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Klaus Matthies, Hans-Joachim Timm*

HWWA Raw Materials Price Index on a New Basis

The division of labour in the world economy is subject to a process of constant change which also affects the meaningfulness of raw materials price indices. Such indices require periodic revision in order to maintain their significance as current indicators of commodity market price developments. This is particularly true of an index with a constant price and weighting basis such as the HWWA raw materials price index.

The index of raw materials prices developed by the HWWA in the 1950s represents a comprehensive indicator of current price developments on the world commodity markets which are of considerable importance for the development of the global economy. The industrialised countries are largely concerned with the effects that changes in raw material prices have on domestic cost and price structures and on competitiveness. For the developing countries which are dependent on raw materials exports, sales revenues influence the extent to which they are able to purchase investment goods and so to accelerate the process of economic growth.

Given that the traditional industrialised countries continue to dominate international commodity trade both as suppliers and as consumers, there has been no change in the main aim of the HWWA raw materials price index: the index measures changes in the prices of raw materials imports invoiced to the industrialised countries and is thus an indicator of developments in the cost of imported raw materials. In contrast to some other indices, such as the UNCTAD index, the HWWA index pays no explicit heed to the viewpoint of the developing countries. The year 1990, which international organisations currently use in their statistics as the base year for most indexed time series, has been chosen to provide the new price basis for the HWWA index.

The last revision of the HWWA index weightings took place in 1980 and was based on trade data from 1974 to 1976. Since then, the relative importance of individual raw materials for the industrialised coun-

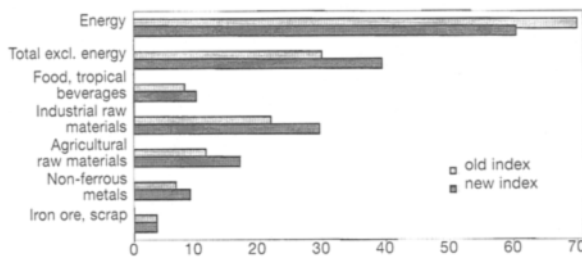
tries has changed. As a result of greater efficiency and energy-saving measures introduced after the two oil price explosions, for example, the proportion of energy commodities in total imports to the industrialised countries has fallen. As far as the other raw materials are concerned, there has been a marked shift in their relative significance away from foodstuffs and towards industrial raw materials (cf Fig.1).

Raw materials price indices are usually weighted according to the goods structure prevailing in the base year (Laspeyres formula). The index thus answers the question of the extent to which the base year's representative basket of goods has become cheaper or more expensive. For reasons of expediency, the HWWA index continues to make use of this construction. It would be conceivable, in theory, to use a weighting pattern which is adjusted on an annual basis. This would answer the question of how much more or less a basket of goods which represents today's volume structure would cost compared to the base period. In practice, however, such an exercise would be of doubtful value as the necessary foreign trade data become available only after a time lag of several years.

Weightings for individual commodity prices are now drawn from the relevant imports to the OECD countries, excluding trade between EC countries. Developments in western Europe, in which national markets are becoming increasingly integrated into a single market, are thus taken into consideration even more than before – the previous index had already excluded intra-EC trade in goods subject to the Common Agricultural Policy. In order to offset short-term fluctuations in raw materials imports, import data was again taken from three consecutive years, 1989

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Figure 1
Change of Weights in the HWWA Index
 – Shares in % –



Note: The price base of the index (volume base 1975) has been corrected for price changes from 1975 to 1990.

to 1991. When determining the weighting pattern, the 1989 and 1991 raw materials imports were also evaluated with 1990 prices in accordance with index design theory which demands a single volume structure in the base years. This was achieved by correcting the collated nominal import values by the respective price deflections from the year 1990.

