



*Manual to
Hungarian Economic Statistics*

Edited by:

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Foreword by the Editors

The purpose of publishing the *Manual* is to share with the public the Bank's experience obtained in the analysis of Hungarian economic statistics. We explain what types of data we consider as relevant in assessing the Hungarian economy, and the various applications of such data. In particular, the book deals with methodological and economic theory aspects underlying the Magyar Nemzeti Bank's *Quarterly Report on Inflation*.

The *Manual* will only be published in electronic format on the [MNB](#) homepage. It will be updated on a regular basis, as need may be and as far as possible. This is suggested by 'Version 1.0' on the title page, as those familiar with the ways of website editing will probably notice. Whenever there is some modification in the text, the marking will be changed to Version 1.1, 1.2, ... etc. Should there be a major addition, the marking will read as Version 2.0, 3.0, ... etc.

The *Manual* is structured as follows. Chapter 1 reviews the general principles of the treatment of economic data series, and seasonal adjustment. The next 19 chapters are divided into a number of major blocs. The first bloc (Chapter 2) deals with the consumer price index, and Chapters 3 to 10 discuss the GDP time series and the major components of GDP by use. The next bloc deals with a few 'miscellaneous', but important, data series on business activity (Chapters 11 to 14) and labour market variables (Chapters 15–16). The paper is concluded by an analysis of fiscal and external balance indicators (17–18) and of measures of analyst expectations (19).

With a view to ensuring that this volume has all the qualities of a handbook, the chapters form separate units that can be enjoyed on their own. Hence, the references about a particular subject are printed, a little unusually, at the end of individual chapters.

This publication may be viewed as an experiment for the Hungarian adaptation of an internationally well-established genre. We would welcome any comments and suggestions from readers.

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1. An introduction on methodology

This publication will typically deal with the analysis and utilisation of *time series*. It will not, however, deal with the problems arising in the assessment of cross sectional data.

A *time series* comprises values for the same phenomenon as measured at different points in time over the same period; the different data points (e.g. level or base index series) are directly comparable. Data relating to periods of different lengths (e.g. cumulated data), and transformed data, such as month-on-month and especially twelve-month indices are *not a series*.¹

Under a cyclical approach, it seems expedient to examine economic data not only on their own, but also in a broader context, since the links between the examined time series and other time series may also convey important information. *Identity* is a trivial case of the relationship between time series. It means that a series is part of a larger aggregate, or when it can be transformed into a new time series. A time series is called an *indicator* when it has no such relationship with the *reference series*, but for theoretical reasons (external demand – domestic industrial production) or on the basis of empirical studies (household confidence index – household consumption) there is reason to assume that they are in correlation.

An indicator can be *leading, coincident or lagging*, depending on whether the change in it precedes in time, co-moves with or responds with a time lag, to changes in the reference time series (GDP, industrial production, etc.). There are a number of possible approaches to decide what characteristics an indicator may have, including, for instance, the Granger causality test, points of maximum cross correlation, asymmetry of cross-correlation coefficients (see Jakab and Vadas (2001)).

Seasonality and its treatment

What is seasonality?

The behaviour of economic agents (corporate sales, household consumer demand, etc.) is affected not only by the cyclical situation but other factors as well. Of these, *seasonality* may have a crucial effect. Seasonality may arise from the alteration of seasons, existence of various holidays, number of trading days worked during the reviewed period, etc. These effects may lead to periodical fluctuations in the time series, which have to be removed in order to obtain more accurate information about changes in core developments.

On many occasions when time series are discussed in this publication, there is reference made to corrections and practical methods associated with seasonal adjustment which have a major impact on the usability of the time series examined.

¹ Another problem with twelve-month indices is that they yield irreversible transformation, i.e. the original (level) series cannot be recovered.

Therefore, we have also included a short review on the methodological aspects of seasonal adjustment.²

Seasonality is every cycle in the time series that is capable of producing annual periodicity. In other words, these are cycles the integer multiple of which is the annual period (in the case of monthly data, for instance, this means 2; 2.4; 3; 4; 6 and, of course, 12-month cycles). There are a great number of statistical tests available to decide if a time series under review contains seasonality. Time series with seasonality, for example, show significant auto-correlation at the seasonal periods, and peaks in the spectrum of the time series at the seasonal frequency.

Time series can be divided into four components, such as a trend, a cycle, seasonal components and irregular noise, which can all be observed separately. In the course of seasonal adjustment, various estimation techniques are used to separate these components. This effort is based on the assumption that these *components are independent*.

Seasonality can be *additive*, meaning that the seasonal component does not depend on the trend or the level of the cyclical component, or *multiplicative*, i.e. the seasonal component is proportionate to these components. In the latter case, the principle of component independence can be ensured by logarithmizing the time series.

The seasonal components are not necessarily stable over the period under review, in other words, the time series may contain *moving seasonality*. The most simple reason for this is *calendar effects*. Calendar effects refer to a situation when observed values are affected by

- the number of weekdays or days off,
- changes in the distribution of weekdays, and
- the timing of holidays (Easter, Pentecost).

Such effects are usually due to flow-type volume variables and other related variables (such as production, wages, turnover). Ignoring calendar effects may introduce a bias into indices in the order of several percentage points, even though they are not cyclical information. The above facts clearly show that twelve-month indices can fail to capture current developments not only because of the base effect, but also because they are a major source of bias, due to the calendar effects.

The first pitfall of the seasonal adjustment of time series lies in using the method mechanically and not taking account of the characteristics of a time series. It may also be a problem if the specificities of the *data generating process* are ignored, namely that economic theory relationships typically relate to the *level* of the economic data series, which are the source data where the information is ‘generated’. In this way, in the course of seasonal adjustment, it is the level of the data series that should be subjected to the seasonal adjustment procedure, especially when an automated software solution is used.

² On the methods of time series analysis in general, see Hamilton (1994), Canova (1998), or, in Hungarian, Lieli (1999) and Darvas (2001). Specifically on the theoretical foundations of seasonal adjustment, see Franses (1998), Gomez and Maravall (1998) and Higo and Nakada (1998), and in Hungarian, Sugár (1999).

Why is seasonality removed?

First, seasonality is ‘unnecessary’, i.e. seasonal movement is systematic and can be foreseen with great certainty and, at the same time, is not associated with the trend-cycle, so economic analysts and economic policy makers may, in general, ignore it. Second, seasonality is ‘disturbing’ in a sense that raw series may contain such a high amount of seasonality that no information on the state of the business cycle can be extracted from them.

Methods of seasonal adjustment

The most common algorithms for seasonal adjustment are X-12 ARIMA (empirical moving average-based method) and TRAMO/SEATS (model-based method). Both algorithms can be accessed from the Demetra^{3,4} software package, a user-friendly (Windows based) interface. Both X-12 and TRAMO/SEATS are capable of the treatment of calendar effects and changing seasonality, but in international practice, TRAMO/SEATS is generally preferred, due to its theoretical and practical features.⁵ Another favourable feature of the software package is that the TRAMO/SEATS module facilitating the removal of calendar effects also contains Hungarian working days and holidays.

Practical issues

The section below will discuss a few important methodological issues raised in the course of the regular seasonal adjustment of time series.

Revision problem

A revision problem emerges when there is a change in the former trend or seasonally adjusted data, due to incorporation of new information.⁶ Thus, the past also changes together with the present, which can be especially significant at the end of a sample. Although this is natural, as the optimal filter and estimate is derived using all the information (see Dossé and Planas (1996b)), adjusted time series users who are not aware of this problem may be confused in interpreting the data.

³ Demetra can be downloaded free of charge at <http://forum.europa.eu.int/irc/dsis/eurosam/info/data/index.html>.

⁴ On the use of Demetra, see Gomez and Maravall (2000a, b, c).

⁵ From a theoretical aspect, TRAMO/SEATS is better than X-12 ARIMA, as:

- X-12 ARIMA does not estimate the basic model but picks an acceptable one out of the five built-in models, whereas TRAMO/SEATS estimates a model.
- X-12 ARIMA uses the same filter to produce seasonally adjusted time series, regardless of the basic model, while TRAMO/SEATS constructs an optimal filter based on the estimated ARIMA model.

For further comparisons, see Fischer (1995) and Dossé and Planas (1996a).

⁶ This is due to the fact that when new data are received, the parameters of the former model, or perhaps the model itself, are revised in the course of the re-estimation (seasonal adjustment).

The revision problem could be treated in several different ways:

- by constructing the seasonally adjusted time series using pre-estimated seasonal factors,
- by fixing the model specification estimated earlier, but re-estimating the model parameters,
- by fixing both the model and the model parameters.

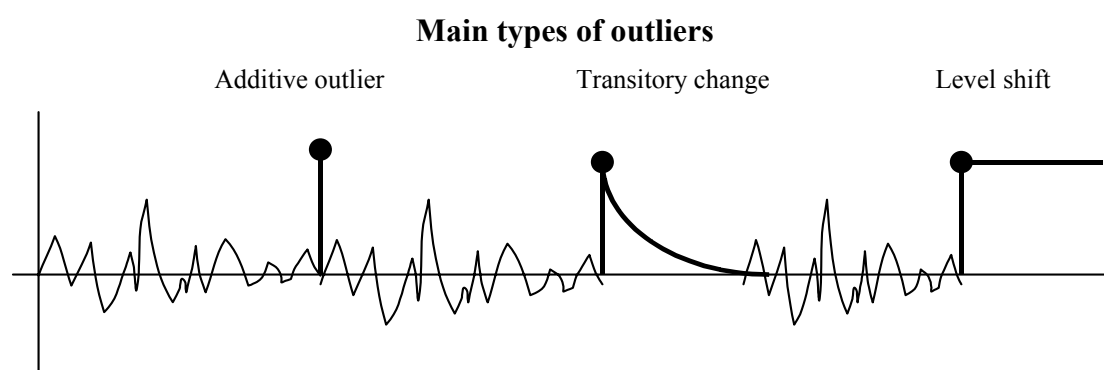
The second approach is the most common, i.e. the model is re-estimated at the end of a full year, and only the model parameters are re-estimated when new data arrive during the year.

Seasonally adjusted or trend-cycle data series?

The answer to the question whether the information is carried by the seasonally adjusted or the trend cycle⁷ time series also depends on the size of the irregular component, the user's person and the purpose of the application. Should the series be noisy (i.e. the irregular component plays a significant part), it is more expedient to use the trend series. Interpreting the seasonally adjusted series, which also contains the irregular component, needs greater expertise. However, for deeper analysis or modelling purposes, the seasonally adjusted series is more suitable, as part of the irregular component computed by seasonal adjustment may be accounted for by other variables.

Outliers

In time series analysis, one can encounter individual data that significantly 'lie outside' the path of the rest of the data. If the outliers are the consequence of some actual economic development, in other words, if they convey actual information, they cannot be ignored. Should, however, an outlier value be due to sampling or measurement error, sample change or some similar effect, it seems reasonable to omit the observation. The above programme can handle the treatment of three different outlier values. The additive outlier represents a one-period spike, and the transitory change disappears over several periods. The level shift represents a lasting break in the time series (usually occurring after some change of methodology).



⁷ The trend-cycle component will be hereinafter referred to as trend component.

Auxiliary variables and dummies

If a series contains more problematic breaks than the outliers, but these breaks are meaningful from the point of view of economic theory, these effects can be removed using auxiliary variables and dummies. Such corrections are used, for instance, in the seasonal adjustment of wages and retail trade.

Problem of aggregation

In practice, it is usually not one selected series that is examined, but a large set of series. If they have identical features, i.e. a series is the aggregate of several sub-series,⁸ seasonal adjustment can be done in two different ways. Direct adjustment means that first the raw series are aggregated, and then the aggregate is directly adjusted. Indirect adjustment means that the raw series are adjusted individually before being aggregated. Compliance with the aggregation constraint that the results obtained by the direct and indirect approach should be identical is a logical requirement. This is, however, not always fulfilled as seasonal adjustment is non-linear (multiplicative seasonality, outliers) and the sub-series may have different seasonality. Unfortunately, there is no general solution to this problem, and it needs to be judged on a case by case basis which adjustment type is more appropriate (see Gomez (2000) on selection supporting tests).

Time consistency requirement

The time dimension has some similarities with the aggregation problem. It is a logical requirement that the annual aggregates (averages) of the original and seasonally adjusted series are identical. One such requirement, for instance, is that the average of volume indices derived from seasonally adjusted quarterly data should be equal to the annual volume index calculated from the original data. However, this is not fulfilled with respect to variable seasonality and outlier correction. Although compliance with time consistency can be forced out in the course of adjustment, this may divert seasonal adjustment from the optimum. Unless there is explicit need, it should not be applied.

Seasonal adjustment at the Central Statistical Office (CSO)

The CSO, the primary reporter of the majority of economic statistics, already published seasonally adjusted data for some data series before 2002 Q1, and since then it has published the full set of seasonally adjusted data for GDP use.⁹ Therefore it seems expedient to evaluate the methods applied by the CSO and compare them with those of the Magyar Nemzeti Bank.

The CSO uses the TRAMO/SEATS module of Demetra, and both the models and the parameters are fixed, i.e. during-the-year adjustments are made with settings estimated on data for the previous full year.

⁸ Vertical aggregation involves the summing up of different phenomena, such as data on the use of GDP. Horizontal aggregation represents the totality of identical phenomena, such as regional sales data, for instance.

⁹ Previously the CSO had published seasonally adjusted data as well for industrial statistics and retail trade.

When adjusting retail trade turnover and industrial statistics, trading day effects are also taken into account and outliers are removed. It should also be noted that with respect to the data on GDP use, the CSO demands compliance with the aggregation constraint and time consistency.¹⁰ The aggregation constraint is satisfied by stating the difference between seasonally adjusted total GDP and the sum of seasonally adjusted GDP components as change in inventories and other non-specified items. Time consistency is created by distributing the difference between the annual data and the seasonally adjusted quarterly data proportionately among the quarters. As noted in the discussion of time consistency, a forced compliance with this constraint may cause a divergence from optimal adjustment. Therefore, an analysis of the components of GDP use also involves assessment of the quality of the seasonally adjusted data series published.

Seasonal adjustment at the Bank

The software in most common use is the TRAMO/SEATS module of the Demetra package. As the X-12-Arima module also contains an explicit test of seasonality, this module is used in addition to TRAMO/SEATS, to test for the presence of seasonality, in the analysis of time series that have already been seasonally adjusted. The following are a few of the main principles followed by the Bank:

- should the Hungarian trading day and Easter effects be predominant in the series, the general rule is to remove them. The ‘depth’ of trading day correction, i.e. the determination of how many trading day auxiliary variables should be used in the estimation, depends on the length of the time series.¹¹
- As the base series (may) contain noise of different magnitude, the frequencies (monthly or quarterly) used in the analysis vary from one series to another. A rule of thumb is that a very noisy series is only tested at the quarterly frequency.
- Revisions of seasonal adjustment may contain cyclical information (‘wagging tail problem’). Based on earlier seasonal series, the changes in the magnitude and direction of revisions may provide information on current developments.
- Choice between direct versus indirect adjustment depends on desired adjustment quality.
- Time consistency is in general not forced.
- It is a requirement that a seasonally adjusted series contains no significant seasonality (idempotence).

¹⁰ See the supplement to the 3 July 2002 GDP data release at <http://www.ksh.hu/>.

¹¹ Calendar effects may be removed by differentiating only between trading days and days off, but it is also possible to approach trading days individually, i.e. number of Mondays, Tuesdays...

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2. Consumer Price Index

Source: CSO

Frequency: monthly indicator

Accessibility: www.ksh.hu, electronically downloadable against payment from Statdat in the form of time series; and electronically downloadable from www.mnb.hu, in the form of time series (as classified by the Bank).

The Hungarian Consumer Price Index (CPI) measures changes, i.e. inflation, in the price of goods purchased by an average resident household. In 1991, when this indicator, available as a time series today, was designed it was a fundamental principle that it should correspond to the price index of household (monetary) expenditures as stated on the national accounts (see chapter 4). However, there are a few differences, with respect to some items, including ‘owner-occupied housing’ or ‘second-hand cars’.

It can be demonstrated from a theoretical point of view that consumer price indices typically overstate changes in the costs of living. The size of this bias is not known with regard to Hungary, but speculative analysis suggests that it could be significant (on how much use economic theory can make of Hungarian consumer price statistics, see Ferenczi et al. (2000)).

