

In physical terms the EU-27 imports three times more than it exports

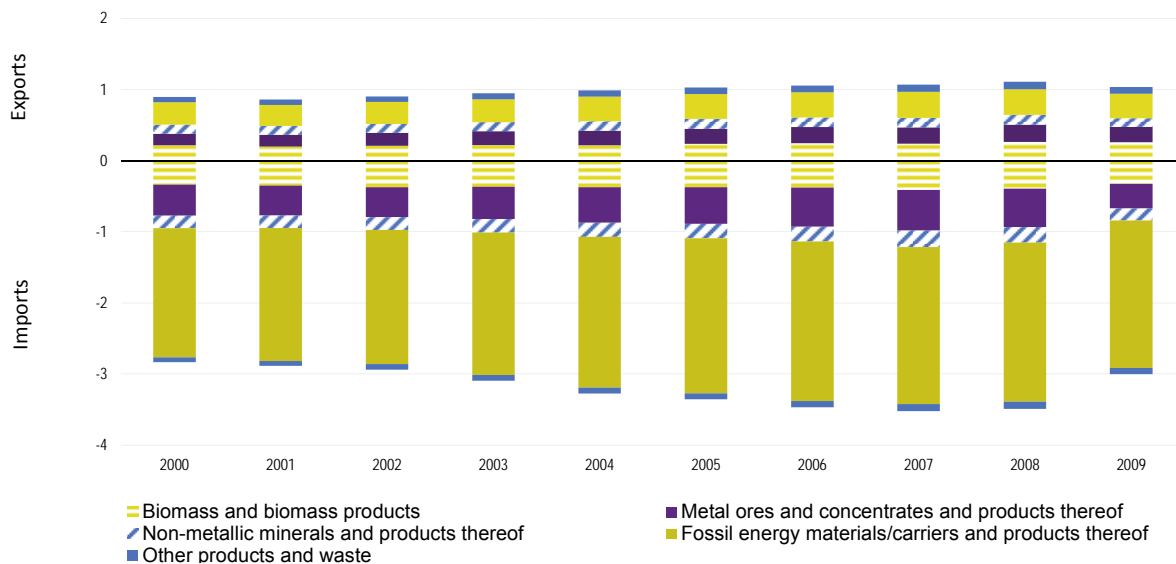
In contrast to the monetary value of trade EU's physical trade balance is asymmetric. The EU imports three times more goods by weight from the rest of the world than it exports. The amounts of physical imports into the EU are dominated by fossil fuels and other raw products which typically have significantly lower values per kilogram. On the other hand, the EU exports high value goods such as machinery and transport equipment.

In monetary terms extra-EU imports and exports of goods and services are of the same order of magnitude, with imports slightly exceeding exports. From a physical perspective – measured as

the actual weight of traded goods – the EU's trade pattern with the rest of the world is quite different (see Figure 1). Eurostat compiles physical trade data in the framework of its *economy-wide material flow accounts (EW-MFA)* which is currently collected on a voluntary basis but soon will become mandatory (see methodological notes). At around 3 tonnes per capita per year, imports of goods are three times larger than exports, at around 1 tonne per capita.

Between 2000 and 2008, both physical imports and exports increased by around 20%. In the economic crisis year 2009 imports decreased by 14% whereas exports fell by only 7%.

Figure 1: Physical imports and exports of goods (weight) by main material category, EU-27, 2000-2009 (tonnes per capita)



Source: Eurostat (online data codes: [env_ac_mfa](#), [demo_gind](#))

A look at the traded goods in a breakdown by 5 main material categories (original data are provided in a more detailed breakdown by around 50 material categories) reveals a clear asymmetry between physical imports and exports (see Figure 1). Imports of goods grouped in the material category *fossil energy materials/carriers and products thereof* -