Selection and Definition of the Raw Materials

In accordance with the aims of the HWWA index, the selection of raw materials is drawn from the "non-manufactured goods" as defined in the Standard International Trade Classification (SITC); this group covers the sections 0 to 4 and 68. The HWWA index

continues to include energy commodities (crude oil and hard coal), a point in which it differs from most other well-known raw materials price indices such as those published by the IMF, UNCTAD and the World Bank. Given the high weight of fuels, which have a decisive influence on movements of the total index, a partial index without energy commodities will continue to be computed.

When selecting the basket of goods, efforts were made to include only unprocessed or little-processed goods, i.e. raw materials with a low level of value added. Products which include a high proportion of labour costs and other factors charges – as is the case with most semi-finished and finished goods – were largely rejected. Delimitation can prove difficult in individual cases, however. Historical trading practices must also be taken into account. In the case of most non-ferrous metals, for instance, international trade and the publication of representative market prices takes place not on the level of primary processing (as ores) but on a higher level (as metals). With the exception of steel scrap which is used in manufacturing in the same way as a raw material, waste materials or secondary raw materials remain excluded. While the importance of recyclable waste materials in the manufacturing process is certainly increasing, published prices are not available in most cases.

Table 1
Weights in the HWWA Index of World Market Prices of Raw Materials

– Base 1990 = 100 –

Commodities and commodity groups	Share in % ¹	Commodities and commodity groups	Share in % ¹
HWWA-Index, total	100	Industrial raw materials	29.53
HWWA-Index, excluding energy	39.48	Agricultural raw materials	16.90
Food, tropical beverages	9.95	Cotton	1.23
Cereals	2.07	Wool	1.11
Barley	0.11	Hides	0.76
Maize	1.10	Wood	8.58
Rice	0.26	Rubber	0.94
Wheat	0.61	Wood pulp	4.27
Oilseeds, oils	1.95	Non-ferrous metals	8.95
Soybeans	1.62	Aluminium	3.84
Coconut oil	0.13	Lead	0.22
Palm oil	0.10	Copper	3.04
Sunflower oil	0.10	Nickel	0.95
Beverages, sugar, tobacco	5.93	Zinc	0.63
Coffee	2.48	Tin	0.27
Cocoa	0.71	Iron ore, scrap	3.69
Tea	0.36	Iron ore	3.00
Tobacco	1.33	Steel scrap	0.69
Sugar	1.05	Energy	60.52
		Coal	5.03
		Crude oil	55.48

¹ Rounded figures, therefore group shares might differ from the sum of individual weights.

In order to come as close as possible to its aim of providing a representative picture of commodity price developments, the HWWA index includes important raw materials which are traded internationally. However, only goods which are of significance for imports to the industrialised countries are taken into account. The lower limit for consideration is set at 0.1% of trade in non-manufactured goods excluding fuels (SITC 0+1+2+4+68). Exceptions are necessary, however, when no current or representative world market prices are available. Natural gas, for example, continues to be omitted for this reason. Precious metals are also excluded as they can only partially be regarded as raw materials in the sense of industrial inputs (on the selection cf. Table 1). Sisal and ground-nuts are no longer included in the index.

Altogether, the HWWA index now covers 29 commodities which, in the base period, accounted for half of the OECD imports (without EC intra-trade) in non-manufactured goods according to the SITC definition. The proportions of individual raw materials in the corresponding SITC groups vary because there are major differences between the relative amounts of products at various stages of the manufacturing process.

Compared to other international commodity price indices, the HWWA index ranks towards the middle

of the field as far as the number of raw materials is concerned. The Reuters index covers 17 commodities, the Economist index 24; in the indices published by the international organisations IMF, UNCTAD and the World Bank, between 32 and 39 raw materials are represented – not least as a result of their different focus. The most comprehensive of all is the UN index with 66 items. The lower number of items in the HWWA index is due above all to the exclusion of numerous foodstuffs which tend to resemble finished products rather than raw materials.

