Statistics in focus

ECONOMY AND FINANCE

23/2005

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Contents

Definition of IPPE 2

Distinction between IPPE and other price and exchange rate measures..... 2

Trends in the IPPE 3

Use of the IPPE and other indices in contracts..... 4

Data sources available at Eurostat .. 5

Future of IPPE 6

Manuscript completed on: 02.08.2005
Data extracted on: 01.07.2005
ISSN 1024-4298
Catalogue number: KS-NJ-05-023-EN-N

The Index of purchasing power of the euro (IPPE)

Features and uses

Summary

The IPPE may be described as a combined index of consumer prices and exchange rates. It was designed in particular for indexation of contracts expressed in ECUs. However, its uses have become more limited since the launch of the euro, and the IPPE can be calculated with little difficulty from its components. It is therefore intended to discontinue some, possibly all, of the IPPE series.

This Statistics in Focus also includes a description of how monetary values can be indexed to various indices and exchange rates.

The Index of Purchasing Power of the Euro (IPPE) aims to account for the change in consumer prices and movement of currency exchange rates over time. More specifically, the change in price levels is measured by the Harmonized Index of Consumer Prices (HICP) and the movement in exchange rates is measured against the euro. A change in the IPPE of a Member State over time is the combined effect of changes in its national HICP, and movements in that Member State's currency vs. the euro over the same period.

The graph shows the trend in the IPPE for EU-25, EU-15, and euro-zone since 1995. The HICP for the euro-zone (MUICP[1]) is added for comparison purposes. It can be seen that, from 1999 onwards, the trend in the IPPE aggregate for the euro-zone is identical to that of the MUICP[2]. This is because exchange rate movements against the euro do not, by definition, exist within the euro-zone. Therefore, since the start of monetary union in 1999, the IPPE series for the euro-zone reflect the same price movements measured by the MUICP.

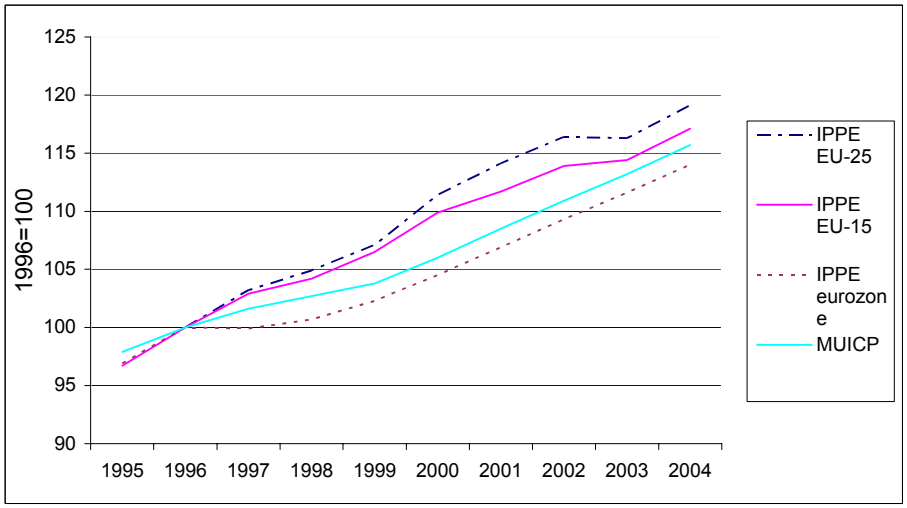

Figure 1: IPPE (EU aggregates) and MUICP

1 *Monetary Union Index of Consumer Prices: the harmonised index of consumer prices for the euro-zone.*

2 *There may however be a small difference due to rounding in the IPPE calculation.*

Definition of IPPE

The IPPE measures the combined effect of changes in consumer prices and movements in euro exchange rates. The IPPE for a Member State may be expressed as follows:

$$\mathrm{IPPE}_t = \mathrm{HICP}_t \cdot \frac{\mathrm{EUR}_t}{\mathrm{EUR}_{1996}}$$

where:

$HICP_t$ = Harmonized Index of Consumer Prices (1996=100)

EUR_t = euro (ECU) monthly average exchange rate of the national currency

EUR_{1996} = euro (ECU) average exchange rate of the national currency in 1996

t = month t

The (relative) level of the consumer prices in a country is represented by its Harmonised Index of Consumer Prices (HICP). The exchange rate of the country is measured against the euro: an increase in the exchange rate compared to the 1996 base means an appreciation of the currency. The HICP, euro exchange rate indices and IPPE are all compiled monthly by Eurostat.