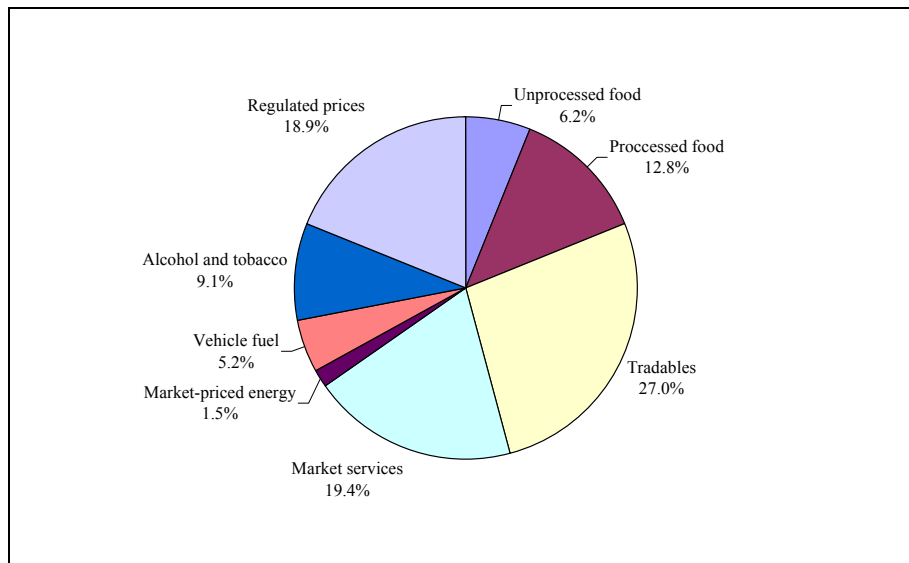
The time series of the current consumer price index is the weighted average of 156 product categories. The CSO publishes three types of indices which measure price change relative to the previous month, December of the previous year and the corresponding month of the previous year. The ‘main’ statistic is the index which takes December of the previous year as a basis of comparison. When, for example, the Bank uses a different starting point, its annual index may show a discrepancy as large as one percentage point from the aggregate index values published by the CSO. The data published are not seasonally adjusted.

In addition to a full breakdown into 156 categories, the CSO also reports data classified by two different methods. Both the CSO’s own classification and the COICOP¹² are to provide a breakdown by purpose of consumption. However, there exists a third type of classification more suitable for analytical and forecasting purposes, where the different categories are based on the economic developments underlying price change. Therefore, following the practice of the ECB, the Bank also constructs its own categories for analysis using the 156 product groups. The weights assigned by the Bank to the individual main groups are shown in the chart below.¹³

¹² Classification of Individual Consumption by Purpose.

¹³ For a detailed description of the Bank’s classification, visit http://english.mnb.hu/dokumentumok/en0203_mnbcsoportok.xls

Breakdown of the CPI by the Bank



The Bank has defined the following main groups:

- Food: the products classified here are those whose prices are determined predominantly by domestic supply.¹⁴ This division is divided into yet another two groups, namely unprocessed and processed food products. The price of the former is influenced mainly by factors that are difficult to model (such as agricultural producer prices or the weather), while price changes in the latter group can be relatively satisfactorily accounted for by certain cost factors, such as unprocessed food prices and manufacturing sector wages.
- Tradable goods: comprise (internationally traded) products which face strong competition from imported goods. The primary factors that determine prices here are the forint/euro exchange rate and foreign inflation within the corresponding product group. This main group comprises not only products in the physical sense, but also the CSO's 'Holiday abroad' (group 682).
- Market services: the prices of products in this group (nontradables) are primarily governed in the short term by forces of domestic demand and supply, while the main long-term factors are the price level and productivity of the tradables sector as well as the terms of trade. Just as in the previous group, 'physical' products – such as the CSO categories (No. 550–552) of 'Newspapers and periodicals', 'Books' and 'Textbooks' – are also included here.
- Market energy: this category comprises household fuels, (such as firewood, Butane and propane gas (in bottles), etc.), with non-regulated prices.
- Motor fuels: this group corresponds to line 541 in the CSO breakdown and has a similar name. They are in a category of their own because global oil prices have the greatest effect on this group.
- Alcohol and tobacco: this group corresponds to 'Alcoholic Beverages and Tobacco' in the CSO's classification. It is primarily distinguished from other market goods in that prices here are strongly affected by the size of excise duties.

¹⁴ Accordingly, coffee sold at retail units and non-alcoholic beverages are classified with the tradable goods group, while restaurant meals and buffet products are in the main group of market services.

- Products with regulated prices: this group includes products (such as electricity, natural and manufactured gas, telephone and pharmaceuticals) the prices of which are regulated, to a great extent, by central or local authorities.

Capturing long-term trends needs the removal of seasonal effects from the time series. The time series to be seasonally adjusted are those that are determined by market mechanisms, such as series of tradables, market services and food. Adjustment is conducted in accordance with the methodology and practice of the CSO adopted in January 2002.¹⁵

Experience with seasonal adjustment

- The time series for tradables and market services appear to be stable and have constant seasonality.
- The main problem with food products is that the series tend to be ‘noisy’, meaning basically, in the context of adjustment, that much care should be taken to remove outliers. Another feature of this group is the presence of variable seasonality, with special regard to unprocessed food products.
- As both analysis and forecasting take place at a quarterly frequency, the Bank adjusts the quarterly series derived from the original data separately. In general, quarterly series appear to be more stable than monthly ones.

Selecting the indicator that conveys the greatest amount of information about one particular time series depends primarily on the economic factors determining the behaviour of that series. When prices governed by mechanisms of market competition and following a trend are the subject of review, period-on-period indices are used for quick analysis, while for forecasting purposes, in addition to the former, price levels (fixed base indices) are also used, mainly in a seasonally adjusted form. By contrast, when prices that are governed by a handful of market participants or the government’s discrete moves (such as motor fuels and regulated prices) are concerned, the price level is the key indicator for analytical purposes.

Core inflation

The purpose of calculating core inflation is to obtain an indicator that is free of the components influenced by largely idiosyncratic effects on the CPI.¹⁶ The new uniform measure for core inflation, introduced jointly by the CSO and the Bank in August 2001 and published since January 2002, can be approximated by excluding unprocessed food, motor fuels, products with regulated prices and market energy from the CPI.¹⁷ Core inflation accounts for 64.3% of total CPI. The CSO’s base period for this series, published in both original and seasonally adjusted form, is December 1994.

¹⁵ See <http://www.ksh.hu/pls/ksh/docs/hirek/09szez.html> (in Hungarian).

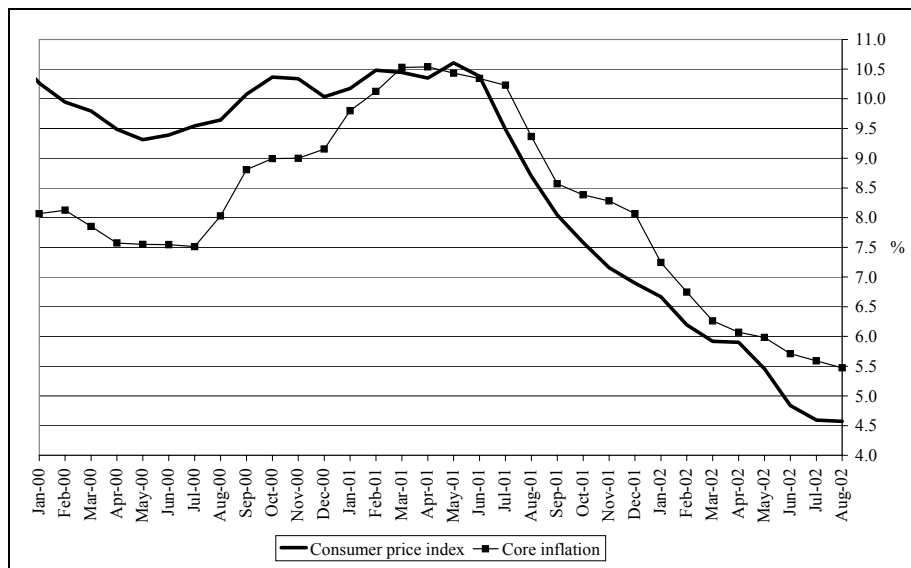
¹⁶ For more on core inflation, see Valkovszky and Vincze (2000), and Ferenczi et al. (2000), who cover the monetary policy aspect of core inflation, together with the theoretical and practical considerations.

¹⁷ See <http://english.mnb.hu/modulei.asp?id=130&did=372>

Items excluded from the 2002 core inflation index: ¹⁸

1. *Unprocessed food*
pork; beef; other meat products; offals; poultry; fish; eggs; potatoes ; fresh vegetables; fresh domestic and tropical fruit
2. *Other seasonal products*
Flowers and potted plants
3. *Fuel and power*
electricity; natural and manufactured gas; steam supply; coal; briquettes, coke; firewood; butane and propane gas (in bottles); motor fuels
4. *Other products and services with centrally administered prices*
pharmaceutical products; rents; waste disposal; water charges; sewage disposal fee; local transport; travel to work and school; other travel (excluding air transport); telephone; postal services; TV fee (a regulated category); gambling; school and nursery school meals
5. Owner-occupied dwellings

CPI and core inflation, seasonally adjusted
Percentage changes on a year earlier



¹⁸ This list was compiled in August 2001 for the year 2002, and it is subject to regular review by the two institutions.

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3. Gross domestic product (GDP)

Source: CSO

Frequency: a quarterly indicator

Date of publication: preliminary information is published at the beginning of the 3rd month following the quarter under review, and detailed information appears at the end of the 3rd month and the beginning of the 4th month after the reviewed quarter

Accessibility: www.ksh.hu, electronically downloadable against payment from CSO-Statdat in the form of time series

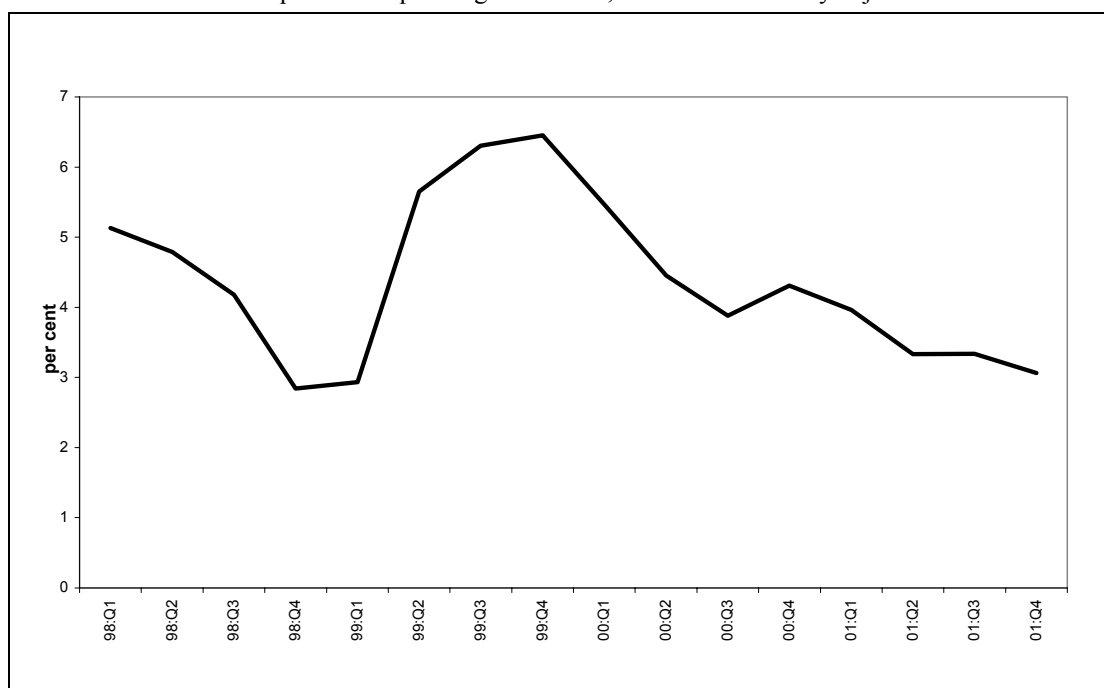
GDP measures economic performance, showing the value of goods and services produced in the geographical territory of a country. Preliminary annual statistics, based on more detailed information than the quarterly data, are prepared in the autumn following the year under review. Finalised data are usually reported during the first half of a consecutive year. This is consistent with international practice, which has examples of subsequent data revision going back to several years.¹⁹ GDP is reported at both current and constant prices. Calculation of quarterly GDP data goes back only to the recent past in Hungary, with official time series only available since 1995 Q1. Nevertheless, the Bank also uses longer, estimated, series that go back to the early 1990s in some of the analyses prepared here. On the imputation of quarterly data, see Várpalotai (2000). Seasonal adjustment is conducted by recalculating the data using prices in 1998 as a base.

The quarter-on-quarter GDP volume index, which can be derived from the time series, is used as a cyclical indicator. However, the Bank's forecasts are based not directly on GDP but its market determined components, such as household consumption, fixed capital formation, exports and imports (to be dealt with at length below). It should be noted that the key factor that determines the inflation forecast is not so much GDP or its domestic use, but movements in household consumer demand.

¹⁹ Revising national accounts is a normal part of statistical procedures. There are examples for significant subsequent revision even in a number of developed countries. These revisions are typically made on a regular basis and may be systematically one-directional. For more on this, refer to Atkinson and York (1997), Barklem (2000) and Faust et al. (2000).

Quarterly growth of GDP

Annualised quarter-on-quarter growth rates, based on seasonally adjusted data



*Seasonal adjustment by the Bank.

Components of GDP use are as follows (in brackets: as a percentage of GDP at current prices):

- Household consumption expenditures (51,2%)
- Social benefits in kind (12,7%)
- Public consumption (11,0%)
- Fixed capital formation (23,4%)
- Inventory investment and other non-specified absorption (3,8%)
- exports (60,4%) and imports (62,6%).

The series should be corrected for two factors prior to analysis, or more precisely, prior to the required seasonal adjustment. First, there is the difficulty that the price base of the available quarterly data is not constant. For example, the data for the period 1995 to 1998 are based on 1995 prices and the data for 1998 to 2000 are calculated using 1998 prices as a base. Therefore, the GDP series is recalculated directly (i.e. not as an aggregate of its components) at a uniform 1998 price base, using the available GDP deflators. Second, the data series, which are at constant prices in principle, are calculated using the annual average price for a given year, and they cannot be analysed at a fixed base of a particular quarter. The implication is that quarter-on-quarter implicit price indices derived from the published data state the total of annual average price change for the first quarter of the year.²⁰ This bias is especially conspicuous in respect of the series of fixed capital formation (see Chapter 8).

²⁰ Naturally, the differences arising from within-the-year differences in the weights assigned to the factors cause price movements within the year.

Final domestic sale

Of GDP components, the Bank often uses final domestic sales instead of domestic use, due to the problems associated with the accounting and forecasting of inventory investment. The final domestic sales category excludes the extreme variability of inventory investment and other non-specified use. Thus, a more trustworthy association can be made between final domestic sales and net exports excluding the import requirement on the one hand and external and domestic cyclical factors on the other hand, which enables more reliable forecasts to be made.

Gross Domestic Real Income (GDI)

This indicator is occasionally published by the CSO, in addition to GDP. As real GDP growth also includes change in the terms of trade, its rate of growth is sensitive to the terms of trade. Real GDI is obtained by correcting GDP for the effect of the change in the terms of trade. When terms of trade change significantly, GDI grows at a different rate than GDP.

Economic theory attributes significance to the analysis and projection of GDI mainly because the external real economic balance tends to deteriorate when domestic use grows faster than GDI, other factors being equal.