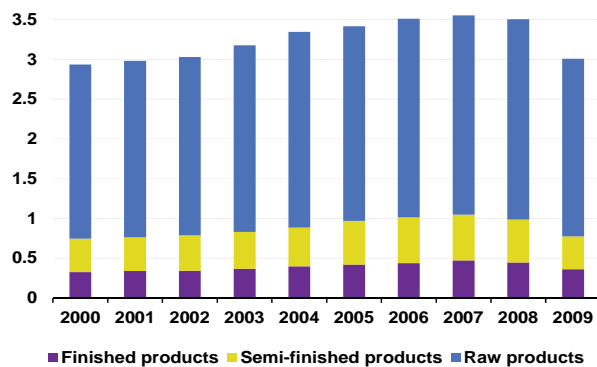
around 2.3 t/cap in 2009 - are more than 6 times higher than the exports of goods of the same category. Goods grouped in the material category of *metal ores and concentrates and products thereof* are - at around 0.5 t/cap - the second most important imported product group. Exports of goods grouped in this material category are around 0.2 t/cap.

Physical trade by stage of manufacturing

Eurostat also provides the physical imports and exports of goods in a breakdown by stage of manufacturing (see Figure 2, Figure 3 and Figure 4). Three stages are distinguished.

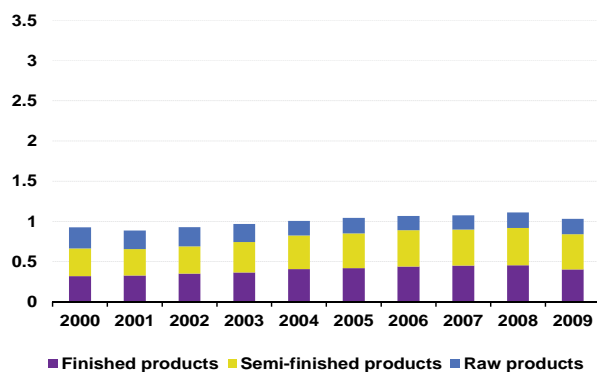
The extra-EU imports of *finished products* are more or less balanced with the extra-EU exports – around 0.4 t/cap each. The same balance holds for *semi-finished products* – also 0.4 t/cap each. However, the EU imports 10-12 times more *raw products* from the rest of the world than it exports (see Figure 2 and Figure 3). The patterns show a certain dependency on the rest of the world for raw materials. The EU economy transforms low value *raw products* into high value *finished* and *semi-finished products*.

Figure 2: Extra-EU imports by stage of manufacturing, EU-27, 2000-2009 (tonnes per capita)



Source: Eurostat (online data codes: [env_ac_mfa](#), [demo_gind](#))

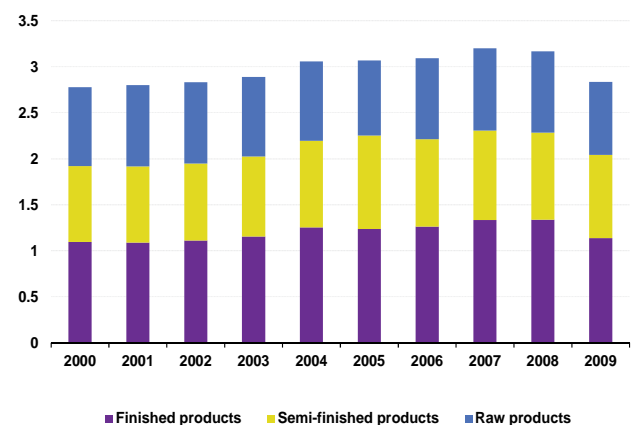
Figure 3: Extra-EU exports by stage of manufacturing, EU-27, 2000-2009 (tonnes per capita)



Source: Eurostat (online data codes: [env_ac_mfa](#), [demo_gind](#))

The physical intra-EU trade between Member States is of the same order of magnitude as the imports from the rest of the world – around 3 tonnes per capita (see Figure 4). The biggest single category traded within the EU-27 is *finished products* (about 40 %) indicating the importance of the European single market as a sales market for products produced within the EU. With slightly more than 30 % *raw products* also constitute an important share of intra-EU trade. This suggests that the material resources extracted within the EU are shared amongst Member States, most notably agricultural products.

