	Malta	0.00	United Kingdom	5.56

**The weight of each EU country's milk import into the EU-27 milk imports** is also different

from a state to another, according to its consumption needs, but also trade interest. The main EU milk importers are: Germany 17.22 %, Italy 16.75 %, Netherlands 11.86 %, United Kingdom 11.09 %, Belgium 9.32 %, Spain 7.63 % and France 7.54 %. All these 7 European countries imported 81.41 % of the EU-27 milk imports. There are also countries such as Cyprus 0.10 %, Lithuania 0.11 %, Romania 0.14 %, Slovenia 0.15 %, Malta 0.15 %, Estonia 0.19 %, Latvia 0.24 %, Bulgaria 0.30 %, Slovakia 0.41, Hungary 0.56 % and Finland 0.73 % whose imports represent 3.08 % of the EU milk imports (Table 4).

**The weight of Stock Changes by country in the EU-27 changes of milk stock** is different from a country to another. The largest milk stocks changes in the EU are registered by France 15.02 %, Germany 13.26 %, Poland 11.53 %, Netherlands 10.34 %, Spain 9.59 %, Italy 8.73 % and U. Kingdom 6.58 %. All these 7 countries keep 75.05 % of the EU milk stock changes.

**Table 4.** Import Weight by country in the EU-27 Milk Imports in the period 2003-2005 (%)

Country	Milk Imports Share (%)	Country	Milk Imports Share (%)	Country	Milk Imports Share (%)
Austria	2.27	Germany	17.22	Netherlands	11.86
Belgium	9.32	Greece	3.43	Poland	2.15
Bulgaria	0.30	Hungary	0.56	Portugal	1.44
Cyprus	0.10	Ireland	1.70	Romania	0.14
Czech Republic	0.83	Italy	16.75	Slovakia	0.41
Denmark	1.68	Latvia	0.24	Slovenia	0.15
Estonia	0.19	Lithuania	0.11	Spain	7.63
Finland	0.73	Luxemburg	0.39	Sweden	1.48
France	7.54	Malta	0.15	U. Kingdom	11.09

Changes of less importance in milk stock are registered by Malta 0.10 %, Luxemburg 0.16 %, Cyprus 0.27 %, Slovenia 0.31 %, Sweden 0.42 %, Estonia 0.50 %, Latvia 0.60 %, Portugal 0.64 %, Romania 0.75 % (Table 5).

**Table 5.** Share Milk Stock Changes and other uses by country in the EU-27 Milk Stock Changes in the period 2003-2005 (%)

Country	Share of Milk Stock change (%)	Country	Share of Milk Stock change (%)	Country	Share of Milk Stock change(%)
Austria	2.37	Germany	13.26	Netherlands	10.34
Belgium	2.15	Greece	1.32	Poland	11.53
Bulgaria	1.05	Hungary	0.77	Portugal	0.64
Cyprus	0.27	Ireland	4.26	Romania	0.75
Czech Republic	1.25	Italy	8.73	Slovakia	1.29
Denmark	3.77	Latvia	0.60	Slovenia	0.31
Estonia	0.50	Lithuania	1.75	Spain	7.517
Finland	1.07	Luxemburg	0.16	Sweden	0.42
France	15.02	Malta	0.10	United Kingdom	6.58

**The Weight Milk Supply Balance by country.**

The distribution of milk supply balance in the EU territory varies according to each country's production, imports, exports and stock changes. The most important countries in the EU milk supply balance are: Germany 17.56 %, France 13.97 %, Italy 12.78 %, United Kingdom 12.56 %, Poland 6.07 %, Netherlands 4.68 % and Romania 4.51 %. All these 7 states contribute by 54.57 % to the EU milk supply balance.

The countries with less importance in the EU milk supply balance are: Malta 0.06 %, Luxemburg 0.11 %, Cyprus 0.12 %, Estonia 0.28 %, Slovenia 0.42 %, Slovakia 0.50 % (Table 6).