The IPPE is produced not only for Member States and some non-EU Member States, but also for the EU aggregates EU-25, EU-15, and euro-zone. These aggregates are compiled as weighted averages of the IPPE series of the countries comprising the aggregate. The weights are annual; they are identical to those used for calculating the HICP aggregates and they are updated each year at the same time as those of the HICP.

Up to 1999, when the euro came into being, the exchange rate measured movements of each currency against the ECU, which was defined as a weighted basket of EU currencies. The series before and after 1999 are consistent, however, as the euro replaced the ECU on 1st January 1999 on a one-for-one basis.

Distinction between IPPE and other price and exchange rate measures

As the IPPE is primarily used for indexation purposes it is important not to confuse it with other series also used for the same purpose. These are briefly described below.

Consumer price indices, including the HICP, used in calculating the IPPE, measure changes in prices of goods and services available to consumers over time independently of exchange rate movements. Where exchange rates are fixed between currencies, or where countries share a common currency, changes in the IPPE mirror exactly changes in the HICP.

Producer price indices, broadly speaking, aim to measure developments in producer' transaction prices. For example, the industrial output price indices compiled by Eurostat are based on 'ex-factory' prices, and cover both domestic and non-domestic prices (separate domestic and non-domestic output price indices are also compiled by Eurostat).

Exchange rates between two currencies measure the price of one unit currency expressed in the other currency.

Bilateral exchange rate *indices* offer a measure in index form of changes in the value of one currency against another over time.

It is possible also to construct inflation-adjusted or real bilateral exchange rate *indices*. These differ from IPPE because they must take into account price changes in both the countries concerned. For example, a real exchange rate index for the euro against the Polish zloty would take into account not only price changes in Poland but also in the euro-zone. In theory, changes in real exchange rates should be close to zero in the long term.

Purchasing Power Parities (PPPs) on the other hand are designed to make spatial (between countries or regions) comparisons of price levels and volumes rather than temporal comparisons (between two periods or points in time within one country or region). PPPs convert prices expressed in national currencies to a kind of artificial common currency, which make up for the price level differences between countries or regions in the process of conversion. Despite its name, the IPPE has nothing to do with purchasing power parities.

The IPPE can be considered a way of measuring changes in prices of consumer goods and services over time in a country assuming the euro as the reference currency. (NB it measures the inflation experienced by the euro holders). That is, the IPPE takes the euro exchange rate as well as national price movements into account.