Figure 4: Intra-EU exports by stage of manufacturing, EU-27, 2000-2009 (tonnes per capita)



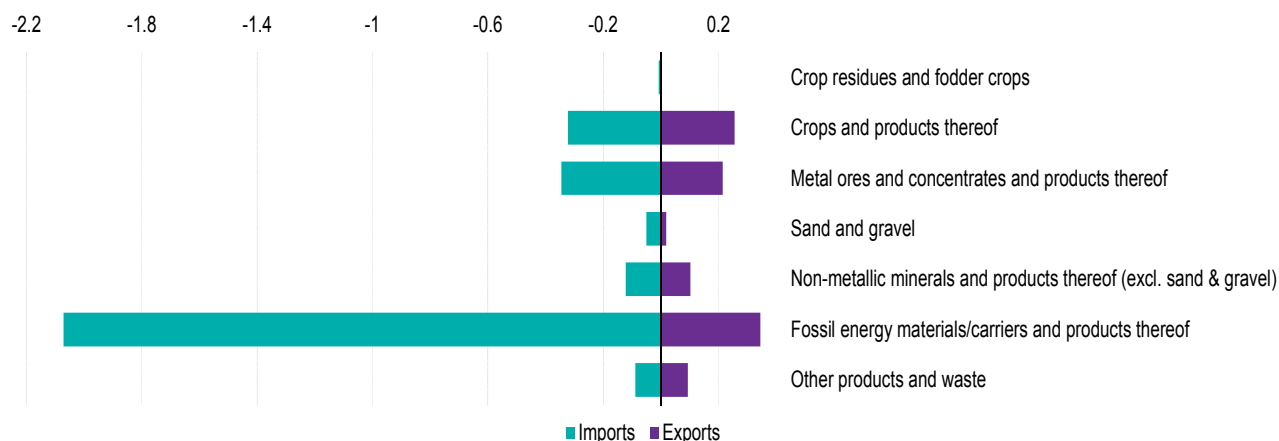
Source: Eurostat (online data codes: [env_ac_mfa](#), [demo_gind](#))

Physical trade balance

The physical trade balance (weight of imported goods minus weight of exported goods) of the EU economy with the rest of the world is illustrated in Figure 5 for

the main material categories. The largest negative trade balance was recorded for the material category *fossil energy materials/carriers and products thereof*.

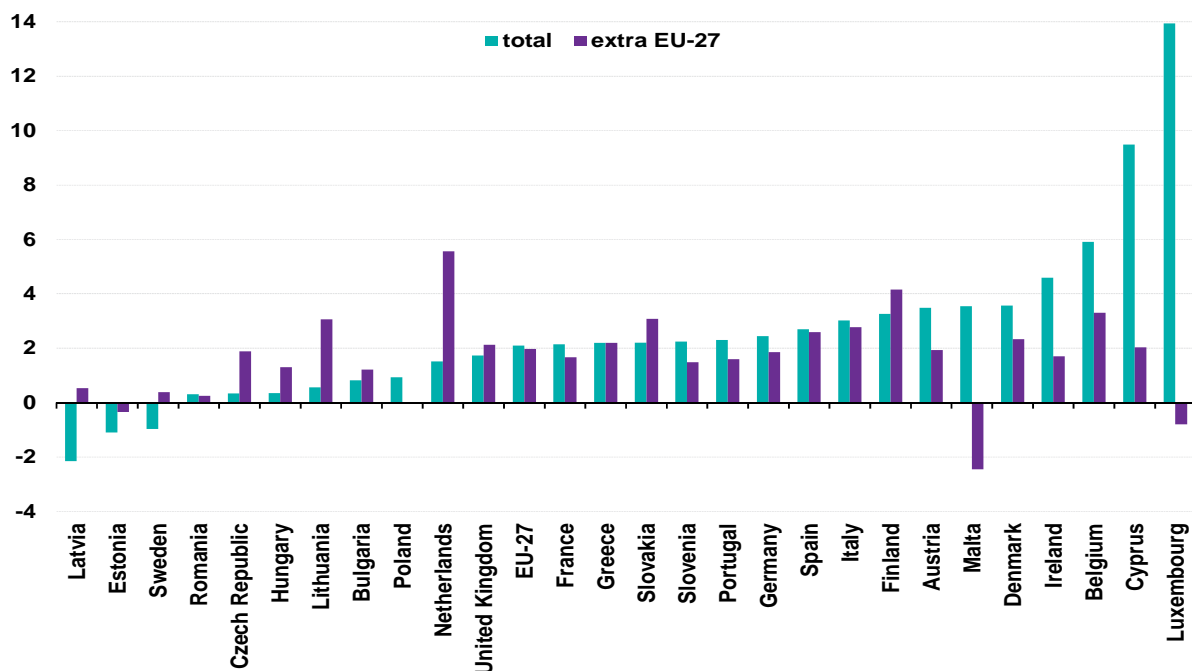
Figure 5: Physical imports and exports* by main material category, EU 27, 2009
(tonnes per capita)