The literature recommends several different kinds of methods for calculating losses/gains in the terms of trade. The calculations shown in the *Inflation Report* are based on the GEARY approach.

$$GDI = GDP/PGDP + T$$

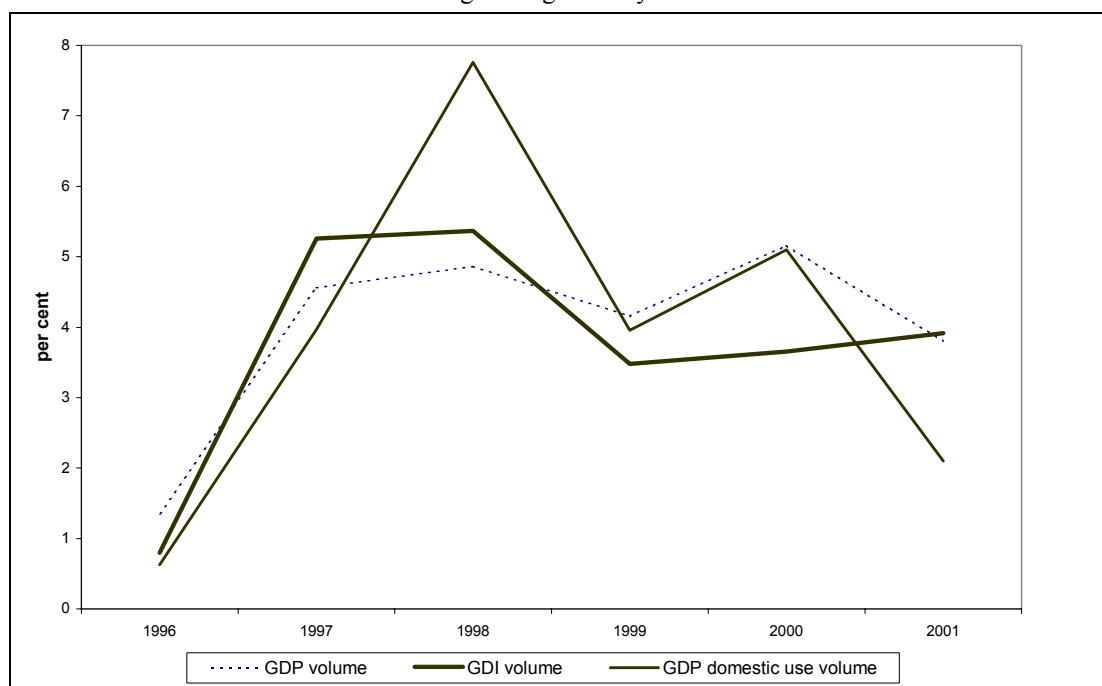
where: PGDP denotes the GDP-deflator, T losses/gains in the terms of trade:

$$T = \frac{X - M}{P} - \left[\frac{X}{PX} - \frac{M}{PM} \right]$$

X and M exports and imports at current prices, PX and PM the export and import price indices, P the average of the export and import price indices, in accordance with the SNA recommendation.

GDP, GDI and the volume index of domestic use, 1996–2001

Percentage changes on a year earlier



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4. Household consumption expenditure

Source: CSO

Frequency: a quarterly indicator

Accessibility: www.ksh.hu, electronically downloadable against payment from CSO-Statdat in the form of time series

Relevant indicators:

- Leading: retail trade in durables and new car sales,
- Coincident: changes in the trends of retail trade, imports for consumer purposes and the rate of unemployment,
- Lagging: the GKI household confidence index and net consumer loans.

Being the largest component of GDP use, total household consumption is of crucial importance both in respect of growth and inflation.

Total household consumption is the sum of household consumption expenditure and social benefits in kind. Household consumption expenditure comprises household income spent on goods and services, regardless of whether it was spent in the territory of Hungary or abroad. Household consumption expenditure is the sum of consumption purchased and produced by households, as well as wages in kind.²¹

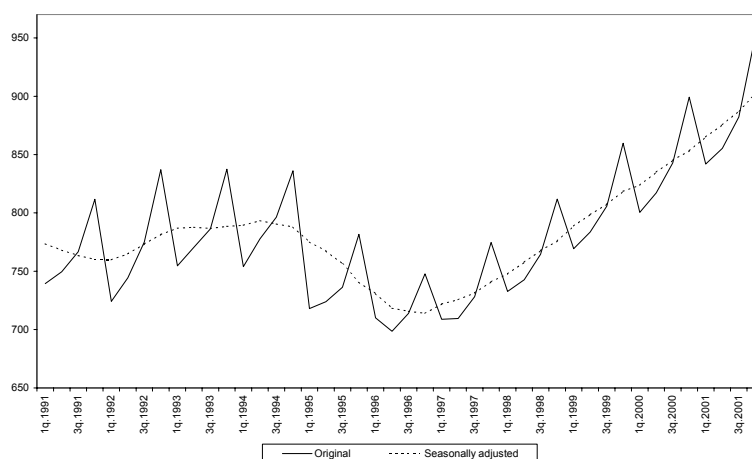
Note, however, that calculations for quarterly consumption, published within the year, are based on less information than calculations of annual GDP. The estimation of quarterly consumption is based primarily on the household expenditure survey and quarterly retail sales data in a breakdown by category of goods. The quarterly value of the consumption of home produced agricultural goods is estimated by the CSO from the data of the household expenditure survey, while wages in kind are assumed to change to the same extent as purchased consumption.

As benefits in kind are determined by the budget, an analysis of household consumption deals primarily with household consumption expenditure (spending by households on goods and services), as this is the category on which household decisions have a direct impact.

²¹ Wages in kind comprise goods and services that employers provide for employees free or at a discount price. This is not the same as social benefits in kind.

Household consumption expenditure

At 1995 prices; HUF billions



The CSO has published quarterly data on household consumption expenditure only since 1995, and there are only annual data available on previous periods. For the purpose of formal analysis, this appears to be a rather short sample period. The Bank has used different kinds of procedures to obtain quarterly estimates from the annual data for the pre-1995 period (see, for instance, Várpalotai (2000)). Although this approach does not yield ‘genuine’ quarterly data, it enables a comparison to be made with other time series from the pre-1995 period (see, for instance, the chapter on the GKI’s household confidence index).

As the seasonal adjustment of consumption expenditure series published by the CSO since 2002 differs from the Bank’s approach in several respects, it seems useful to compare the two approaches. One difficulty may be that although the X-12 explicit seasonality test finds no significant seasonality in any of the series, it detects a significant trading day effect in the series adjusted by the CSO. Furthermore, the adjustment of the CSO also differs from optimal adjustment (for the purpose of analysis) in respect of compliance with time consistency. All in all, as it suits the purposes of analysis and forecasting better, the Bank also uses its own adjustment in addition to the CSO data.

On time series forecasting methods, see Jakab and Vadas (2001).

References

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5. Retail trade turnover

Source: CSO

Frequency: a monthly indicator

Accessibility: www.ksh.hu, electronically downloadable against payment from CSO-Statat in the form of time series

An indicator of household consumption expenditure

Retail trade statistics measure the turnover of enterprises that operate retail outlets (stores, fuel stations, etc). The CSO publishes data on retail trade turnover at current prices, as well as time series where the corresponding period of the previous year equals 100 and where 1995 equals 100. The latter is also published in seasonally adjusted form. Although chaining together year-on-year volume indices yields a time series at constant prices, better results can be obtained by analysing data constructed from the series for 1995 = 100.

An examination of the statistics on retail trade turnover should not neglect to make a comparison with actual household consumption as stated in the National Accounts. An approach which holds that retail trade turnover can be compared with household consumption as a whole seems to be inaccurate, as:

- total household consumption also includes benefits in kind, which are not stated in the retail trade statistics,
- household consumption expenditure²² comprises resident households' income spent on goods and services regardless of whether purchases take place in Hungary or abroad, whereas
- retail trade turnover only comprises some of the goods purchased in the territory of the country, regardless of whether they were bought by residents or non-residents, and retail turnover also includes business purchases.²³

The above points prove that both household consumption expenditure and retail trade turnover include components that are only in one of them. All in all, roughly 60% of retail trade sales are represented in resident households' consumption expenditure.

²² Household consumption expenditure = actual consumption by households – social benefits in kind. See Chapter on GDP.

²³ Of household fuel and power, it only includes fuel.

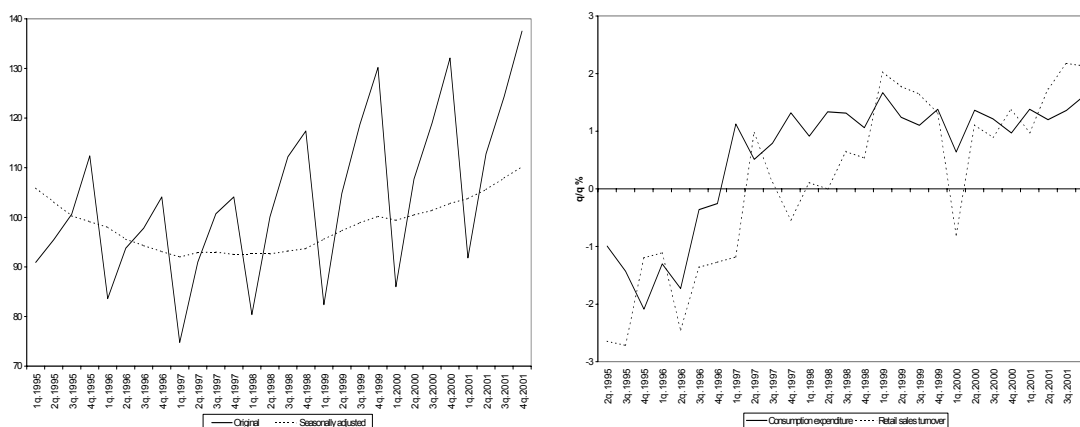
Household consumption expenditure vis-à-vis retail trade turnover

	‘Measuring’ resident households		Business purchases	Measuring non-residents
	in Hungary	abroad	in Hungary	
Goods (excluding fuel and power)	C / R	C / X	X / K	X / K
Fuel and power	C / (R in part)	C / X	X / X	X / X
Services	C / X	C / X	X / X	X / X

Note: C: included in household consumption expenditure, R: included in retail trade turnover, X: not measured by the given statistics.

The CSO publishes seasonally adjusted data on retail trade turnover, using 1995=100 as the base, but the X-12-arma module of Demetra can still detect significant seasonality, trading day and Easter effects in the series. In January 1998, there was a change in statistical reporting on retail turnover,²⁴ and retail turnover was also significantly affected by the number of working and trading days and the Easter effect in the period. Accordingly, including a dummy in seasonal adjustment, and taking account of working day and Easter effects as well yield satisfactory results. When retail turnover and consumption expenditure are adjusted using the above approach, they are in strong correlation, which is no surprise since, even theoretically, a portion of retail turnover is included in resident households’ expenditure, and is also used by the CSO to measure consumption expenditure. Although the data are published at a monthly frequency, it seems more expedient to analyse them on a quarterly basis, due to the noise in the original time series. Retail turnover plays an important role as, despite its coincidence with consumption expenditure, its publication date precedes that of consumption expenditure.

Retail trade turnover



The chart on the left-hand side presents original and seasonally adjusted series for retail turnover (1995 =100%). The chart on the right-hand side depicts seasonally adjusted quarterly growth rates of consumption expenditure and retail turnover.

²⁴ Since January 1998, sampling has been based on licensed retail outlets, also listed in the CSO’s retail outlet register (KISREG).

Retail turnover relating to durable consumer goods

Source: MNB estimate derived from CSO data

Frequency: a quarterly indicator

Accessibility: www.ksh.hu, electronically downloadable against payment from CSO-Statat in the form of time series

An indicator of household consumption expenditure

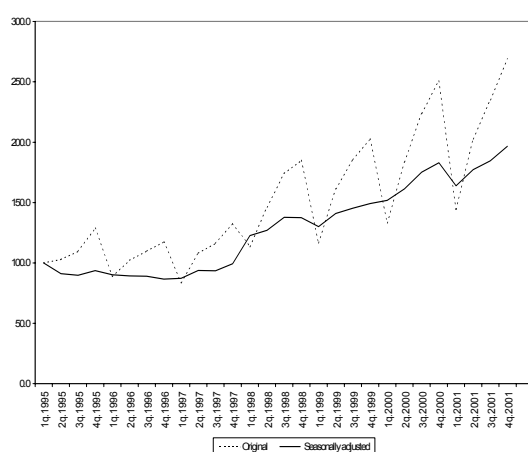
Consumer durable goods correspond to certain product categories in retail trade statistics. As, however, there was a change in the product classification of retail trade statistics in 1998, the series had to be recalculated.

For the period 1995–97, the value of consumer durable purchases at current prices was derived as the sum of the categories ‘road vehicles and fuels’ and ‘other manufactured products’, and in the period 1998–2001, as the sum of ‘furniture and appliances’ and ‘motor vehicles and vehicle parts and accessories’. For the 1997–2001 period, the value at constant prices was derived using volume indices published by the CSO. The deflator for the sample between 1995 and 1996 was the consumer durables price index as stated in consumer price statistics. However, for analytical purposes seasonally adjusted quarterly, rather than monthly, data have been used.

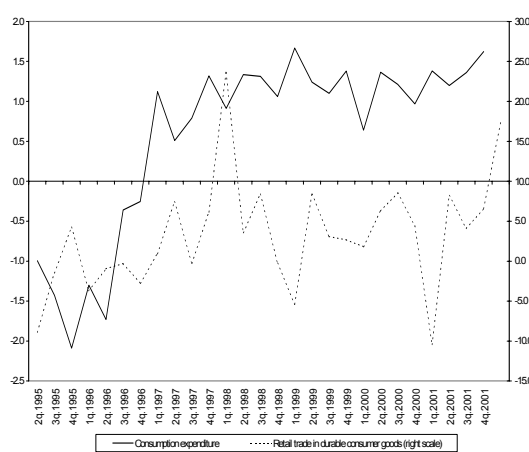
There is strong coincident relationship between quarterly growth in consumption expenditure and that in consumer durables consumption. The latter is, to a certain extent, a leading indicator for consumption expenditure.

Consumer durables consumption and its relationship with household consumption expenditure

In HUF millions at January 1997 prices



Seasonally adjusted quarterly growth rates



6. Consumer loans

Source: CSO

Frequency: a monthly indicator

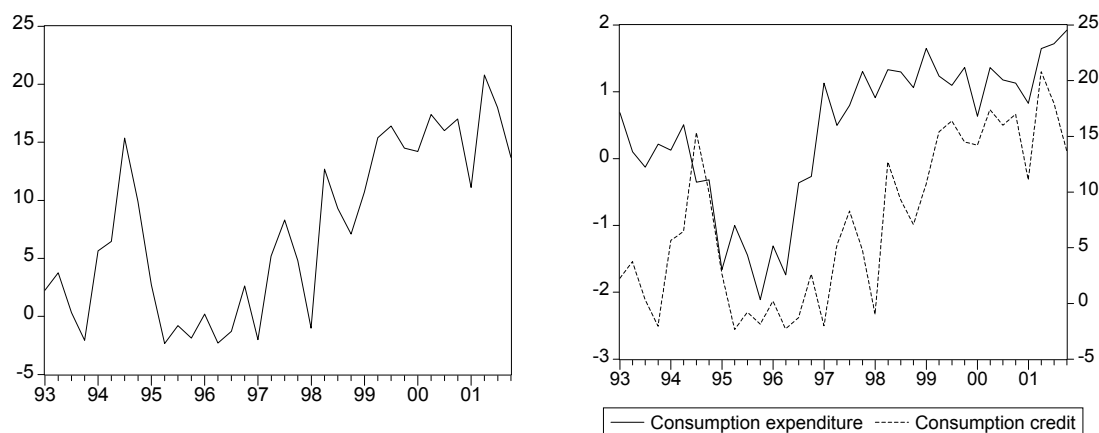
Published on 17th of each month

Accessibility: www.mnb.hu, as an electronically downloadable time series

The Bank reports monthly on households' financial savings. The two key components of household loans are consumer loans and mortgages. The most significant factor in the size of consumption expenditure is net borrowing.²⁵ Theoretically speaking, when net borrowing increases, consumption should also increase, being thus a leading, or at least coincident, indicator of consumer spending. However, Hungarian data show neither leading nor coincident features. Nevertheless, as households' liquidity constraint eases, net borrowing becomes an increasingly important factor (even if not in the econometric sense) in the analysis of consumption expenditure.

Change in the stock of consumer credit

At 1995 prices in HUF billions



The chart on the left hand side shows change in the stock of net consumer loans at 1995 prices in billions of forints. The chart on the right-hand side displays quarterly growth rates of seasonally adjusted consumption expenditure and changes in net consumer credit.

²⁵ Net borrowing is derived as new loans less repayment.

7. GKI Household Confidence Index

Source: GKI Economic Research Co.