Trends in the IPPE

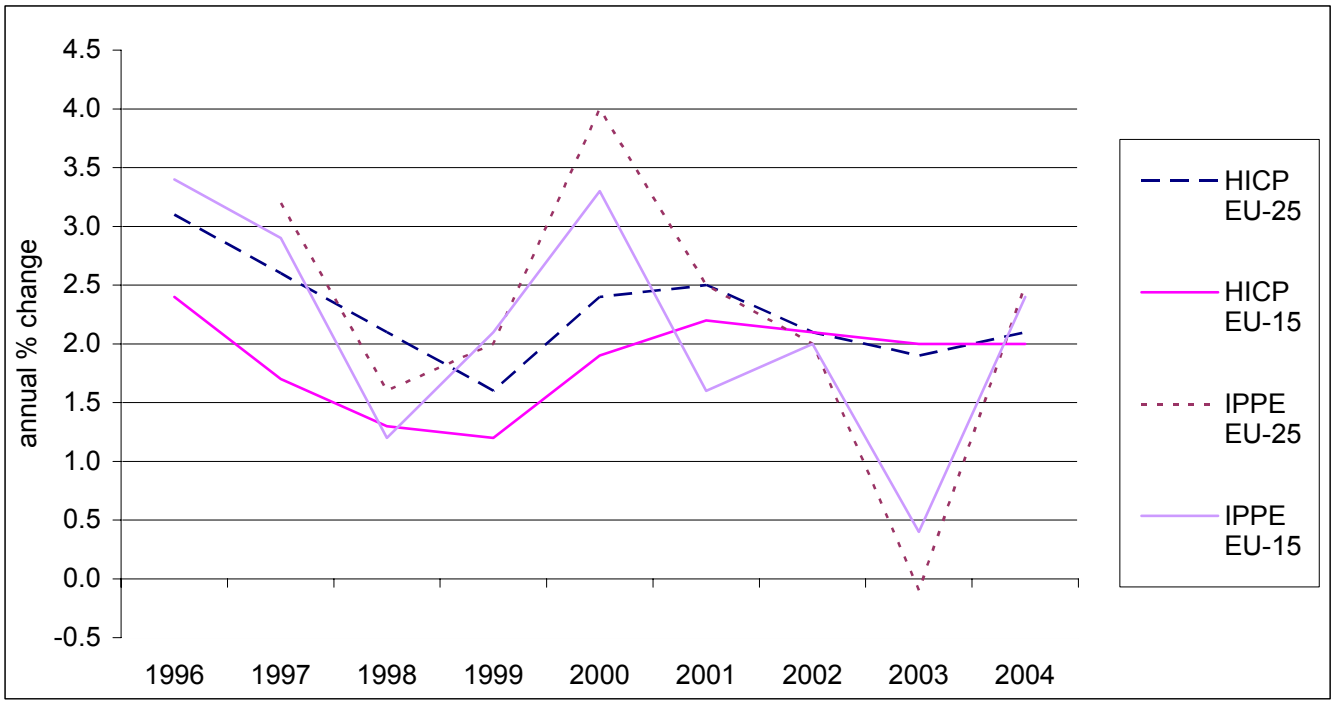

Figure 2: IPPE and HICP for EU-15 and EU-25, annual average percentage changes

Caution is needed when interpreting trends in the IPPE. Movements in the index can be explained by changes in both consumer prices for the Member State to which the index refers and exchange rate movements vs. the euro.

Figure 2 shows the annual average percentage change in IPPE for EU-15 and EU-25, in comparison with the equivalent HICP series. It can be immediately observed that the IPPE is more volatile than HICP. This is because exchange rate movements usually are more volatile than consumer prices. Apart from one small exception, the IPPE values are always positive, whereas a real bilateral exchange rate index, as explained above, would normally be closer to zero and may be expected to show many negative as well as positive values over a long time period.

The HICP for EU-25 and EU-15 converge in 2002, as inflation differences between the new Member States and EU-15 countries diminish. Thereafter the HICP remains at around 2% for both EU-15 and EU-25. At more or less the same time the corresponding IPPE series also tend to converge. This suggests some link between exchange rate movements and consumer prices, although the time series is rather short and further analysis would be needed for any firm conclusions to be made.

The IPPE annual average index levels for individual EU countries are shown in table 1, and the corresponding annual average percentage change in table 2. Focussing on 2003 and 2004, a considerable uniformity in IPPE can be observed in table 2. For most countries, the IPPE grew at an annual average rate of between 1% and 3%. The main exceptions are:

in Slovakia the IPPE grew by 11.6% in 2003 and a further 11.3% in 2004, mainly because of relatively high inflation, while the currency also appreciated against the euro;

in Hungary the IPPE grew by 7.6% in 2004, mainly because of relatively high inflation, while the currency also appreciated slightly against the euro;

in Latvia, Poland and the UK the IPPE fell by 6.7%, 11.7% and 7.9% respectively in 2003, because of currency depreciation against the euro, while inflation was relatively subdued in Poland and the UK compared to the rest of the EU.

Figure 3 shows the annual average percentage changes in IPPE and HICP for the euro-zone. The percentage changes in the two series are identical from 2000 onwards, because of the elimination of exchange rate movements between countries of the euro-zone at the beginning of 1999. Before that date the differences reflect changes in euro-zone currencies against the ECU.