*extra-EU trade

Source: calculation based on Eurostat (online data codes: [env_ac_mfa](#), [demo_gind](#))

Figure 6: Physical Trade Balance (Imports minus Exports) by country, 2009
(tonnes per capita)



Source: Eurostat (online data codes: [env_ac_mfa](#), [demo_gind](#))

Figure 6 shows the physical trade balance (weight of imported goods minus exported goods) for all Member States. The left greenish bar shows total trade (including intra-EU) and the right bluish bar only extra-EU trade.

With regards to total trade (incl. intra-EU) the majority of Member States import more than they export (= net importers) – generally in a restricted range around the EU-27 average. There are four Member States with extraordinary high net imports of above 4 tonnes per capita. Net exporting

countries are Latvia, Estonia (wood) and Sweden (metal ores).

The picture changes when considering only the trade balance with the rest of the world, i.e. extra-EU trade (see second right bluish bar in Figure 6). Certain countries have a higher extra-EU trade balance than to their balance of total trade (e.g. the Netherlands, Lithuania, Hungary and the Czech Republic). For some Member States the total trade balance is positive while the extra-EU trade balance is negative (e.g. Luxembourg and Malta).

Import dependency of EU on the increase

Import dependency denotes the share of extra-EU imports in total materials available to the EU-27 economy (the latter comprises domestic extraction used plus extra-EU imports).

Table 1 shows that the EU economy is almost self-sufficient in the supply of construction materials (*sand and gravel, non-metallic minerals and products thereof*) and *crop residues and fodder crops*.

For *metal ores and concentrates and products thereof* as well as for *fossil energy*

materials/carriers and products thereof the EU is highly dependent on extra-EU imports. For *metal ores and concentrates and products thereof* the import share in domestic extraction plus imports (= Direct Material Input) is around two thirds and it has been increasing over the last decade until the economic crisis in 2009 when it dropped significantly. Import dependency for *fossil energy materials/carriers and products thereof* also shows a steady increase and was around 55-56% by the end of the decade.

Table 1: Import dependency* by main material category, EU-27, 2000-2009
(% of extra-EU imports in total materials made available to EU-27 economy)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Crops and products thereof	14.7	15.7	16.3	16.8	15.5	16.0	17.1	18.1	17.3	15.0
Crop residues and fodder crops	0.8	0.8	0.8	0.9	0.7	0.7	0.7	0.6	0.6	0.5
Metal ores and concentrates and products thereof	61.7	61.6	62.0	64.0	66.1	66.7	67.5	69.3	67.4	58.4
Non-metallic minerals and products thereof (excl. sand & gravel)	5.4	5.4	5.4	5.5	5.3	5.1	5.0	5.3	4.8	4.5
Sand and gravel	0.7	0.7	0.8	0.8	0.9	0.9	0.9	1.0	1.1	1.1
Fossil energy materials/carriers and products thereof	46.6	47.4	47.8	49.5	51.5	53.3	54.7	55.1	56.0	55.5

* $\text{extra-EU imports} / (\text{Domestic Extraction Used} + \text{extra-EU imports})$

Source: calculation based on Eurostat (online data code: [env_ac_mfa](#))

Import dependency by main material category – country comparison

In a physical perspective most of the Member States are dependent on imports from the rest of the world to meet their direct material input. Table 2 shows for 2009 the degree of dependency broken down by material categories for each Member State and the EU-27 as a total.