Frequency: a monthly indicator

Date of publication: between 12th and 17th day (a Monday) following the reviewed month

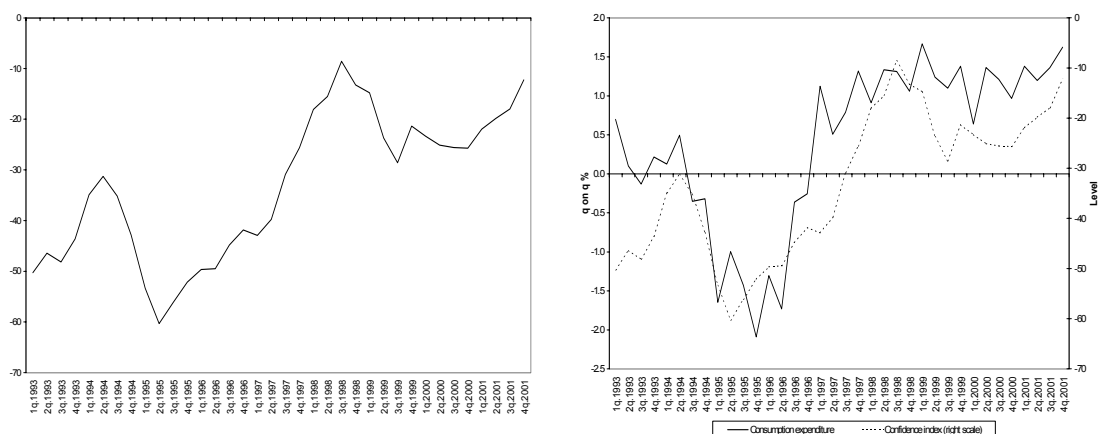
Accessibility: www.gki.hu, where monthly business and household expectations are electronically downloadable in time series form.

Indicator of household consumption expenditure.

The GKI has conducted household surveys since 1993. In the surveys, twelve questions are asked every month and another three questions in the first month of each quarter, in accordance with EU recommendations. Respondents are asked about their views on households and the country's past and prospective financial and economic situation, change in the costs of living, as well as their current and prospective consumption and saving intentions. The quarterly questions survey households' intentions of house, flat and car purchases (for more on domestic cyclical surveys, see Tóth, I.J. (2002)).

The GKI publishes a seasonally adjusted composite index in terms of a weighted average of five questions on a monthly basis. The GKI's household confidence index is a lagging indicator of consumption expenditure. The predictive ability of the consumer spending index can be enhanced by assigning new weights to its constituents (see Vadas (2001)). The predictive power of confidence indices arises from their unique information content (about expectations, uncertainty, etc.). Another important consideration would be to shorten the delay in time before confidence indices are published so that they can be used for short-term forecasting. This use of confidence indices is common in international practice, with numerous central banks (including the Bank of England, Bank of Canada, Reserve Bank of New Zealand and Sveriges Riksbank) using them for analysis and forecasting.

GKI household confidence index



The left-hand chart shows the seasonally adjusted time series of the GKI household confidence index (adjusted by the GKI). The chart on the right-hand side shows quarterly growth in the seasonally adjusted values of consumption expenditure and the GKI household confidence index.

References

- Tóth, I. J. (2002) 'Business and consumer surveys in Hungary', MNB Working Papers, 1/2002
- Vadas, G. (2001) 'Beyond macro-variables: Household consumer confidence index and households' expenditure' MNB Background Studies, 2/2001

8. Fixed capital formation

Source: CSO

Frequency: a quarterly indicator

Date of publication: the beginning of the fourth month following the quarter under review

Accessibility: www.ksh.hu, electronically downloadable against payment from CSO-Statat in the form of time series

Its indicators are capital goods imports, capacity utilisation indicators and the GKI business confidence index

Preparing forecasts about the demand side of GDP also involves projecting growth in fixed capital formation. The time series of fixed capital formation and whole-economy investment differ only in their levels, as both series increase at effectively the same rate. Accordingly, the outlook for fixed capital formation is defined from two perspectives: in addition to a direct projection, the Bank also provides separate investment forecasts for each particular (corporate, government and household) sector.

Definition

Whole-economy investment records investment performance as reflected in contracts regardless of whether the relevant accounts have been settled or not. The CSO reports quarterly information on whole-economy investment at current prices at the beginning of every third month following the reviewed quarter in addition to a year-on-year volume index. The investment price index can only be constructed implicitly, and the methodological difficulties in its calculation are outlined at more length in the section about the price index of fixed capital formation.

The time series of fixed capital formation is in effect derived from investment statistics, but in addition to the items therein it also contains financial leasing and contribution in kind. This series is published separately from investment as a component of quarterly GDP statistics at the end of every third month following the reviewed period. Thus, information on fixed capital formation is released with a month's lag compared with the time series on investment.

Methodological difficulties

The greatest difficulty in respect of the econometric analysis of the *investment time series* lies in the absence of a fixed price base which could be used for the construction of a time series at constant prices. Out of necessity, the Bank uses for this purpose a price index which is the weighted average of the price indices of the industries of equipment and construction.

Another problem is the sectoral breakdown of investment data. First, the CSO only publishes a full set of data on sectoral investment one and a half years after the review

period. Second, these data are only available at an annual frequency. Accordingly, quarterly series on sectoral investment are constructed by estimation.

Corporate sector: the time series on corporate investment is derived from the industry structure of whole-economy investment by weighting together the investment time series on A to K industries at current prices. The weights are derived from the shares of the corporate sector within the individual industries, for which the CSO reports data two years following the year under review. Information at current prices is deflated with a combined price index of equipment and construction.

The Bank's corporate sector classification also differs from that of the CSO. The Bank essentially classifies under corporate investment the projects that are financed and executed by companies. In addition, minor projects that are publicly financed but are implemented by firms are also stated with corporate sector investment. However, unlike the CSO, the Bank classifies motorway construction as a public sector project.

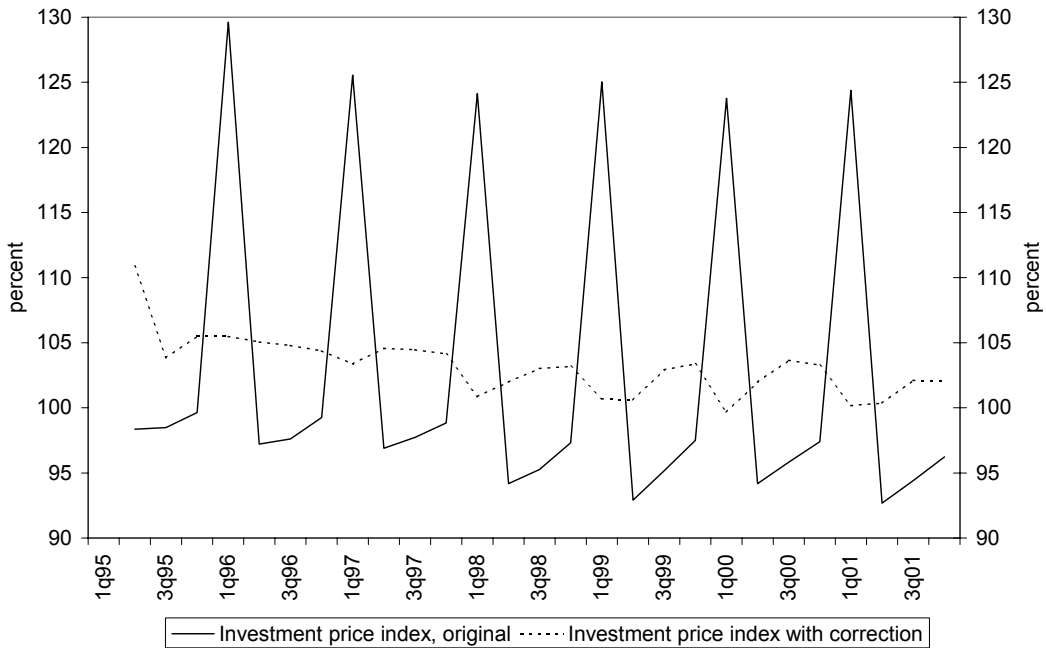
Estimation of public investment is based on *general government statistics*. It is a problem that only indirect correspondence can be established between government statistics and the CSO data on public investment. General government statistics cover funds actually spent on investment, while the CSO only records investment projects that have been completed. Accordingly, there is a time discrepancy between the two types of statistics the accurate extent of which is not known. Source data at current prices are deflated with the combined price index of equipment and construction.

Public sector investment comprises direct government projects and projects financed publicly but implemented by the corporate sector (motorway construction is a typical example).

Household investment refers to projects, typically home building, financed by households. The CSO's household income balance reports on household investment with approximately two years' lag.

Using constant prices series on *fixed capital formation* for analysis also needs a correction of the data series, since in the time series of the implicit price index computed from CSO data, the average annual price change is stated in the first quarter. On the required correction, see Várpalotai (2000).

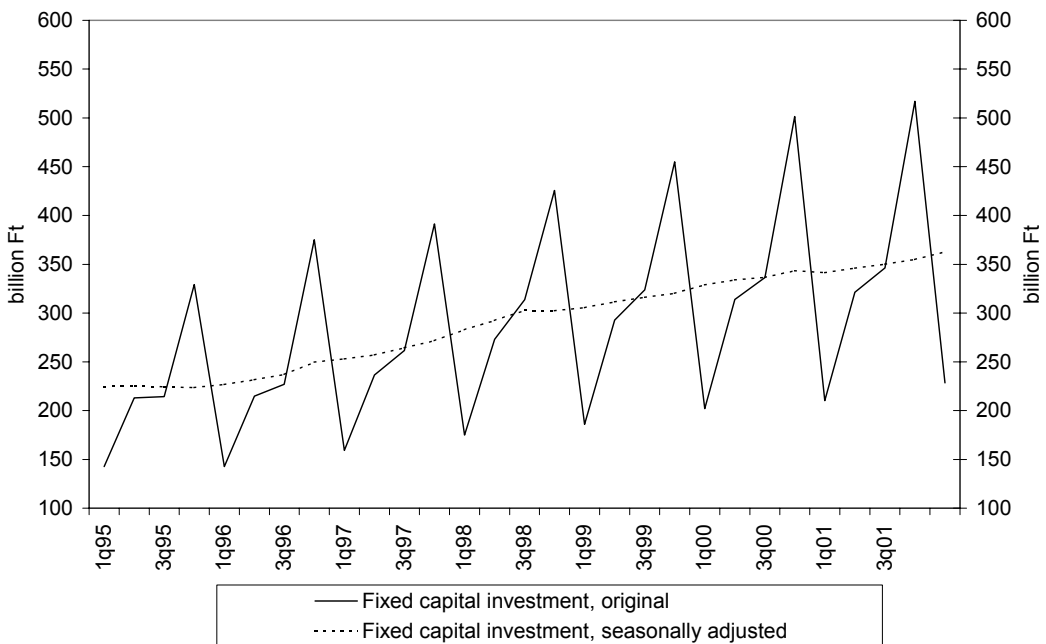
Quarter-on-quarter price index for fixed capital formation



The Bank’s analysts have eliminated this bias by determining constant prices in a way that ensures that the dynamics of the time series of quarter-on-quarter price indices makes economic theory sense while leaving quarterly current prices data and annual price indices unchanged. The price index is estimated with a view to ensuring its ‘smoothness’ and similarity to consumer and import price indices.

Fixed capital formation using the corrected price indices

Forint billions; at 1995 prices



Since 2002 Q1, the CSO has also published the seasonally adjusted time series of gross fixed capital formation. This seasonally adjusted series is suitable for direct analysis.²⁶

Data used for forecasting

Investment (and fixed capital formation) by sectors is projected along the following lines.

1. Corporate sector:

The following indicators are used to project corporate investment:

- Investment goods imports,
- GKI business confidence index,
- External demand.

2. Public sector:

Analysis and projection of public sector investment is based on the evolution of investment spending by general government. Its rate is shown by investment statistics with a certain time lag. Forecasting of investment spending partly relies on expenditure appropriations and partly on actual figures for past periods. In respect of local government authorities, the projection also takes into account estimated changes in available funds. The forecast of credit-financed road construction is based on government materials and briefing materials from the Hungarian Development Bank (MFB), in charge of financing.

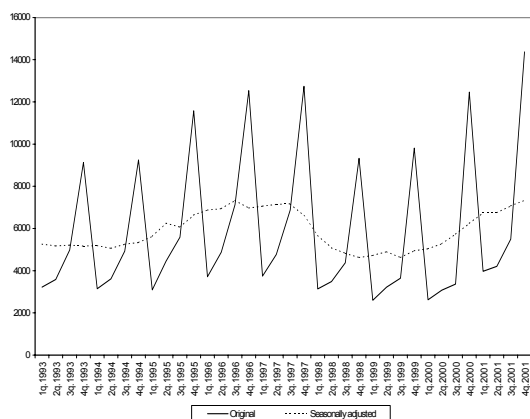
3. Household sector

The estimation of household investment takes account of the following data:

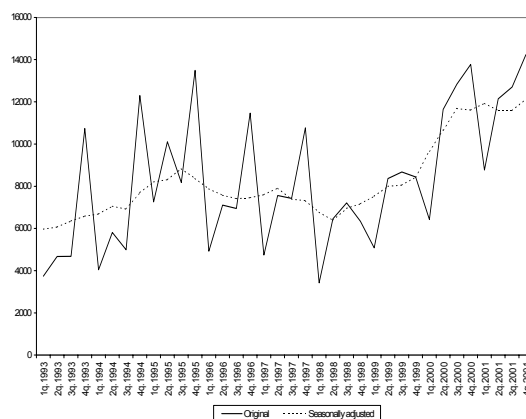
- Number of building permits issued (at a quarterly frequency),
- Number of dwellings built (at a quarterly frequency).

²⁶ The gross capital formation series adjusted seasonally by the CSO does not contain any further seasonality. The series is smoother than the series constructed using the Bank's current method, showing smaller variance in the differences between quarter-on-quarter indices. In addition, the annual indices of the original and seasonally adjusted series do not differ significantly more from the CSO's adjustment than when the Bank's method is used.

Dwellings built



Building permits



In addition to the above information, the Bank also utilises data such as average area (m²) of dwellings built and building costs per 1 m².

References

Várpalotai, V. (2000) 'Re-estimation of quarterly GDP data by use, going back to 1991', an MNB manuscript

Forecasting fixed capital formation is dealt with in more detail in the 4/2001 issue of the *Inflation Report*.

9. Inventories

Statistics on inventories may be of interest from a Hungarian perspective in their capacity as indicators of business activity. International experience shows that a high level of inventories projects a slowdown in activity, while a low level is a forerunner of increased activity. Accordingly, inventories and the business cycle are in correlation, with growing output stimulating stockbuilding and falling output dampening excessively high inventory levels.

The CSO publishes two kinds of data series on inventories, one showing changes in inventories according to the national accounts and the other showing the stock of inventories at current prices in a breakdown by industry.

Inventory investment and other unspecified use based on the National Accounts

Source: CSO

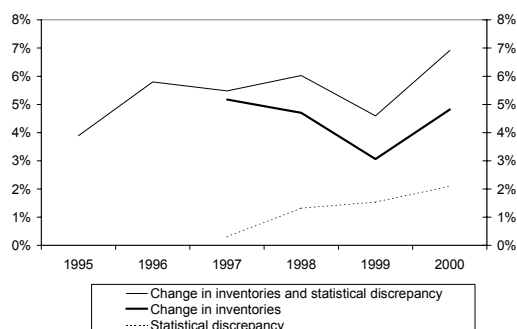
Frequency: a quarterly indicator

Date of publication of the aggregate data: the third month following the quarter under review

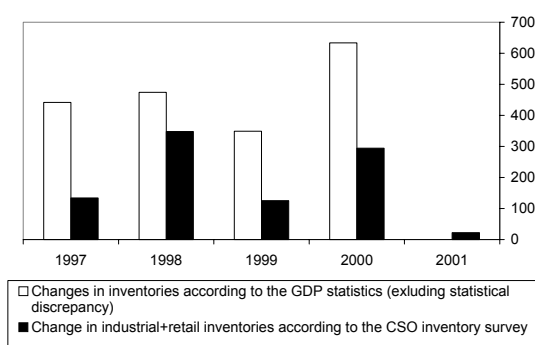
Accessibility: www.ksh.hu, electronically downloadable against payment from CSO-Stadat in the form of time series

Inventory investment and other unspecified use, which contains the statistical discrepancy (error) between production and use in addition to actual inventory investment, constitutes the most precarious item of GDP publications. Economic analysis and forecasting are faced with the difficulty of having only sporadic information on the annual size of the statistical discrepancy, and there is no within-the-year information available at all. Also, there is no clear link between inventory investment as stated in the GDP balance and the findings of the inventory statistics survey.