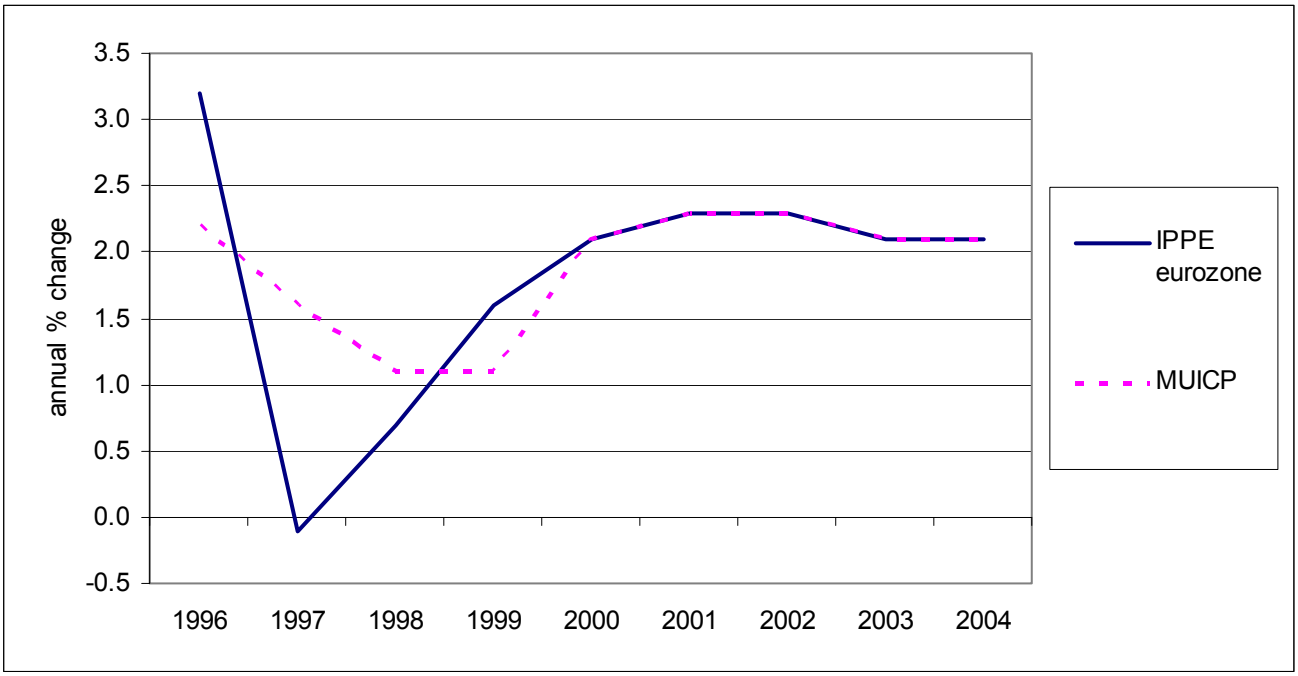

Figure 3: IPPE and HICP for euro-zone (MUICP), annual average percentage changes

Use of the IPPE and other indices in contracts

This section provides an overview of how the IPPE and other indices may be used for adjusting monetary values. The purpose of indexation, when referring for instance to contracts, is normally to compensate a contracting party for the adverse impact of inflation on the value of the contract. Normally a consumer price index (the all items index) is used for this purpose, but in some contracts it might be considered more suitable to use a price index of a particular item group for compensation purposes. A producer price index of a product or group of products may also be used in specific circumstances.

Generally, the following formula is used for indexation of contracts:

$$At = Ao \cdot \frac{It}{Io}$$ where

At = revised total amount (re-valuated) (t = revision date specified in the contract clause)

Ao = total original amount in the contract, i.e. the value to be price updated

Io = index at the time of Ao, usually the start of contract

It = index at the time of At i.e. the time when the initial value is re-valued

The following cases are not meant to be exhaustive, but to illustrate the use of the indices mentioned above.