Prices and Index Structure

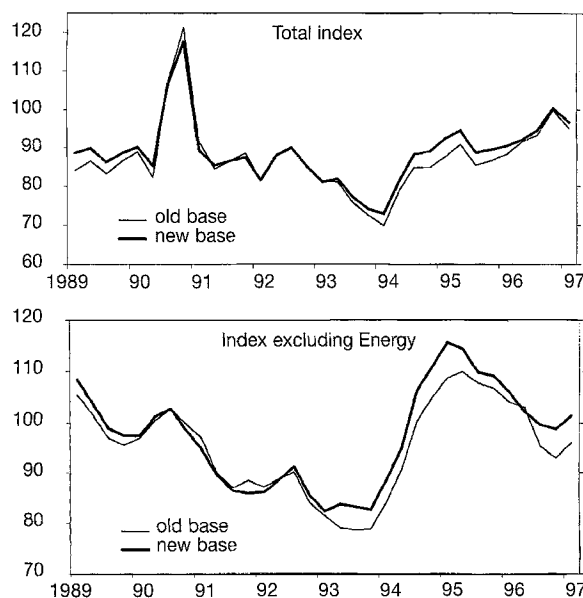
An important criterion for the selection of the raw materials prices was that they should provide a true reflection of market movements and thus be representative of imports to the industrialised countries. Daily prices for standardised qualities recorded at international commodity exchanges or auctions appeared the most appropriate; these also generally serve as prices for raw material import contracts. The prices already used in the previous HWWA index come closest to fulfilling this selection criterion. Daily quotations are not always available for all the prices represented in the HWWA index, however. In such cases, further sources of information (e.g. IMF, World Bank, company statements) are exploited.

The number of prices has been reduced compared to the old index. The prices removed no longer mirrored market movements in a significant fashion. In these cases the prices were largely manufacturers' official sales prices which remained constant over long periods of time, one example being the manufacturers' price for aluminium. Some goods, such as sugar or cocoa, are now represented by one price only, rather than by two quotations as in the past. Altogether, 36 price series have been selected for the 29 representative raw materials, i.e. some raw materials are represented by two – oil by three – price series in order to take different qualities into consideration. The greater weighting of wood in the new index is reflected by the inclusion of an additional price for logs; the old index covered only sawn wood.

The HWWA index is computed on the basis of what continues to be the most important currency in world trade, the US dollar. Where trade is conducted in currencies other than the dollar the prices are converted accordingly. As in the past, the HWWA index will also be computed in Deutschmarks, and in future data will also be provided in ECU, thus enabling differentiated interpretations of raw materials price developments.

Figure 2
Raw Materials Price Trends according to the new and old HWWA Index

– 1990 = 100 –



The raw materials price index will continue to be divided into main and sub-indices; the subdivision provides transparency with regard to the fundamental movements which together constitute a general development, without completely abandoning the advantage of aggregated information. Finally, linking the new index to the old index is relatively uncomplicated and price developments remain comparable over a long period of time, which is of great importance for long-term analyses.

Raw Materials Price Developments according to the New and the Old Index

The new HWWA raw materials price index has been computed back to 1989 (cf. Table 2) such that a comparison for the last eight years is possible with the old index on the basis of the year 1975. For comparative purposes, the old index was re-computed on the basis of the year 1990, the base year for the new index. For the total index the graph shows largely identical curves - which are determined decisively by the price of oil - for both series. However, in the case of the index without energy there are also very considerable concurrencies. The turning points almost always coincide; only the lowest point in the new index without energy commodities is reached earlier

than in the old index. The close correspondence between the old and the new total indices is also apparent in the correlation between the indices for individual series. The correlation coefficient for the total index is $R=0.98$. In the index without energy, the coefficient is only slightly lower at $R=0.97$.