Inventory investment and statistical discrepancy as a percentage of GDP



Inventory investment (at current prices) reflected by GDP and inventory statistics



Stock of inventories at current prices

Source: CSO

Frequency: a quarterly indicator

Date of publication of the aggregate data is typically the third month following the quarter under review

Accessibility: CSO, exclusively in paper format (Monthly Bulletin of Statistics)

Definition

Current price statistics on the stock of inventories are derived from the CSO's inventory statistics survey. This survey covers businesses employing over 50 people. Prior to 1998, it only dealt with manufacturing, construction and retail and wholesale trade, but in 1999 it was extended to all branches of the national economy.

Methodological difficulties

The time series on current price inventories is associated with two methodological difficulties. First, deflation of current price data hampers the utilisation of the series, as there is no information available on valuation changes arising from inventory revaluation. Prompted by necessity, the Bank uses the producer price index for this purpose. Second, the above-mentioned change of sample was another problem. In the pre-1999 period, only manufacturing and trade inventories were taken account of and not those of the whole economy. As, however, these two branches account for nearly 90% of total whole-economy inventories, by making the appropriate corrections, the whole-economy series can be made suitable for analysis.²⁷

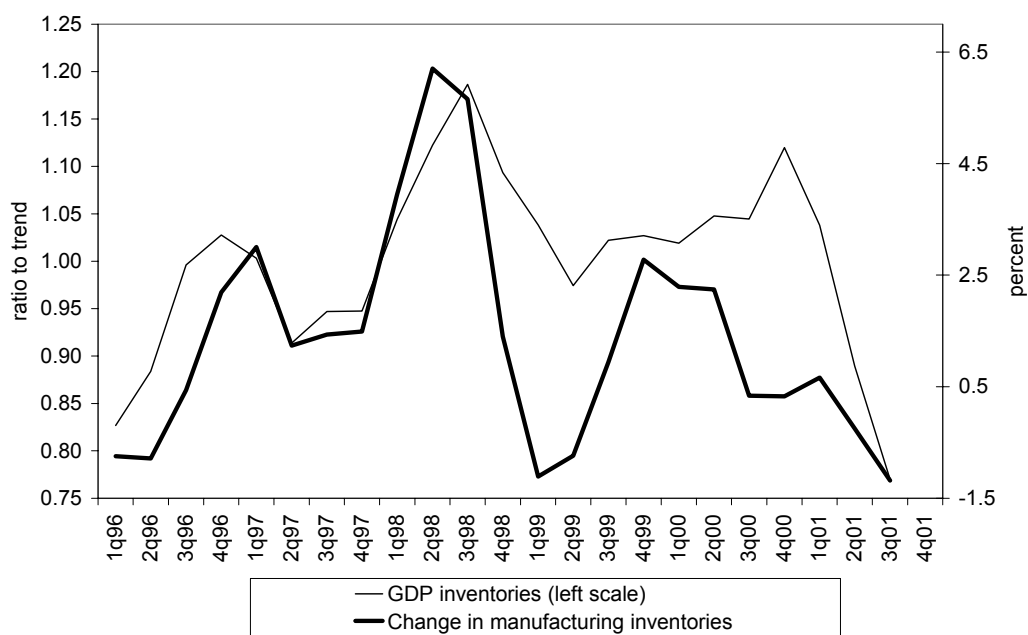
The methodology problem arising from the change of samples can be fully eliminated if the analysis is only directed at manufacturing stocks. There are two arguments in favour of using manufacturing stocks, one being that they account for a high, 65%, share of whole-economy inventories and second, this industry is the most sensitive to changes in activity.

Use of the time series

A comparison of the series based on the national accounts and that on changes in manufacturing inventories will reveal that despite their difference in terms of coverage, these statistics project a similar picture. Accordingly, consistent with international experience, changes in Hungarian inventories tend to be procyclical, i.e. inventories and production are in positive correlation over the long term.

²⁷ In the course of seasonal adjustment, the effect of the 1999 sample change was neutralised by introducing an auxiliary variable.

Indicators of changes in inventories



Data on whole-economy and manufacturing inventories are derived from current price inventory data deflated by the manufacturing producer price index. The series on GDP-based inventory changes is detrended.

References

The Special Topics chapter of the 1/2002 issue of the *Inflation Report* contains an analysis on correlation between inventories and business activity.

10. Indicators of trade

The trade in goods and services is reported by three different macroeconomic statistical systems.

- The system of *national accounts* includes foreign trade in goods derived from the corrected customs statistics²⁸ and the trade in services. These statistics are reported by the CSO under GDP statistics on a quarterly basis. Only value and volume indices of total trade (of goods and services combined) are published. The data on goods and services are not reported separately by the CSO. The Bank relies on this data source in its cyclical analysis of foreign trade.
- *Gross customs statistics* measure imports and exports of goods to and from the statistical territory of Hungary in terms of three currencies at current prices. These data are reported on a monthly basis by the Ministry of Economic Affairs and the Central Statistical Office (CSO).
- In contrast to the previous two statistical systems, the Magyar Nemzeti Bank's *balance of payments system* measures the trade in goods not as reflected by the flow of goods crossing the customs frontier, but rather in the mirror of data reported by commercial banks and resident companies directly borrowing from, or lending to, non-residents, or maintaining cross-border accounts and offsetting their foreign claims against their liabilities. The balance of payments statistics primarily focuses on the money settlement of goods shipments, taking also account of certain goods transactions that not entail money transfers (such as, for instance, loan servicing in terms of goods).²⁹ Due to a sometimes significant discrepancy between flows of goods and money, the balance-of-payments statistics is not suitable for providing a picture of our foreign trade that truly reflects current cyclical conditions.

The GDP-based trade series appears to be the most suitable for the purposes of the analyses of business activity conducted by the Bank. Nevertheless, the gross customs statistics is also a valuable source of supplementary information, due to its longer availability and monthly frequency. Therefore, below there is a discussion of trade series derived from gross customs statistics.

It should be noted that rather than examining net exports, all three data frameworks give a separate treatment to exports and imports, as they are affected by partly different economic influences which, if ignored, would cause a major loss of information. The analysis of developments in foreign trade is not primarily focussed on changes in the external balance, but rather the cyclical aspect of economic activity.

²⁸ Gross customs statistics on goods trade are corrected for the material content of materials and finished goods for processing, contributions in kind and products not crossing the borders, bunker fuel and the reexport balance, and in the case of imports, by freight costs.

²⁹ On related methodological issues, see www.mnb.hu.

GDP-based data series on foreign trade

Source: CSO

Frequency: a quarterly indicator

Date of publication: the final day of the quarter following the quarter under review

Accessibility: www.ksh.hu, electronically downloadable against payment from CSO-Stadat in the form of time series

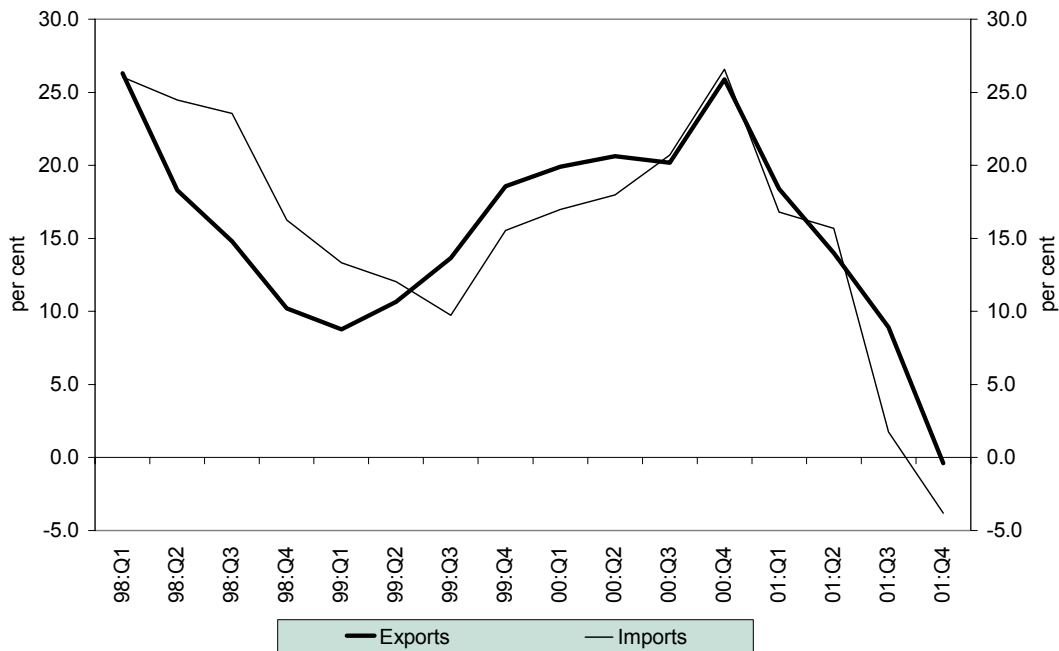
Indicators:

Total exports correspond to the exports of both goods and services as recorded by the corrected customs statistics, and similarly, total imports stand for imports of goods and services according to the corrected customs statistics.

As the Bank regards these two series as the best indicator of international and domestic business activity, the real economic projection of the *Inflation Reports* involve the publication of related volume changes and forecasts.

GDP-based volume indices of foreign trade*

Percentage changes on a year earlier

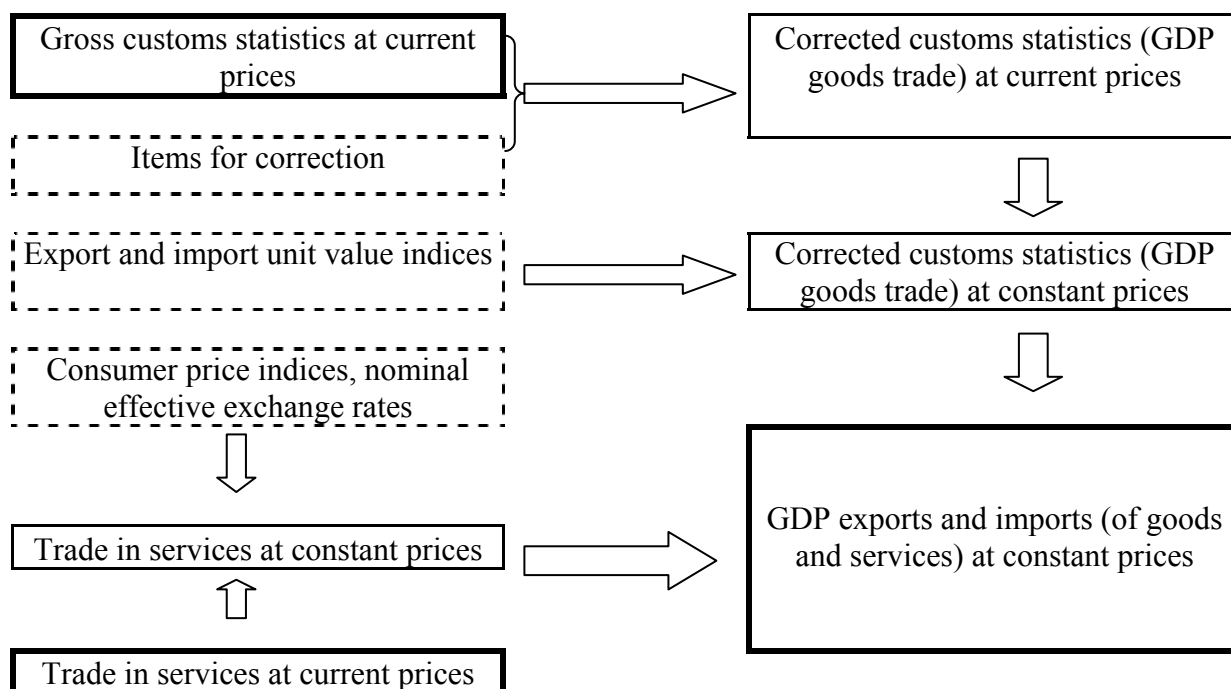


* Seasonally adjusted data (adjusted by MNB).

The cyclical nature of foreign trade by the national economy is basically dominated by flows of goods. This component can be quantitatively well explained by changes in external demand, domestic absorption and the real exchange rate.

As the GDP-based foreign trade series are noisier than the data recorded by gross customs statistics, for projection purposes under the Bank's approach first expected

developments in the trade of goods are assessed, which is then supplemented by providing expert forecasts on the trade of services.



Trade in goods accounts for over 80% of total foreign trade, with the share of travel and other services remaining below 20%.

Trade in goods – gross customs statistics

Source: CSO

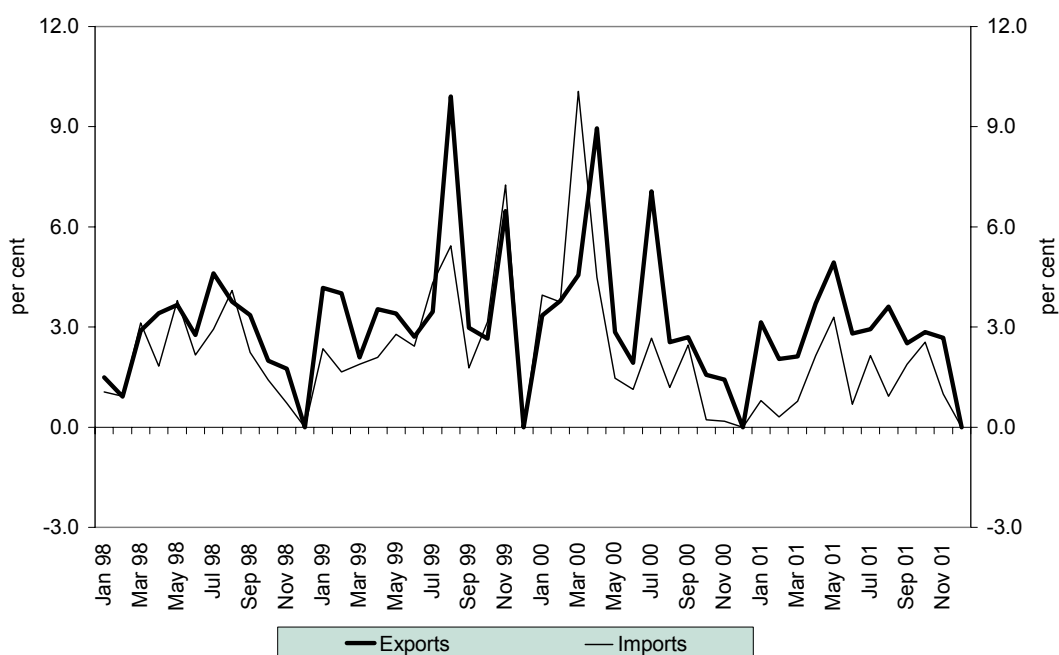
Frequency: a monthly indicator

Date of publication: prior to day 10 of the second month following the quarter under review

Accessibility: www.ksh.hu, electronically downloadable against payment from CSO-Statat in the form of time series

Gross customs statistics records the value of monthly exports and imports *at current prices* (in forint, euro and dollar terms) in a breakdown by main product and country groups, based observing and certifying goods crossing the customs frontier. Due to the slowness of customs declarations processing, the data are preliminary and are revised in the course of the reviewed year. As the additions are nearly always positive and often sizeable, they have a higher-than-zero expected value. This is the reason for the systematic discrepancy between the preliminary and subsequently published actual data (see chart). Due to this discrepancy, the analyses prepared by the Bank are invariably based on data series that have been revised by the Bank's statisticians.

Discrepancy between finalised and preliminary customs statistics



For the purposes of analysis, the Magyar Nemzeti Bank uses the *real* data series and volume indices on export and import trade of gross customs statistics. These are derived using the CSO's unit value indices. As the latter are only Accessibility: a quarterly frequency, the Bank staff aggregate monthly current price data on the trade of goods for each quarter to construct the volume indices.

For both exports and imports, the first observation of volume index series dates back to 1992 Q1. Data are seasonally adjusted using the Seats/Tramo technique. The adjustment of export series has revealed the existence of a significant working day effect, while no adjustment for working day effect is needed in the case of imports.

The adjusted series on goods exports and imports are forecast using various methods (such as quantitative models and expert forecasts). Export forecasts are based on econometric models which are compared with the results of expert estimates. For a discussion of goods export forecasting techniques, see Jakab, Kovács and Lórinz (2000).

Import forecasting is based on expert estimates to a greater extent. The Bank's domestic use and export forecasts and import requirement coefficients serve the basis for the estimation of expected changes in the value and volume of imports. These estimates provide the starting point for the foreign trade projection used in forecasting GDP by use.