Case 1: single currency contract with price indexation

Typically, in the case of a contract denominated in one currency, and where neither contracting party is subject to exchange rate risk, an indexation clause would frequently refer to a consumer price index. Using the example of the euro-zone, the clause might refer to the HICP of the euro-zone (MUICP) or the EU (EICP[3]) (especially where operations of a contracting party are spread over several countries), or to the HICP of a single country if that seems most relevant.

Case 2: single currency contract with exchange rate indexation

It may be the intention, where one contracting party bears an exchange rate risk, to cover the risk by way of indexation. In this case bilateral exchange rates (or

[3] *European Index of Consumer Prices: a weighted average of HICPs from EU Member States. Its composition increased from 15 to 25 countries, following the accession of the 10 new Member States in 2004.*

exchange rate index) might be used as a means of maintaining the value of the contract in the currency denomination of that contracting party.

Case 3: single currency contract with price and exchange rate indexation

If the intention is to compensate a contracting party for changes in both prices and exchange rate risk against the euro, the IPPE might be suitable. For example, a contract worth originally € 10 million was signed in January 2001 between a contractor ('buyer') in the euro-zone and a service provider ('seller') operating in the United Kingdom. The amount was to be paid in full, indexed to the IPPE, in December 2004. The IPPE for the UK has moved from 134.9 in January 2001 to 131.6 in December 2004. Using the indexation formula, the result is

$$\text{At} = € 10.0\text{m} \times \frac{131.6}{134.9} = € 9.755374\text{m}$$

Between these dates the IPPE fell considerably as the pound sterling weakened. The buyer was therefore due to pay less than € 10m, despite inflation during the intervening period. The seller receives the same amount in sterling as at the time of signature of the contract, with the addition of an inflation adjustment. In other words, the revised value (€ 9.75537m) is the same in sterling terms as the original value, plus an adjustment for UK inflation.

It is important to note that the IPPE is relevant in case 3 only if the contract is denominated in euro. If, reversing the example, the contract is in sterling and the seller is based in the euro-zone (say, Germany), a calculation similar to that used for deriving the IPPE[4] should be made but from the point of view of sterling. This would involve:

the HICP of the euro-zone (or Germany) and the movement in euro vs. sterling exchange rate (inverse of sterling/euro rate).

Case 4: contracts involving two or more currencies

Assuming again that the contracting parties agree to index for both price inflation and exchange rate movements, the following method is suggested. The full value of the contract is indexed to the relevant HICP, and bilateral exchange rates (or exchange rate index) are used for indexing the value of the relevant currency component.

For example, a contract totalling € 10m is denominated 80% in euro and 20% in the Hungarian forint. The seller is based in Hungary. The total amount should be indexed to the HICP of Hungary. The euro component (80% of the new total following indexation to the HICP) would then be adjusted for movement in the forint/euro rate.[5] If however the seller is based in the euro-zone, then the total amount should be indexed to the HICP of the euro-zone or member country, while the forint component (following indexation to the HICP) should be adjusted for movement in the euro/forint rate.

Implications for contracts

These examples show that it is essential for contracts to state clearly the purpose of indexation, and how it is to be calculated. In cases of compensation for both inflation and exchange rate movements, most contracts would become clearer if the two issues were separated, i.e. if the contracts were defined in the currency which requires the inflation compensation and these amounts are converted to other currencies at well defined points in time using the current exchange rates.

Data sources available at Eurostat

The IPPE may be found in the Eurostat database under 'Economy and finance/Monetary and other financial statistics/Index of purchasing power of the euro/ECU'. In addition to IPPE, the table also includes two series based on non-harmonised price indices: these series have been discontinued and will shortly be removed from the database.

Euro exchange rates and exchange rate index may be found under 'Economy and finance/Exchange rates and interest rates/Exchange rates/Bilateral exchange rates/ Euro/ECU exchange rates'.

The HICP is available in 'Economy and finance/Prices/Harmonized indices of consumer prices (HICP), 1996=100'. There is a monthly press release and 'Statistics in Focus' with the latest data.

Purchasing power parities are also available in the 'price' domain.

Producer price indices may be found under 'Industry, trade and services/Industry, trade and services - horizontal view/Short-term Business Statistics/Industry (NACE Rev.1 C-F)/Producer price indices (2000=100)'.