**Table 6.** Share of Milk Supply Balance by country in the EU Milk Supply Balance in the period 2003-2005

Country	Share of Milk Supply (%)	Country	Share of Milk Supply (%)	Country	Share of Milk Supply (%)
Austria	1.62	Germany	17.56	Netherlands	4.68
Belgium	2.21	Greece	2.55	Poland	6.07
Bulgaria	1.09	Hungary	1.43	Portugal	1.89
Cyprus	0.12	Ireland	1.01	Romania	4.51
Czech Republic	1.72	Italy	12.78	Slovakia	0.50
Denmark	1.10	Latvia	0.48	Slovenia	0.42
Estonia	0.28	Lithuania	0.66	Spain	6.06
Finland	1.54	Luxemburg	0.11	Sweden	2.88
France	13.97	Malta	0.06	U.Kingdom	12.56

**The Degree of Milk Supply Coverage** by production, exports, imports and stock changers is presented in table 7. At the EU-27 level, it is obviously. That production is the most important source for milk supply with 1,32 production/milk supply ratio. On the second position comes milk imports with an import/milk supply ratio 0.36 and

then on the 3<sup>rd</sup> position are situated changes in tocks with a 0.23 stock changes milk supply ratio (Table 7).

**Table 7.** Degree of Milk Supply Coverage by Production, Exports, Imports and Stock Changes and other uses in the period 2003-2005

Country	Production	Exports	Imports	Stock changes and other uses
Austria	1.69	0.85	0.51	0.35
Belgium	1.23	1.52	1.52	0.23
Bulgaria	1.21	0.08	0.10	0.23
Cyprus	1.42	0.20	0.31	0.53
Czech Republic	1.36	0.36	0.18	0.17
Denmark	3.72	2.41	0.57	0.81
Estonia	1.93	0.75	0.24	0.42
Finland	1.37	0.38	0.17	0.16
France	1.57	0.51	0.19	0.25
Germany	1.39	0.57	0.35	0.18
Greece	0.69	0.05	0.49	0.12
Hungary	1.18	0.19	0.14	0.13
Ireland	4.55	3.16	0.61	1.00
Italy	0.80	0.11	0.47	0.16
Latvia	1.43	0.30	0.19	0.30
Lithuania	2.38	0.82	0.06	0.63
Luxemburg	1.96	1.83	1.20	0.34
Malta	0.58	0.01	0.82	0.39
Netherlands	2.01	1.40	0.92	0.52
Poland	1.69	0.37	0.13	0.45
Portugal	0.94	0.14	0.28	0.08
Romania	1.03	0.01	0.01	0.04
Slovakia	1.93	0.60	0.29	0.61
Slovenia	1.35	0.30	0.13	0.18
Spain	1.07	0.15	0.45	0.38
Sweden	0.97	0.12	0.19	0.03
U. Kingdom	1.01	0.20	0.32	0.12
EU-27	1.32	0.45	0.36	0.23

The coverage degree is different from a country to another but it is very important to mention EU that milk production achieved in 22 EU countries exceeds their milk supply, reflected their production potential and that milk consumption is not influenced by imports .

**Self-Sufficiency** is present in 22 European countries which reflects that they are able to cover milk supply by there own production. The countries with the highest milk self-sufficiency are: Ireland 451.56 %, Denmark 360 %, Lithuania 238 %, Netherlands 200.95 %, Luxemburg 195.62 %, Estonia 192.5 %, Slovakia 190.84 %. At the EU-27 level, the degree of self-sufficiency is 132.70 % reflecting that the European community has an over production able to cover milk supply and consumption (Table 8).

**Table 8.** Milk Self-sufficiency in the EU-27 member states in the period 2003-2005 (%)

Country	Self-sufficiency	Country	Self-sufficiency	Country	Self-sufficiency
Austria	1689	Germany	139.30	Netherlands	20095
Belgium	1230	Greece	69.07	Poland	168.63
Bulgaria	1205	Hungary	117.35	Portugal	94.05
Cyprus	141.3	Ireland	451.56	Romania	103.35
Czech Republic	1356	Italy	80.37	Slovakia	190.84
Denmark	3600	Latvia	141.03	Slovenia	134.69
Estonia	1925	Lithuania	238.00	Spain	7.517
Finland	1365	Luxemburg	195.62	Sweden	96.75
France	1568	Malta	58.44	United Kingdom	100.48
				EU-27	132.70

**Milk Trade Balance** at the EU-27 is a positive one, +10,448 thousand tons, as the EU exports exceed its milk imports. This aspect reflects that the EU is an important milk exporter at world level.

Among the EU countries there are states whose milk trade balance is a positive one, but also states with a negative balance.

In the period 2003-2005, the main milk exporters of the EU have been: France, Germany, Ireland, Netherlands, Denmark and Poland, whose milk trade balance represent 13,948 thousand tons and exceeds milk trade balance at the EU level. There are also EU countries registering a negative milk trade balance, being considered milk importers: Italy, Spain, U. Kingdom and Greece (Table 9).