Import content of the expenditure components (per cent)

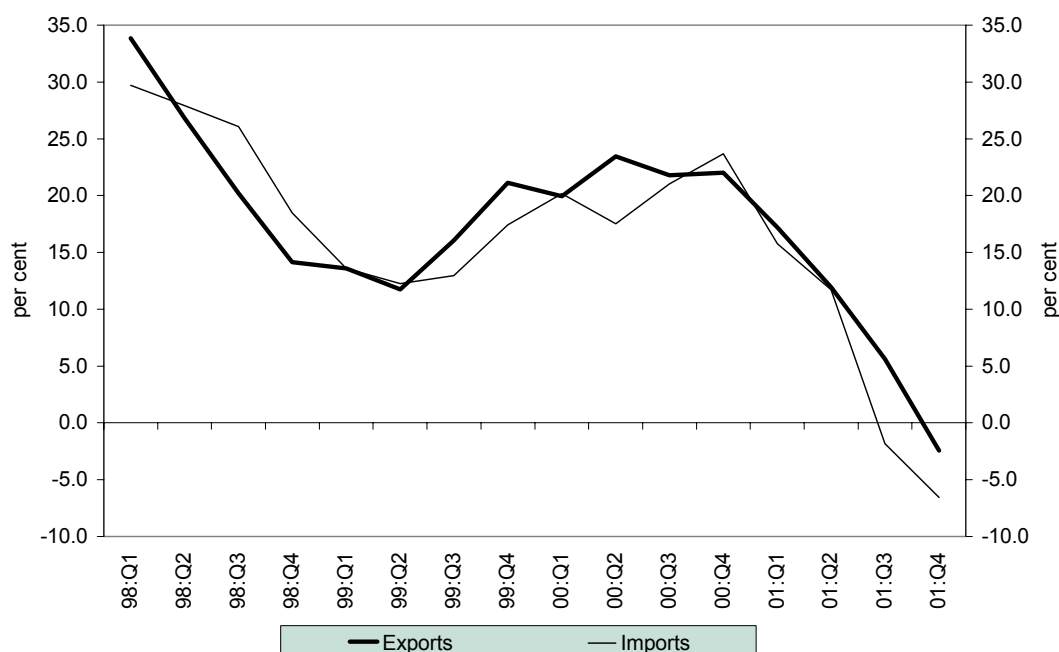
	1998	1999	2000	2001
	Actual data	Estimates		
Household consumption	25.5	25.5	28.5	27.8
Public consumption	10.0	10.0	11.0	11.0
Gross investment	45.3	46.0	49.0	47.0
– fixed capital formation	43.4			
– inventories and other investment	57.4			
Exports	43.4	44.5	51.0	49.0

Source of import content coefficients for 1998: CSO Input Output Tables, 1998

The coefficients reflecting the total imported component (direct and indirect use of imported materials) show that changes in the economy's import requirement depend to a considerable extent on changes in domestic use and the industry structure of exports. The above import requirement coefficients relate to current price data. Therefore, our forecasts have to take into account relative price change, shifts between import prices and domestic prices, and change in the terms of trade.

Changes in foreign trade volume indices based on gross customs statistics*

Percentage changes on a year earlier



* Seasonally adjusted data.

Breakdown of imports by categories of use and products, in euro terms

Source: Bank estimates derived from CSO (KOPINT) data

Frequency: a quarterly indicator

Date of publication: simultaneous with the *Report*

Accessibility: www.mnb.hu, homepage of the Bank.

Using the HS-4 digit product categorisation of KOPINT-DATORG, the Bank makes its own classification for the breakdown of imports by products and categories of use. The euro-based import statistics are thus divided into the following product groups: non-durable consumer goods, durable consumer goods, investment goods and other products. Business activity analyses rely primarily on consumer and investment imports data, from which volume measures are derived as well (see chapters 4 and 8). The variables are seasonally adjusted.

Imports of consumer goods in real terms

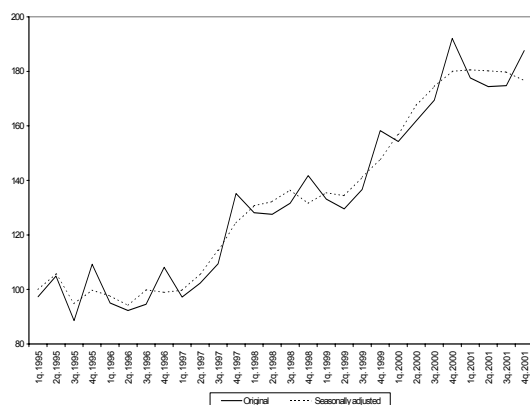
An indicator of household consumption expenditure

The Bank estimates the value of consumer goods imports in real terms. The series is derived by converting the original data on durable and non-durable imports for consumption using the average monthly forint/euro exchange rate. The current price forint value obtained is then deflated by the price index of CPI durable and non-durable goods (based on the Bank's classification), and the resulting two constant price series are summed. Finally, the data series are aggregated into a quarterly series, and are then seasonally adjusted.

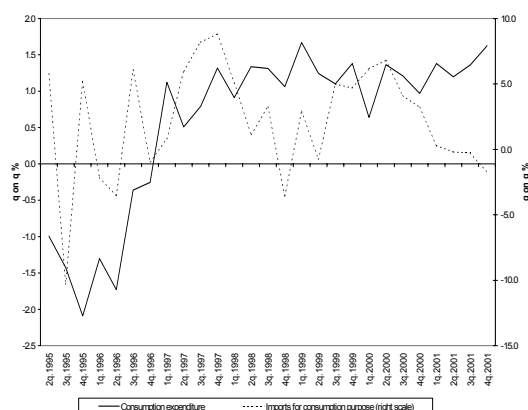
There is relatively strong coincident correlation between quarterly growth in real consumer imports and quarterly growth in consumption expenditure. Imports of consumer goods are more coincident with consumption.

Imports of consumer goods in real terms and their relationship with consumption expenditure

In HUF millions, at 1995=100%



Quarterly growth rate of seasonally adjusted data



Investment imports in real terms

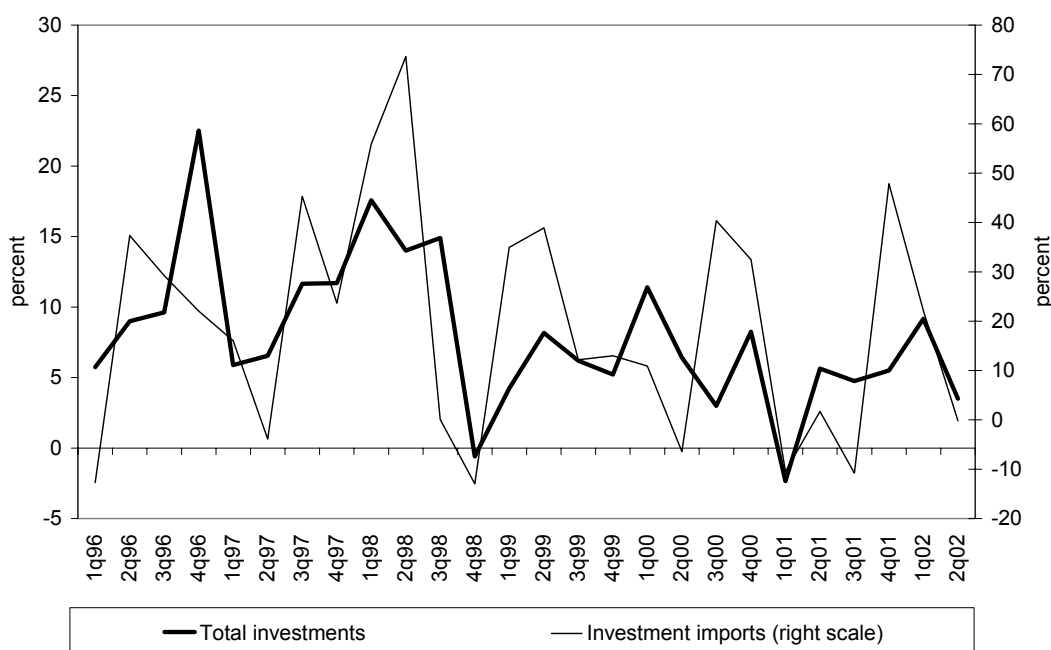
An indicator of fixed capital formation

The Bank estimates imports of investment goods in real terms. The time series is derived by multiplying the euro value of investment goods imports by the average monthly forint/euro exchange rate. The current price forint data obtained are then deflated by the foreign effective producer price index³⁰. The underlying assumption is that the price of imported investment goods should not permanently diverge from foreign producer prices. The resulting monthly data series is then aggregated into a quarterly series and is seasonally adjusted.

There is relatively strong coincident correlation between quarterly growth in real investment goods imports and that in fixed capital formation and corporate investment. In addition, it appears to play a relatively strong quarterly leading indicator role.

Imports of investment goods in real terms and their relationship with fixed capital formation

Quarterly growth rate of seasonally adjusted data



As GDP-based data on the trade in goods are not published separately by the CSO, the Bank uses its own calculations and estimates in the analysis and forecasting of this series.

³⁰ The foreign effective producer price index is derived as the product of the foreign producer price index included in the real exchange rate based on the producer price index and the nominal effective exchange rate index.

Trade in services

Trade in services, comprised of travel and other services, accounts for a smaller share (below 20%) of foreign trade. The CSO does not report separately on the foreign trade in services. For the purposes of analysis, the Bank obtains an adequate real series by converting and correcting current price data from the *balance-of-payments statistics*.

Travel

Source: MNB

Frequency: a monthly indicator

Date of publication: 3rd day of month following reviewed month for preliminary data and 18th day for finalised data

Accessibility: www.mnb.hu, electronically downloadable in the form of time series

The Bank makes a number of corrections for the purposes of business activity analysis. The Bank's revisions made in the data for 1999 have not yet been repeated in the GDP statistics due to methodological problems. Thus, travel revenues according to GDP statistics do not include the balance of households' foreign currency account transactions previously stated within current transfers (by contrast, the Bank's revised data include this balance going back to 1995). Furthermore, as correction, for the value in excess of the 1997 level, of foreign currency purchased from residents by foreign currency trading businesses is not included in GDP statistics either, the GDP-based travel revenue and expenditure data are lower (from 1998) than the data published by the Bank.

Accordingly, the travel revenues and expenditure entries in GDP statistics, although not published on their own, diverge considerably from those of the balance of payments.

The travel revenues volume index is derived using the CPI, and the expenditure volume index is derived using the CSO's nominal effective exchange rate index. They are not published individually.

The series for travel revenues and expenditure as recorded in GDP is only available in a quarterly breakdown after 1995 (there is only annual data for pre-1995 years). Thus, the seasonal adjustment of quarterly data is only possible from 1996 Q1.

Annual travel revenues are forecast using GDP growth rates of Hungary's major tourism partners. The Bank also uses the TUX index (not discussed in this paper) for short-term forecasting. The forecasts make an association between travel expenditure and changes in household consumption.

Other services

The CSO calculates data on services other than travel from balance-of-payments statistics, but does not publish them individually, ignoring items that are recorded with trade in goods (such as processing fees, reexports and reimports). As complementary information, the CSO uses services statistics compiled by the Ministry of Economic Affairs, substituting the Ministry's data on construction and repairs services for balance-of-payments information.

The CSO derives volume indices for services using its own nominal effective exchange rate index, but does not publish the series individually.

Quarterly volume indices have been available since 1996. Seasonal adjustment of these indices is rather cumbersome and, due to structural breaks, they have no stable seasonal model. Due to the short span of the relevant time series, other services are forecast using expert techniques and forecasts on trade in goods.

References

Baár, Ny. I. and Sisak, F. Zs. (1999) 'A szolgáltatások külkereskedelmének alakulásáról' (On developments in external trade in services), *Bankszemle*, 5–6/1999

Bagó, E. (2001) 'A globalizáció hatása külkereskedelmi termékgazdálkodás statisztikájára' (Effects of globalisation on foreign trade statistics), *Statisztikai Szemle*, March 2001

Hamar, J. (1996) 'A kereskedelmi mérlegre ható főbb tényezők és a magyar gazdaság importigényességének alakulása' (Major factors affecting the goods balance and developments in Hungarian import intensiveness), *Külgazdaság*, December 1996

Jakab, M. Z., Kovács, M. A. and Lőrincz, Sz. (2000) 'Forecasting Hungarian export volume', MNB Working Papers, 4/2000

Sisakné, F. Zs. (2002) 'External sector response to transition and external shocks (The case of Hungary): East European transition and EU enlargement (A quantitative approach)', edited by: Wojciech W. Charemza, Krystyna Strzała. Physica-Springer Verlag. Currently under publication.

11. Industrial output and sales

Source: CSO

Frequency: a monthly indicator

Date of release: preliminary data are released at the beginning of the 2nd month following the review month; detailed data are released in the middle of the 2nd month following the review month

Accessibility: www.ksh.hu, downloadable as time series in electronic format from the KSH-Stadat system, against payment.

Indicators:

- Leading: Average number of hours worked
- Coincident: Import-based external demand,³¹ Manufacturing employment

Definition

The time series for industrial output is regarded as the most important reference indicator in the analyses of business activity. Accordingly, analysing and forecasting industrial output provides help to assess current and future business conditions.

The indicator measures the production value of industrial activity, i.e. net revenues from industrial sales adjusted for changes in stocks of outputs. Industrial activity is own production of corporations categorised into industry, industrial production with the involvement of sub-contractors and industrial services performed.

It should be kept in mind when preparing economic analyses that, whereas aggregate data on industrial output refer to all industrial corporations, data in a breakdown by sub-sector or other only refer to a narrower range of corporations which, moreover, keeps changing over time. Accordingly, these types of data refer to corporations with more than 20 employees prior to 1995, to those with more than 10 employees between 1995–98 and to those with more than 5 employees from 1998. Since 1998, aggregate data on industrial output of corporations with more than 49 employees have been observed in full; those of corporations with 5–49 employees on a representative basis; and those of corporations with less than 5 employees have been estimated.

Methodological problems

The time series raises two methodological problems.

1. The Hungarian Standard Industrial Classification of Industrial Activities (TEÁOR) has changed in 1998, which makes it difficult to use times series of sub-sectors. As a consequence, the sector classification, published since 1999, is

³¹ Import-based external demand means imports of goods and services by Hungary's 11 most important trading partners on a GDP basis, where the weights are calculated on the basis of percentage shares accounted for by the 11 countries within Hungarian exports.

different from those published earlier. In the analyses, the Bank attempts to solve this problem by generating groups of sub-sectors largely compatible with the earlier sector classification using the available information. For the majority of sectors this means aggregating the current more detailed classification with fixed weights.

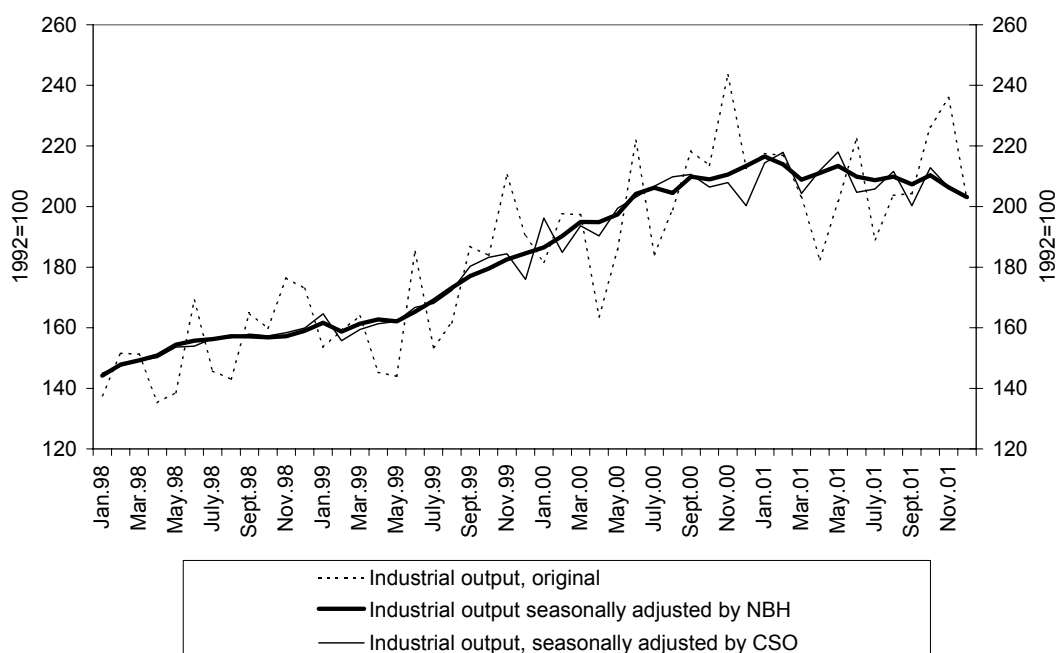
Differences between the 1992 and 1998 TEÁOR

1992 TEÁOR	Mining	Food products, beverages and tobacco	Textile and leather products		Wood and paper products		Chemical industry		
1998 TEÁOR	Mining	Food products, beverages and tobacco	Textiles and textile products	Leather and leather products	Wood products	Paper products publishing and printing	Coke, refined petroleum products and nuclear fuel	Chemical products	Rubber and plastic products
1992 TEÁOR	Nonmetallic mineral products	Basic and fabricated metal products	Machinery			Manufacturing n.e.c	Manufacturing	Electricity, gas, steam and water supply	
1998 TEÁOR	Other nonmetallic mineral products	Basic and fabricated metal products	Machinery and equipment	Electrical and optical equipment	Transport equipment	Manufacturing n.e.c	Manufacturing	Electricity, gas, steam and water supply	

2. The second problem relates to the seasonally adjusted times series of industrial output released by the CSO. According to the CSO's methodological description, up to December 2001 data were adjusted for seasonal and working-day effects using the X11ARIMA/88 software package. However, this software does not include a module for Hungarian national holidays, which has to be handled separately when seasonally adjusting data. The CSO has not published the method of this and other parameters of seasonal adjustment. Another deficiency of data reporting was that the seasonally adjusted time series data were only partially revised, irrespective of the inclusion of new data, whereas this information alters retroactively the seasonally adjusted time series. From January 2002, the CSO seasonally adjusts data using the a SEATS/TRAMO software. This automatically adjusts for variations in working days and holidays. Historical data series which reflect adjustment for seasonal effects using the new method are not currently available (March 2002), and so they cannot be used for the analysis. Due to this problem, the Bank uses its own adjusted time series for analytical purposes, instead of the seasonally adjusted time series for industrial output published by the CSO.
3. The base period (1992) is now too distant, which may be a source of potential distortion.