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[4] *The IPPE in the example could be derived from the HICP of the UK and the movement in sterling vs. euro exchange rate.*

[5] *Conceivably, the IPPE could be used for indexing the Hungarian forint component, and HICP used for only the euro component rather than the total amount of the contract. This alternative is not recommended, however.*

Future of IPPE

As described, the IPPE is specifically designed for indexation of certain types of contract. It had a wider practical application before the creation of the euro-zone, as many more European currencies were subject to exchange rate movements against the ECU. As has been explained, movements in the IPPE for the euro-zone aggregate and its member countries are identical to movements in HICP, apart from a possible rounding difference. It is therefore planned to discontinue the IPPE series for the euro-zone and euro-zone countries at the end of 2005. The EU-25 and EU-15 aggregates will also be discontinued, as they appear to serve little practical purpose.

For the time being, the remaining IPPE series, referring to countries not belonging to the euro-zone, will be continued. However, the series can be calculated without much difficulty using the formula provided. Eurostat may therefore decide, at some future date, to discontinue these too.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
EU-25	:	100.0	103.2	104.9	107.1	111.4	114.1	116.4	116.3	119.1
EU-15	96.7	100.0	102.9	104.2	106.4	109.9	111.7	113.9	114.3	117.1
euro-zone	96.9	100.0	99.9	100.7	102.3	104.5	106.9	109.3	111.6	114.0
BE	100.2	100.0	98.4	99.1	100.9	103.6	106.1	107.8	109.4	111.5
CZ	91.0	100.0	103.6	113.3	112.7	121.4	132.6	148.7	143.8	147.2
DK	98.4	100.0	100.2	101.4	104.3	106.9	109.4	112.3	114.5	115.4
DE	100.7	100.0	98.7	99.0	100.4	101.8	103.7	105.1	106.2	108.1
EE	85.1	100.0	106.2	115.3	119.7	124.4	131.4	136.1	138.0	142.2
EL	93.5	100.0	104.1	101.8	105.6	105.1	107.6	111.9	115.7	119.2
ES	95.2	100.0	98.7	99.7	102.4	106.0	109.0	112.9	116.4	119.9
FR	97.5	100.0	99.4	100.3	101.5	103.3	105.2	107.2	109.5	112.1
IE	95.2	100.0	107.5	104.4	106.8	112.4	116.8	122.4	127.3	130.2
IT	88.5	100.0	103.5	104.8	106.9	109.7	112.2	115.1	118.4	121.1
CY	:	100.0	105.0	108.0	109.3	115.6	117.5	120.9	123.8	126.7
LV	:	100.0	114.7	119.4	128.7	147.8	151.3	148.7	138.8	142.0
LT	77.9	100.0	121.8	129.4	137.0	159.5	166.7	173.4	171.9	173.9
LU	100.7	100.0	98.3	99.0	100.7	104.5	107.0	109.2	112.0	115.6
HU	95.4	100.0	108.4	109.0	114.1	121.9	134.8	149.8	150.2	161.6
MT	:	100.0	108.7	113.4	118.5	128.6	132.2	133.7	130.8	133.8
NL	100.5	100.0	98.6	99.9	102.7	105.1	110.5	114.7	117.3	118.9
AT	100.1	100.0	98.3	98.9	100.1	102.1	104.4	106.2	107.5	109.6
PL	:	100.0	105.9	112.3	111.5	129.5	148.9	144.5	127.5	128.4
PT	97.0	100.0	100.4	101.1	103.9	106.8	111.5	115.6	119.4	122.4
SI	100.9	100.0	102.8	108.0	109.6	112.4	115.6	119.9	122.4	124.1
SK	94.7	100.0	108.3	111.3	110.2	128.0	135.0	141.7	158.2	176.1
FI	101.0	100.0	100.3	99.9	101.9	104.9	107.7	109.8	111.3	111.4
SE	90.5	100.0	100.3	98.2	100.0	105.7	99.0	102.0	104.8	105.8
UK	95.8	100.0	119.7	124.4	129.5	141.0	139.9	140.1	129.1	133.4
IS	97.8	100.0	107.2	109.6	115.6	128.3	113.6	121.3	122.3	124.5
NO	98.2	100.0	104.8	101.2	105.3	111.1	115.0	124.3	119.0	114.4
BG	:	100.0	65.5	75.1	77.5	85.7	92.2	97.5	99.8	105.7
RO	106.1	100.0	123.2	159.3	141.9	169.6	174.7	178.0	170.8	177.2