The range, defined as the difference between the minimum and maximum monthly index values in the period from 1989 to 1996, is slightly larger in the old total index than in the new one; in the index without energy it is the other way around. However, at 10% and 8%, the differences are not very large for such a long period. The arithmetic mean and standard deviation are similarly close together. As a result of the introduction of an additional price for logs and the omission of a price for sulphite wood pulp - a product which is hardly traded any more - the level of the new index for wood and wood pulp in the period analysed is markedly higher than that of the old index. The range of fluctuation of the index without energy - as measured by the standard deviation - has fallen only slightly as a result of the change in the selection of prices, even in the case of agricultural raw materials.

For price indices whose weighting and price basis are fifteen years apart, the correlations described

Tabelle 2
HWWA-Index of World Market Prices of Raw Materials
- 1990 = 100, US dollar base -

Year, month ¹	Total	Index excl. energy	Food, tropical beverages etc. ²			Industrial raw materials				Energy	
			Total	Food	Beverages etc.	Total	Agricultural materials	Non-ferrous metals	Iron ore, scrap	Total	Crude oil
1989	88	102	111	113	110	99	92	117	89	79	78
1990	100	100	100	100	100	100	100	100	100	100	100
1991	87	89	94	97	91	88	87	83	103	86	85
1992	86	88	91	102	83	87	88	81	97	85	84
1993	79	83	92	103	84	80	84	68	91	76	75
1994	83	100	125	111	134	92	96	85	89	72	70
1995	91	112	127	118	134	107	111	104	94	78	76
1996	94	101	125	139	115	94	96	88	97	90	89
1996 Jan.	91	108	122	139	111	103	109	94	98	79	77
1996 Feb.	89	105	128	140	120	98	99	94	99	78	76
1996 March	92	105	126	141	116	97	98	95	99	84	83
1996 April	94	102	133	156	117	91	88	95	97	89	89
1996 May	92	104	136	160	119	93	91	96	97	84	83
1996 June	90	101	129	147	117	91	93	86	97	83	82
1996 July	92	100	127	144	115	91	93	82	97	87	86
1996 Aug.	94	100	126	140	116	92	95	83	97	90	89
1996 Sep.	98	99	122	135	114	91	96	80	97	97	98
1996 Oct.	101	98	117	123	113	91	97	78	96	103	104
1996 Nov.	99	99	115	119	113	93	97	85	95	99	99
1996 Dec.	101	98	113	119	109	92	96	86	94	102	103
1997 Jan.	101	99	117	123	113	93	95	90	95	102	103
1997 Feb.	95	101	125	125	125	93	93	91	96	92	91
1997 March	94	104	135	133	137	94	93	94	96	87	86
1997 April	91	104	138	134	141	93	93	90	96	82	80

¹ Period averages. ² Sugar, tobacco.

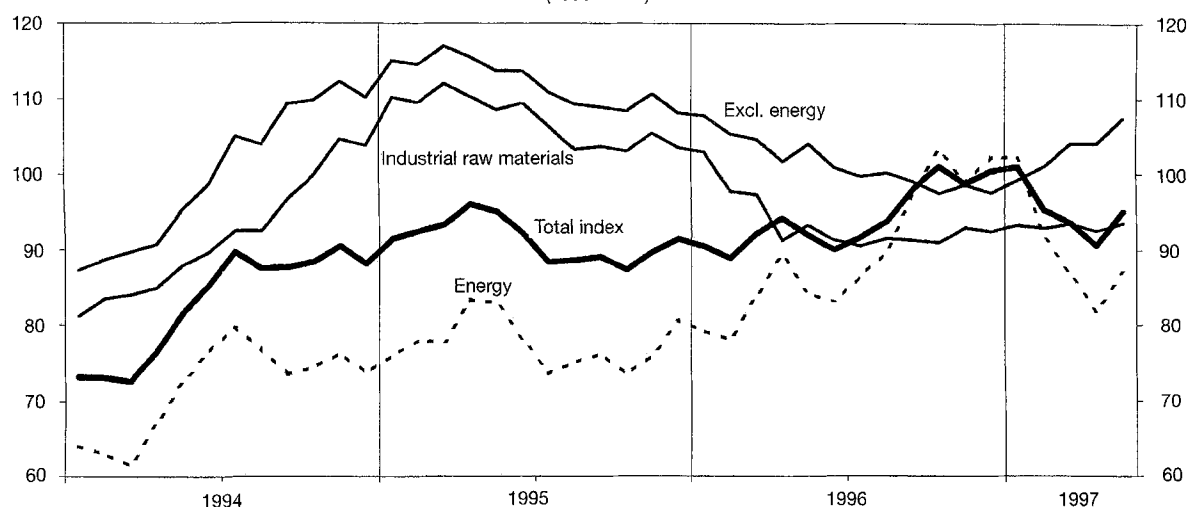
above could not be expected from the outset. The course of the price indices for the cost of living, for example, tends to undergo a relatively marked change over such a long period of time as a result of adjustment of consumer habits to increasing incomes and product innovations. The great similarity of the curves can be partly explained by the fact that the weightings have not changed very much. Although great progress is made in the raw materials sector as far as the extraction and processing of raw materials are concerned, this has so far had little influence on price and volume structures of internationally traded raw materials.