CSO release of seasonally adjusted time series for industrial output and that used by the MNB

1992 = 100



There is a methodological explanation for the difference between the two time series as well. The X11ARIMA software used by the CSO for seasonal adjustment and the SEAT/TRAMO software used by the MNB do not necessarily produce comparable results, due to the differences between the methods of adjustment (see Appendix).

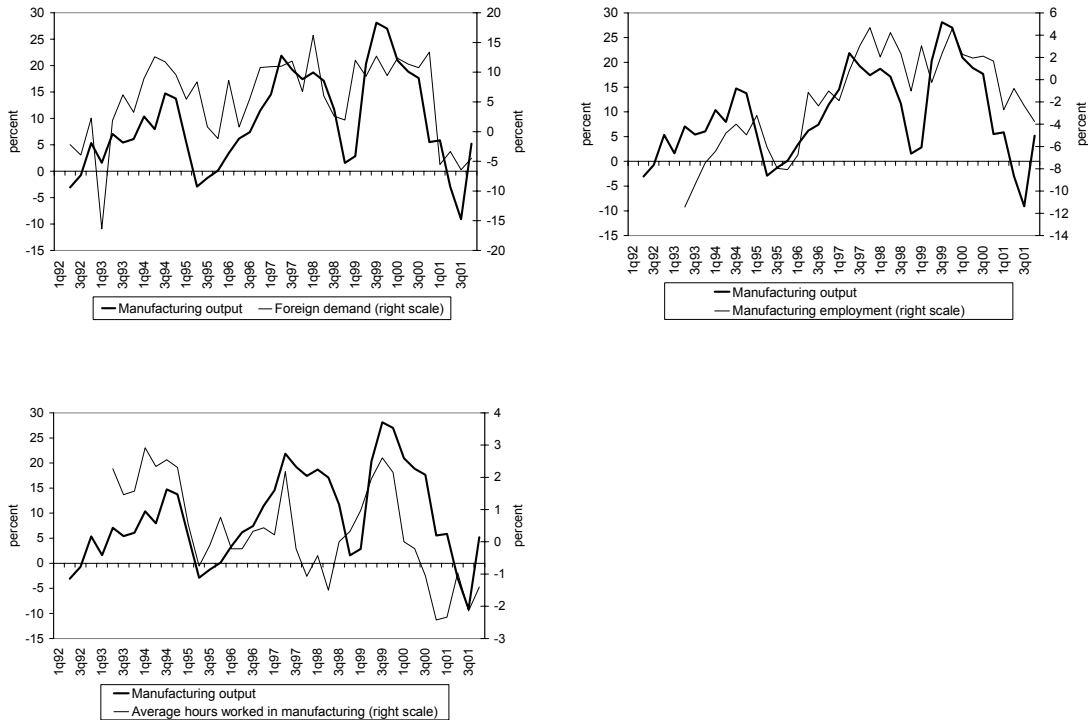
Use of the time series

In line with international practice, the Bank uses the percentage changes based index of industrial output as an indicator of business activity. However, only the quarterly data for *manufacturing* are used for analytical purposes, instead of those for the whole industry sector. Explanation for this is that using quarterly data helps to avoid problems arising from the forecast of the extremely noisy time series for the mining and energy sectors. Moreover, there is only an insignificant loss of information due to the high correlation between industry and manufacturing. In contrast with monthly data, the use of quarterly time series data also serves the purpose of reducing the noise.

The indicators of import-based external demand, the weekly average number of hours worked by manual workers in manufacturing (see page 63) as well as manufacturing employment (page 61) are used by the Bank to forecast manufacturing output. From among these, external demand and the average number of hours worked are treated as leading indicators.

Manufacturing output and indicators of import-based external demand, number of hours worked and manufacturing employment

Percentage change based indices



In international practice, the tools of long-term forecasts of business activity are business survey results and confidence indices. The usefulness of Hungarian business survey data and the possibilities of forecasting industrial output using survey data are currently being assessed by a research project.

Industrial exports and domestic sales

Source: CSO

Frequency: monthly indicator

Date of release: middle of the 2nd month following the review month, including detailed industrial output data

Accessibility: www.ksh.hu, downloadable as time series in electronic format from the KSH-Stadat system, against payment.

Indicators:

- Leading: Average number of hours worked
- Coincident: Import-based external demand, Manufacturing employment

Definition

Industrial exports are the forint value of net sales of goods and services deriving from industrial activity sold to foreign countries or in foreign countries respectively. Domestic sales of industry are a complement to export sales. By abroad territories outside the Hungarian border are meant. Accordingly, sales to corporations operating in customs-free areas are also part of domestic sales.

The properties of sample taking for industrial sales are identical to those for industrial output.

Methodological problems

Methodologically, the problems with time series for industrial sales, and exports and domestic sales by sub-sectors are the same as those with the industrial output time series.

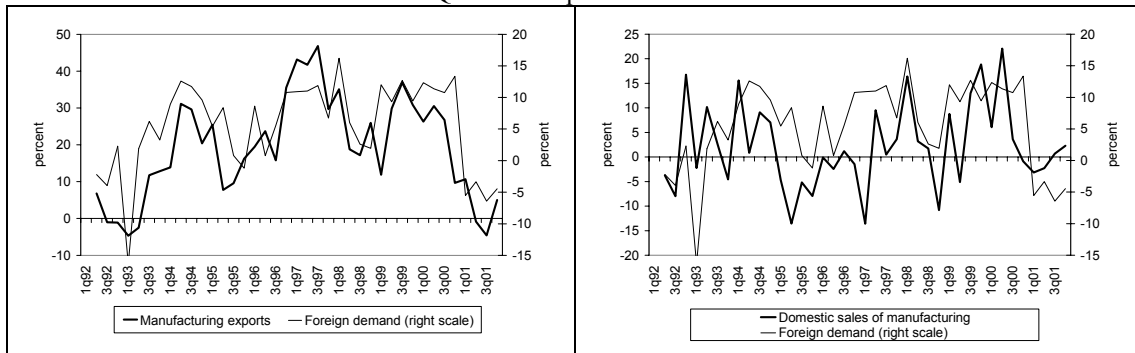
Use of the time series

Similarly to industrial output, industrial exports and domestic sales are indicators of business activity. By definition, the difference between output and sales produces the change in stocks of outputs; however, as this time series has proved to be very noisy empirically, the Bank does not produce forecasts of this. Due to the reasons noted in the discussion of industrial output, analysis and forecast of exports and domestic sales are confined to quarterly manufacturing data.

The Bank relies on the indicator of import-based external demand in forecasting exports. In domestic sales by manufacturing, the indicator of external demand also has the strongest explanatory power. However, the attempt to demonstrate the effect of domestic consumption for the period after 1995 has been unsuccessful, which proves that domestic sales by manufacturing are fundamentally determined by sub-contractors' activity.

Manufacturing exports and indicators of and domestic sales and import-based external demand

Quarter-on-quarter indices



12. GKI Business confidence index

Source: GKI Gazdaságkutató Rt

Frequency: monthly indicator

Date of publication: between the 12th and 17th (Monday) of the month following the review month

Accessibility: www.gki.hu, in electronic format, in the monthly publication 'Havi üzleti és lakossági várakozások' (Monthly business and household expectations).

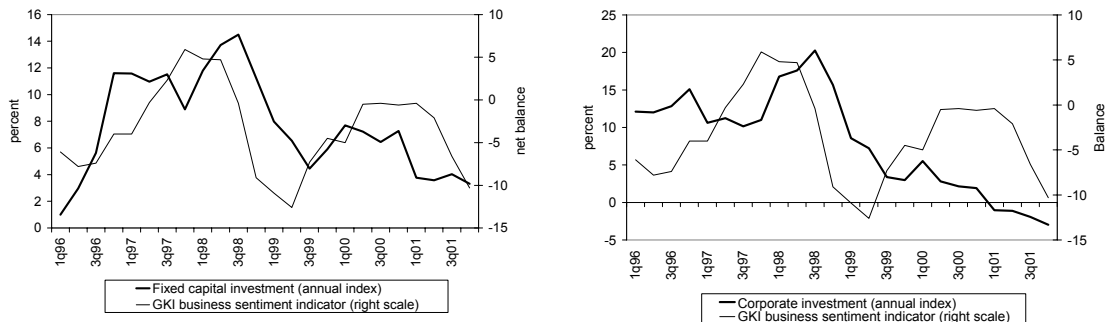
An indicator of fixed capital formation

The GKI business confidence index is derived from answers to questions on industrial and commercial enterprises' business activity and future expectations. The published index reflects seasonally adjusted data; significant seasonal patterns cannot be detected in the released data. GKI publishes the indices backdated to January 1996. The Bank produces quarterly time series from the monthly data with arithmetic averaging.

The index is in close correlation with growth in fixed capital formation and corporate fixed investment, with a leading period of one quarter.

The GKI business confidence index and its relationship with fixed investment

Index value; points



The chart on the right plots the correlation between quarterly growth rates of the seasonally adjusted value of fixed investment and the GKI business confidence index.

13. KOPINT Capacity utilisation index

Source: Kopint-Datorg Rt

Frequency: quarterly indicator

Date of publication: end of the month following the review month

Accessibility: only available in printed format in ‘A feldolgozóipari és az építőipari vállalkozások helyzete és rövid távú kilátásai’ (Situation and short-term outlook of manufacturing and construction companies), published by KOPINT.

Indicators: Indicator of fixed capital formation

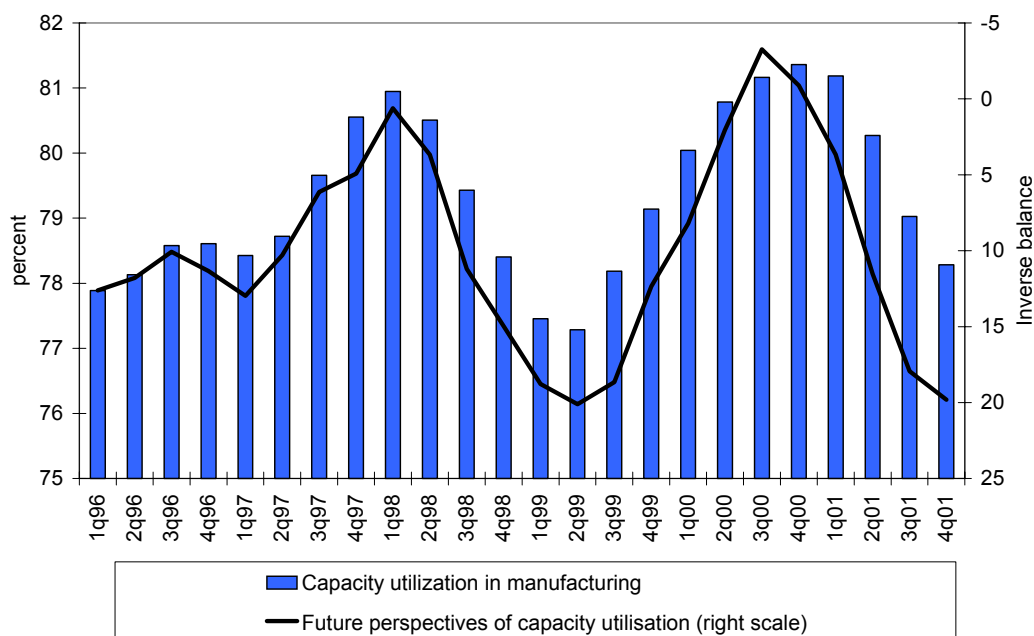
Definition

The Bank collects data on capacity utilisation from the quarterly business activity tests by Kopint-Datorg published on a quarterly basis. Characteristically, the corporate survey encompasses domestic manufacturing firms. The Bank uses two time series to forecast developments in capacity utilisation.

1. The time series for *average capacity utilisation* consists of answers to the question ‘How large is the utilisation of the Firm's major capacities?’ The responses refer to percentage rates of utilisation.
2. The time series for *assessment of future capacity utilisation* is derived from answers to the question ‘How do you evaluate the Firm's current capacity relative to orders expected in the next 12 months?’ Here the Bank produces the balance of ‘high’ and ‘low’ responses. This time series depicts a picture of expected future capacity utilisation. In this sense, it is a leading indicator in comparison with the indicator of average capacity utilisation.

Average capacity utilisation and future capacity utilisation in manufacturing

Seasonally adjusted and smoothed data



Methodological problems – adjustments

A general methodological problem in respect of the time series is that KOPINT publishes rounded data. Rounding may also result in information in the smaller variations in data remaining hidden.

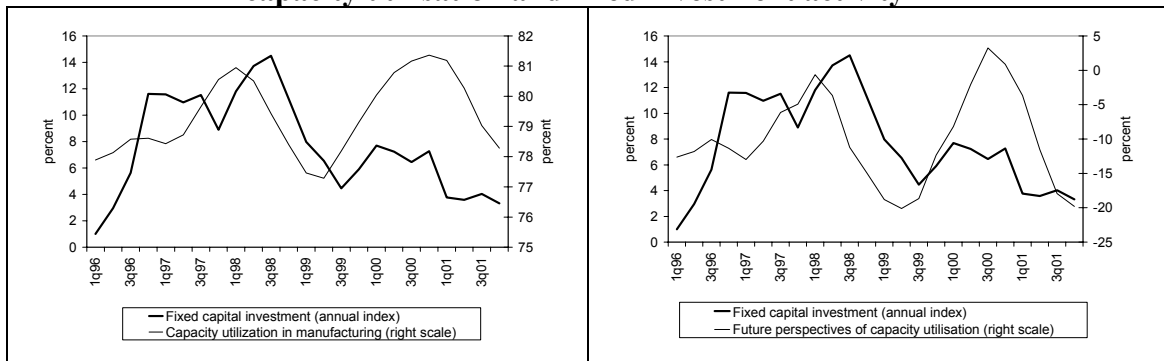
The other problem is caused by the low propensity of a part of companies (mostly multinationals) to respond. Consequently, the survey fails to give information about expectations of a significant proportion of firms accounting for most of manufacturing output.

As the data extracted from the business survey by Kopint are seasonal, the Bank adjusts both time series for seasonal effects. The Bank uses smoothed data (trend) derived from the indicator of average capacity utilisation for analytical purposes.

What does it show?

The gauge of capacity utilisation is used as a leading indicator of fixed capital formation. If the rate of capacity utilisation is low, then output may be increased even without enlarging capacities, and so a pick-up in fixed investment activity cannot be expected either. Consequently, the low level of capacity utilisation projects low fixed investment. In a similar vein, if the level of capacities is high relative to future orders for output, then there is no need to enlarge them. In this case, therefore, the relationship is inverse – the high level of future assessment of capacity utilisation projects low fixed investment activity.