Table 1: IPPE annual series (1996=100)

	1996	1997	1998	1999	2000	2001	2002	2003	2004
EU-25	:	3.2	1.6	2.1	4.0	2.4	2.0	-0.1	2.4
EU-15	3.4	2.9	1.2	2.1	3.3	1.6	2	0.4	2.4
euro-zone	3.2	-0.1	0.7	1.6	2.1	2.3	2.3	2.1	2.1
BE	-0.2	-1.6	0.7	1.8	2.7	2.4	1.6	1.5	1.9
CZ	9.8	3.6	9.3	-0.5	7.7	9.2	12.2	-3.3	2.4
DK	1.6	0.2	1.1	2.9	2.5	2.3	2.7	2.0	0.8
DE	-0.7	-1.3	0.4	1.3	1.4	1.9	1.3	1.0	1.8
EE	17.5	6.2	8.5	3.8	3.9	5.6	3.6	1.4	3.0
EL	7.0	4.1	-2.2	3.7	-0.4	2.4	3.9	3.4	3.0
ES	5.0	-1.3	1.0	2.7	3.5	2.8	3.6	3.1	3.1
FR	2.6	-0.5	0.8	1.2	1.8	1.8	1.9	2.2	2.3
IE	5.0	7.5	-2.9	2.3	5.3	4.0	4.7	4.0	2.3
IT	13.1	3.5	1.2	2.0	2.6	2.3	2.6	2.8	2.3
CY	:	5.0	2.9	1.2	5.8	1.6	2.9	2.4	2.3
LV	:	14.6	4.2	7.8	14.8	2.4	-1.7	-6.7	2.3
LT	28.4	21.8	6.2	5.9	16.4	4.5	4.0	-0.9	1.1
LU	-0.8	-1.7	0.8	1.7	3.8	2.4	2.1	2.5	3.2
HU	4.9	8.4	0.5	4.7	6.9	10.5	11.1	0.3	7.6
MT	:	8.7	4.3	4.5	8.6	2.8	1.1	-2.2	2.3
NL	-0.5	-1.4	1.4	2.8	2.3	5.1	3.9	2.2	1.4
AT	-0.1	-1.7	0.6	1.2	2.0	2.3	1.7	1.3	2.0
PL	:	5.9	6.1	-0.7	16.1	15.0	-3.0	-11.7	0.7
PT	3.1	0.4	0.6	2.8	2.8	4.4	3.7	3.3	2.5
SI	-0.9	2.8	5.0	1.5	2.5	2.9	3.7	2.1	1.4
SK	5.6	8.3	2.8	-1.0	16.2	5.4	5.0	11.6	11.3
FI	-1.0	0.3	-0.4	1.9	3.0	2.7	2.0	1.3	0.1
SE	10.5	0.2	-2.0	1.8	5.7	-6.3	3.0	2.7	1.0
UK	4.4	19.7	3.9	4.1	8.9	-0.8	0.1	-7.9	3.3
IS	1.8	4.8	-3.4	4.1	5.5	3.5	8.1	-4.3	-3.9
NO	2.2	7.2	2.2	5.5	11.0	-11.5	6.8	0.8	1.8
BG	:	-34.5	14.7	3.2	10.6	7.6	5.7	2.4	5.9
RO	-5.7	23.2	29.3	-10.9	19.5	3.0	1.9	-4.0	3.7

Table 2: IPPE annual percentage changes

Further information:

Databases

EUROSTAT Website/Economy and finance/Monetary and other financial statistics/Index of purchasing power of the euro/Index of purchasing power of the euro/ECU - Annual data

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This publication has been produced in collaboration with Sheldon Warton-Woods (text) and Olafur Johannsson (layout).