There are notably Member States where the import dependency for *fossil energy materials/carriers*

and products thereof is above 80 % (Spain, Italy and Lithuania). On the other hand, other countries show very little import dependency for *fossil energy materials/carriers and products thereof* such as Estonia (domestic oil shale) and Poland (domestic hard coal).

Table 2: Import dependency* by main material category and by country, 2009
(% of extra-EU imports in total materials made available to EU-27 economy)

	Crops and products thereof	Metal ores and concentrates and products thereof	Non-metallic minerals and products thereof (excl. sand & gravel)	Sand and gravel	Fossil energy materials/carriers and products thereof	Total
EU-27	15	58	4	1	56	20
Belgium	15	36	9	1	39	20
Bulgaria	6	6	14	0	29	12
Czech Republic	3	44	0	0	19	10
Denmark	12	24	5	6	21	12
Germany	8	27	4	1	35	14
Estonia	5	24	2	3	5	4
Ireland	14	39	12	0	23	7
Greece	9	26	5	1	29	19
Spain	16	48	2	0	81	21
France	4	39	12	0	72	16
Italy	16	53	10	1	80	26
Cyprus	8	26	9	0	42	8
Latvia	2	59	7	3	49	8
Lithuania	6	32	34	5	89	29
Luxembourg	1	1	1	0	0	1
Hungary	3	31	4	0	43	12
Malta	11	18	6	10	4	8
Netherlands	22	35	14	5	41	29
Austria	5	40	1	0	47	10
Poland	14	24	4	3	7	7
Portugal	11	17	1	0	75	11
Romania	5	53	1	0	18	4
Slovenia	20	22	9	5	25	13
Slovakia	3	56	2	0	59	19
Finland	12	8	3	0	67	15
Sweden	8	4	17	0	61	12
United Kingdom	17	59	4	1	43	23

* $\text{extra-EU imports} / (\text{Domestic Extraction Used} + \text{extra-EU imports})$

Source: calculation based on Eurostat (online data code: [env_ac_mfa](#))

Indirect material flows – towards a global perspective

The simple weight of traded goods – as presented above – provides a somewhat incomplete picture as it does not take into account the raw materials originally necessary to produce these traded goods. A more comprehensive picture on the "material footprints" of imports and exports, especially finished and semi-finished goods, can be obtained by converting the traded goods into their *raw material equivalents (RME)*, i.e. amounts of domestic extraction used (DEU) required to provide the respective traded goods.

Eurostat has developed a model to estimate the RME of imported and exported goods for the aggregated EU-27 economy (i.e. extra-EU trade).

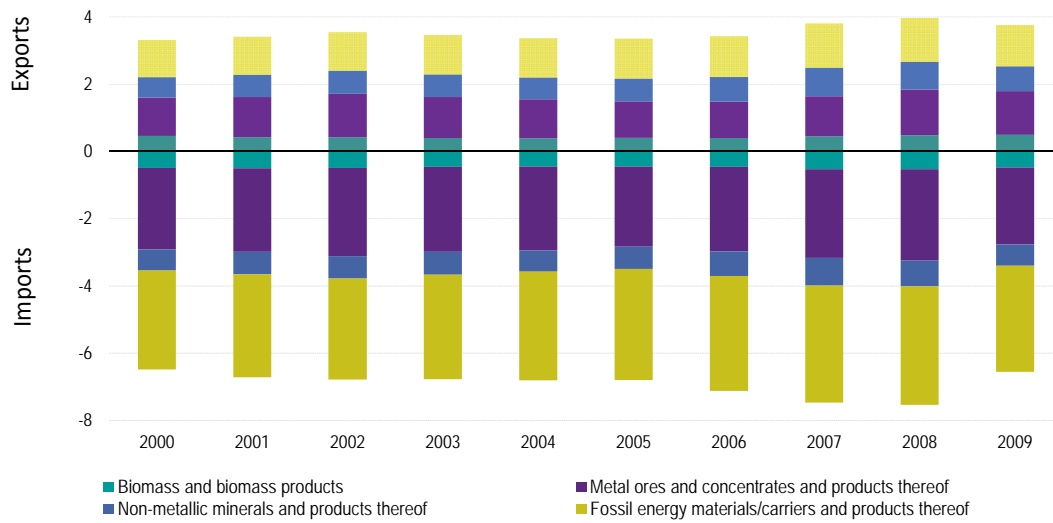
Eurostat estimates the exports in RME to amount to 3.6 tonnes raw material equivalents per capita (see Figure 7) which is more than three times the simple

weight of exported products (compare with Figure 1).