**Milk Trade Balance Efficiency** has been analyzed by means of export/production and export/import ratios.

**Table 9.** Milk Trade Balance by country in the EU-27 in the period 2003-2005 ('000 tons)

Country	Trade Balance	Country	Trade Balance	Country	Trade Balance
Austria	+644	Germany	+4,369	Netherlands	+2,646
Belgium	-4	Greece	-1,284	Poland	+1,669
Bulgaria	-30	Hungary	+77	Portugal	-308
Cyprus	-16	Ireland	+2,975	Romania	-31
Czech Republic	+369	Italy	-5,323	Slovakia	+178
Denmark	+2,289	Latvia	+63	Slovenia	+83
Estonia	+170	Lithuania	+582	Spain	7,517
Finland	+369	Luxemburg	+85	Sweden	-226
France	+5,091	Malta	-62	U. Kingdom	-1,743
				EU-27	+10,448

At the EU-27 level, 34 % of milk production is exported and export/import ratio is 1.25 reflecting a high efficiency milk trade at the international level.

**Concerning Export/Production ratio**, in the period 2003-2005, there are European countries whose milk export represents an important part of milk production. It is about: Luxemburg 0.93, Netherlands 0.69, Ireland 0.69, Denmark 0.65, Germany 0.40, Estonia 0.38, Lithuania 0.34, France 0.32, Slovenia 0.31.

There are also countries whose milk exports are weakly represented in milk production. It is about Romania, Bulgaria, Greece, Sweden, Cyprus, Italy, Portugal, Spain, Hungary.

Belgium has a completely different situation, the export/production ratio is 1.23, because it used to import milk in higher amounts than its own production and then to make milk exports, taking the advantages of these commercial operations.

**The Export/Import ratio**, there are EU countries whose ratio is over 1, reflecting that they are milk exporters. The EU countries with the largest milk foreign trade efficiency are: Lithuania (12.84), Ireland (5.15), Denmark (4.23), Estonia (3.09), Poland (2.84), France (2.60), Slovenia (2.31), Finland (2.17), Czech Republic (2.05), Slovakia (2.02), where milk exports are twice times higher than milk imports.

The countries with the lowest milk foreign trade efficiency concerning this aspect are: Malta (0,01) and Greece (0.10).

In the period 2003-2005, the EU-27 milk supply balance accounted for 116,229 thousand tones, of which 54.57 is assured by Germany, France, Italy, U. Kingdom, Poland, Netherlands and Romania.

The degree of milk supply coverage by production, exports, imports and stock changes is different from a country to another.

**Table 10.** Milk Export/Production Ratio and Export/Import Ratio – as measure of Efficiency in Milk Foreign Trade by country of the EU-27 in the period 2003-2005

Country	Export/Production	Export/Import	Country	Export/Production	Export/Import
Austria	0.50	1.67	Latvia	0.20	1.62
Belgium	1.23	0.99	Lithuania	0.34	12.87
Bulgaria	0.06	0.76	Luxemburg	0.93	1.51
Cyprus	0.14	0.64	Malta	0.02	0.01
Czech Republic	0.26	2.05	Netherlands	0.69	1.53
Denmark	0.65	4.23	Poland	0.22	2.84
Estonia	0.31	3.09	Portugal	0.14	0.49
Finland	0.27	2.17	Romania	0.00	0.49
France	0.32	2.60	Slovakia	0.31	20.2
Germany	0.40	1.60	Slovenia	0.22	2.31
Greece	0.07	0.10	Spain	0.14	0.32
Hungary	0.16	1.32	Sweden	0.12	0.63
Ireland	0.69	5.15	United Kingdom	0.19	0.62
Italy	0.14	0.24	EU-27	0.34	1.25

The EU 27 Self-sufficiency is 132 %, reflecting that milk production exceeds milk supply at community level. A number of 22 EU countries, important milk producers, have a self sufficiency higher than 100 %.

The main milk producers are Germany (18.4 %), France (16.5 %), U. Kingdom (9.5 %), Poland (7.7 %), Italy (7.7 %), Netherlands (7.09 %), contributing by 67 % to the EU milk production.

Concerning milk trade balance, the EU-27 has a surplus of 10,448 thou tons, as its exports exceeds imports.

The main EU milk exporters are France, Germany, Ireland, Netherlands, Denmark and Poland.

A negative trade balance is registered by Italy, Spain, United Kingdom and Greece.

Export/production and export/import ratios are advantaging the main milk producers.

About 34 % of EU milk production is exported an export/import ratio of 1.25, meaning a high efficient milk foreign trade of the EU-27.

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