The relative volumes of traded goods have altered relatively little because raw materials are, in general, complementary goods as far as the manufacture of finished products is concerned and are also far less

subject to changes in demand than final products. Thus the share of oil in raw materials imports has fallen by only a small amount since 1975 despite its becoming much more expensive and despite considerable efficiency increases in the use of oil. In the old index, oil had increased its weighting – particularly in relation to food and tropical beverages which even experienced a slight decline in prices during the same period – purely as a result of the marked increase in price levels and the corresponding doubling of the index value from 1975 to 1990. As a result of the new base year, the weight of oil has been reduced again. Furthermore, the selection of prices required few significant changes as the quotations previously used continue to be highly representative. Both factors contribute to the pronounced correlation between the old and new indices.

HWWA Index of World Market Prices of Raw Materials¹

(1990 = 100)



1990 = 100, on US dollar base.

Raw Materials and Groups of Materials ¹	1996	Nov. 96	Dec. 96	Jan. 97	Feb. 97	March 97	April 97	May 97 ²
Total index	94.3 (3.3)	98.8 (10.1)	100.5 (9.9)	101.0 (11.6)	95.4 (7.3)	93.6 (1.6)	90.6 (-3.8)	95.1
Total, excl. energy	101.4 (-9.6)	98.6 (-10.9)	97.6 (-9.8)	99.3 (-8.0)	101.1 (-4.1)	104.1 (-0.6)	104.1 (2.4)	107.5
Food, tropical beverages	124.6 (-2.1)	115.3 (-8.6)	113.0 (-7.5)	117.0 (-4.5)	125.2 (-2.3)	135.3 (7.1)	138.3 (4.3)	148.9
Industrial raw materials	93.7 (-12.6)	93.0 (-11.8)	92.5 (-10.7)	93.3 (-9.3)	93.0 (-4.9)	93.5 (-4.0)	92.6 (1.4)	93.6
Agricultural raw materials	96.0 (-13.8)	96.9 (-11.9)	95.5 (-11.1)	94.6 (-12.9)	93.2 (-6.2)	92.9 (-5.5)	93.0 (5.6)	92.7
Non-ferrous metals	88.0 (-15.8)	85.0 (-16.6)	86.1 (-14.5)	90.3 (-4.2)	91.4 (-3.0)	93.7 (-1.6)	90.2 (-5.0)	94.1
Energy	89.7 (15.5)	98.9 (30.0)	102.4 (27.1)	102.2 (29.0)	91.7 (17.3)	86.9 (3.5)	81.8 (-8.4)	87.0

¹ On a US dollar basis, averages for the period; figures in brackets: percentage year-on-year change. ² Up to and incl. 23th May.