The import of goods measured in raw material equivalents is estimated at 6 to 7 t/cap. This is twice as much as the simple weight of imported products (compare with Figure 1).

For the simple weight of traded goods, imports are three times higher than exports (see Figure 1). For the traded goods expressed in RME imports are only twice as high as exports (see Figure 7). This is because imports are dominated by raw products, notably *fossil energy materials/carriers and products thereof*, which have a small "material footprint" i.e. RME. On the other hand, exports are dominated by high value semi-finished and finished products which have comparably high "material footprints".

Figure 7: Imports and exports in raw material equivalents (RME) by main material category, EU-27, 2000-2009 (tonnes RME per capita)



Source: model calculation based on Eurostat (online data codes: [env_ac_mfa](#), [demo_gind](#))

The imports measured in tonnes RME are dominated by *fossil energy materials/carriers and products thereof* and *metal ores and concentrates and products thereof* making up roughly 90 %. The exports in RME are also dominated by these two categories, however their share is significantly less at roughly 50-60 %.

Over the period 2000-2008 the composition of imports and exports in RME did not change much. Both dropped in 2009 due to the economic crisis.

METHODOLOGICAL NOTES

Eurostat compiles and analyses physical trade data in the framework of its *economy-wide material flow accounts (EW-MFA)* portraying economies in physical terms following national accounting principles.

Eurostat collects economy-wide material flow accounts from all EU Member States, Norway, Switzerland and the candidate countries via an electronic questionnaire. The EW-MFA Questionnaire comprises mainly the direct material flow accounts with the components: domestic extraction used (DEU), imports (IMP), and exports (EXP). These components enable the derivation of the indicators DMC (domestic material consumption) and DMI (direct material input):

$$\text{DMI} = \text{DEU} + \text{IMP}$$

$$\text{DMC} = \text{DEU} + \text{IMP} - \text{EXP}$$

The data sources national statistical institutes employ for the compilation of these accounts may differ in scope and quality between countries.

With the year 2013 Regulation (EU) 691/2011 on European Environmental Economic Accounts enters into force based on which the EW-MFA Questionnaire is sent out every year asking for data up to T-24 months.

The indirect material flow such as imports and exports in raw material equivalents (RME) are not subject to the above legal base. They are estimated by Eurostat - only for the aggregated EU-27 based on a complex environmentally extended Input-Output model. Further information can be found here.

[Project: Estimates for Raw Material Consumption \(RMC\) and Raw Material Equivalents \(RME\) conversion factors](#)

Economy-wide material flow accounts (EW-MFA) record flows of natural inputs (domestic extraction of materials) and products (imports, exports) in a detailed breakdown by some 50 material categories. Trade data presented in this Statistics in focus employ the following main material categories:

- Biomass and biomass products:
 - crops and products thereof
 - crop residues and fodder crops
- Metal ores and concentrates and products thereof
- Non-metallic minerals and products thereof:
 - sand and gravel
 - non-metallic minerals and products thereof (excl. sand & gravel)
- Fossil energy materials/carriers and products thereof (coal, oil, gas etc.)
- Other products and waste

Important publications:

- [Economy-wide material flow accounts and derived indicators - A methodological guide 2001](#)

- [Economy-wide material flow accounts compilation guide 2012](#)

- [EW-MFA Questionnaire 2012](#)

Further information

Eurostat website: <http://ec.europa.eu/eurostat>

Data on 'Environmental accounts'

http://epp.eurostat.ec.europa.eu/portal/page/portal/environmental_accounts/data/database

Further information about 'Environmental accounts':

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