Indicators of average capacity utilisation, future assessment of capacity utilisation and fixed investment activity



14. New car sales

Source: Association of Hungarian Motor Vehicle Importers

Frequency: quarterly indicator

Date of publication: two weeks after the review quarter

Accessibility: www.mnb.hu, downloadable as time series in electronic format.

An indicator of household consumption expenditure

The Bank derives the time series for car purchases from data released by the Association of Hungarian Motor Vehicle Importers (MGE).³² The Bank produces three sub-categories from the various major categories – small, middle and upper classes.

- The category of small car is derived from the mini and small car categories in the classification by MGE.³³
- The middle category is derived as the sum of MGE's classification of lower-middle, lower-middle single-space, middle category single-space and middle.
- The upper category is the sum of MGE's classification of large cars, sports cars, premium cars, premium landrovers and 4x4 landrovers.

The Bank individually seasonally adjusts the categories derived using this approach and calculates the seasonally adjusted value of weighted car sales. The weighted amount is calculated by attaching a weight of 1 to small cars, one of 2.397 to middle-category cars and one of 5 to upper-category cars.³⁴ Due to this, the time series for weighted car sales measures car purchases in a 'small-car equivalent'.

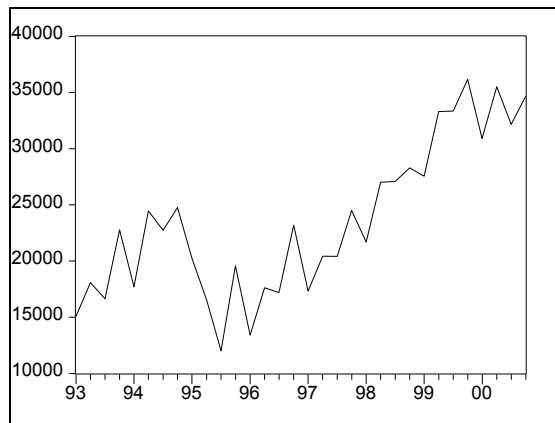
The time series calculated using this approach shows close correlation with consumer expenditure, and it forecasts consumption with a leading period of one quarter. Jakab and Vadas (2001) provide details of the domestic use of new car sales. In international practice, publications by the Bank of England and the Riksbank of Sweden deliver examples of analyses and forecasts of time series for new car purchases.

³² Magyar Suzuki Rt has been a member of the Association since 2002. Previously, the Bank obtained data on domestic sales directly from the company. Consequently, the Bank's data include domestic sales by Suzuki in each period.

³³ Previously, this was registered as a small car category.

³⁴ The weights are based on the 1998 consumer price index.

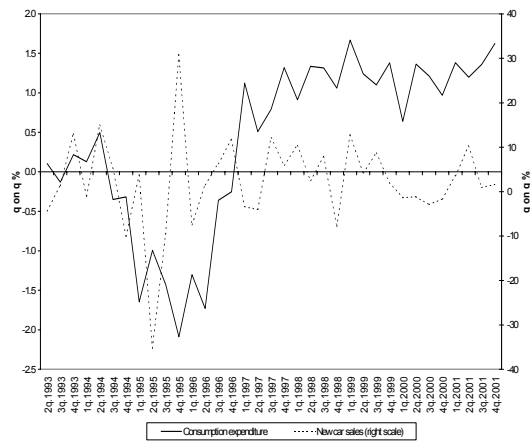
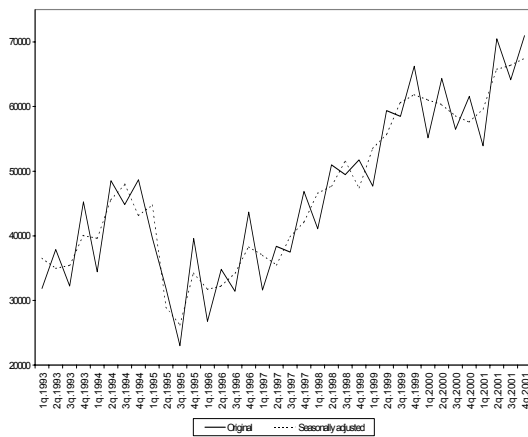
New car sales, original data (pcs.)



New car sales and their relationship with consumer expenditure

In small-car equivalent; pcs.

Quarterly rise in seasonally adjusted data



The chart on the left shows the original and seasonally adjusted time series for new car sales (at 1995 prices). The chart on the right plots the quarterly growth rates of the seasonally adjusted values of consumption expenditure and new car sales.

Reference

Jakab, M. Z. and Vadas, G. (2001) 'A háztartások fogyasztásának előrejelzése ökonometriai módszerekkel' (Forecasting household consumption expenditure using econometric methods) MNB Background Studies, 1/2001

15. Labour market indicators

Domestic data used for the purposes of labour market analyses are extracted from various sources. One set of statistical data is the Labour Force Survey (LFS) by the CSO, which provides information consistently with the ILO recommendations about the whole-economy labour market potential, labour utilisation and reserves. Although since 2000 the CSO publishes monthly data as well, this set of statistical data can only be used with a quarterly frequency, due to the lack of historical data series. The CSO is also the source of institutional labour statistics, which provide information about official employment and earnings in the corporate, and the community and non-profit sectors based on questionnaires returned by companies and institutions. Data on the number of registered unemployed, vacancies and planned staff reductions are published by the National Employment Office.

Published labour market data are mainly stock data which provide no or only insufficient information about current market flows (for example, with the same level of unemployment, high or low rates of inflows and outflow reflect different labour market conditions). This causes some difficulty to economic analyses. Statistical distortions arising from the nature and calculation method of available data on gross average wages also present difficulties to labour market analysis (data refer to officially reported wages which, in the event of a compulsory minimum wage increase, introduce distortions into the measure of the price of labour; for example, the published average wage indices also reflect the effects of changes in manual and non-manual labour, the composition of labour across sectors, and in the number of working days) – see more details below.

The analysis of labour market developments concentrates on the private sector; developments in employment and wages in the government sector are treated as part of the demand effect of fiscal policy, and therefore the Bank analyses them within the framework of those developments. The Bank's research focuses on two major areas within the private sector – manufacturing and market services.³⁵ Based on labour market characteristics and behaviour within market services, trade and repair, and other market services constitute two easily distinguishable segments.

Indicators of labour utilisation

The following sub-chapters take an overview of domestic indicators measuring the quantity of labour utilised in production and the production of services in the private sector. First, the 'extensive' indicators of labour utilisation (number of employees) and then an intensity indicator (average number of hours) will be presented.

³⁵ Market services include trade and repair (G), hotels and restaurants (H), transport, storage, post and telecommunications (I), financial intermediation (J) and real estate and business activities (K) sectors.

Employment

Employment derived from the labour force survey

Source: CSO

Frequency: quarterly indicator

Date of publication: aggregates are released at the end of the month following the quarter under review, detailed data are released at the end of the 2nd month following the quarter under review

Accessibility: www.ksh.hu, downloadable as time series in electronic format from the KSH-Stadat system, against payment.

Following the international recommendations (ILO), in the methodology of the household labour force survey employee is the person who performed a paid work (irrespective of its form, or legal or taxation circumstances) during the reference week, or was away from his job only temporarily (e.g. on sick leave, holiday, etc.). The sample of individuals is taken using a household questionnaire with a monthly frequency; the published data reflect the results of the average of the previous three months. In its analyses, the Bank uses the regular data released with a quarterly frequency.

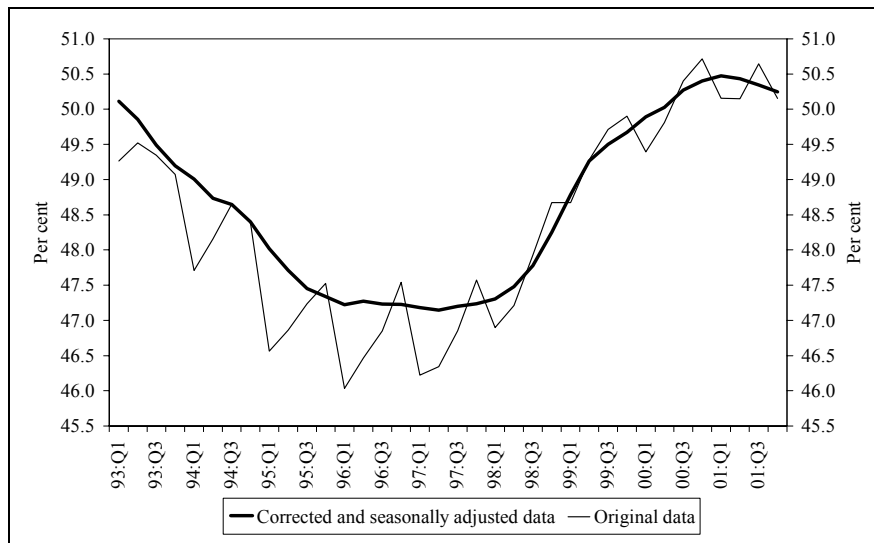
One advantage of the labour force survey is that it categorises individuals based on their actual position in the labour market, taking into account the relevant international recommendations. This means that employees also include those taking a job in the illegal, or ‘shadow’, economy.

The Bank has been using the time series since 1993; however, there appears to be a structural break in the data in early 1998. This stems from the enlargement of the sample and the change in estimation methods used to achieve completeness. As a consequence, the data are not comparable in time. In the analyses, therefore, the Bank has corrected the whole-economy times series retrospectively, taking account of supplementary information released by the CSO.³⁶ In the case of more detailed data, the distorting effect of the structural break has been handled using a dummy variable during seasonal adjustment.

The employment rate measures the ratio of employed persons to working-age population. The Bank calculates this ratio from the seasonally adjusted time series. The indicator provides information about labour potentials of the national economy.

³⁶ For the method of the correction, see Ferenczi (1999).

Employment rate



Employment derived from the institutional labour statistics

Source: CSO

Frequency: monthly indicator

Date of release: middle of the 2nd following the review month

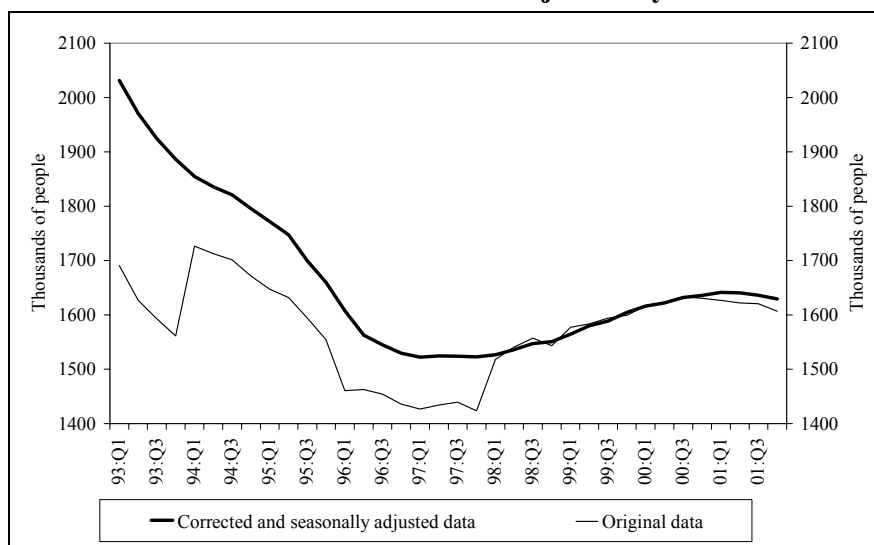
Accessibility: www.ksh.hu, downloadable as time series in electronic format from the KSH-Stadat system, against payment.

The institutional labour statistics are based on questioning organisations and are aimed at measuring the number of employed persons. From this it follows that the data only provide information about the number of those reported officially and as employees, therefore, they presumably systematically distort domestic labour market conditions. In economic terms, it is the labour force survey that can be considered as a reliable source of data on developments in private sector employment; however, due to practical considerations, the Bank's forecasts are based on the category of full-time employees in the institutional labour force statistics – information on wages in a comparable structure are only available from this source. In order to eliminate the statistical noise, the Bank derives quarterly data from the monthly data and it uses these in the analyses.

The sampling frame of statistical observations has been altered several times in the past few years. The Bank's time series includes data for companies with at least 20 employees in 1993, at least 10 employees in 1994–97 and at least 5 employees since 1998; those on full-time employees of the budgetary units, irrespective of work force; and those on employees of specified non-profit institutions since 1998. Data in a sectoral breakdown (private and government sectors) are not available up to 1997 – they are only available in a breakdown by industries. The Bank corrects the data retrospectively before seasonally adjusting them, using the annual indices relevant to the comparable ranges.

The number of part-time employees, as shown by the labour force statistics, increased significantly in 2001. Presumably, this resulted from of the obligation to increase minimum wages significantly rather than from the change in actual employment conditions. Therefore, it is useful to adjust data for this effect in the analyses. For example, the Bank compares the staff index of total full-time employees in 2001 with the source data as well (i.e. it fixes the ratio of full-time employees within the number of employed persons).

Number of full-time employees in the private sector: the CSO's original time series and the time series adjusted by the MNB



Changes in employment are one of the important factors influencing inflation both from the demand side (wage bill) and the cost side (labour costs). The Bank also uses manufacturing labour force data to forecast manufacturing output.

Number of working hours

Developments in the number of working hours indicate better and more sensitively variations in the relationship between demand and supply in the labour market and shifts in business activity than the number of employed persons. There are two ways in which the Bank can use the CSO release of data on working hours which for longer periods are only available in respect of manual employees in industry. The *total* number of hours worked by all employees during a period is the flow counterpart of the extensive, staff-type indicator of developments in employment. This measures total labour input utilised in production in the given sector. The *average* number of hours worked by one employee during a given period which measures the intensity of the utilisation of labour is a frequently used indicator of business activity in international practice.

Number of hours worked

Source: CSO

Frequency: monthly indicator

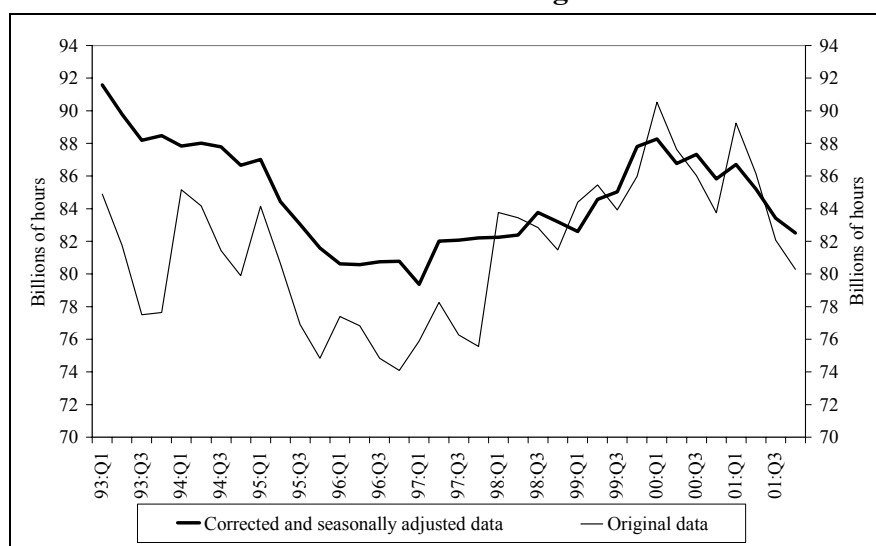
Date of publication: middle of the 2nd month following the review month

Accessibility: only in printed format in 'Statisztikai Havi Közlemények' (Monthly Statistical Bulletin).

The number of hours worked may be a better indication of the quantity of labour used than employment. Longer data series, starting from 1993, are only available for the number of hours worked by full-time manual employees in industry (data on hours worked in the other sub-sectors of the private sector are only available from 1998). The Bank derives quarterly data by averaging monthly data.

The source of data is the institutional labour force statistics, already discussed in the sub-chapter on employment. Consequently, the remarks used there are valid for changes in the range of observation. During seasonal adjustment, distortions arising from changes in sampling frame are eliminated from the data series for the number of hours worked using dummy variables. The number of hours worked reacts sensitively to variations in the number of working days, so the necessity of corrections arising from changes in the number of working days and the Easter effect are tested during seasonal adjustment.

**Monthly number of hours worked by manual workers
in manufacturing**



Weekly average number of hours worked

Source: MNB estimate based on data released by the CSO

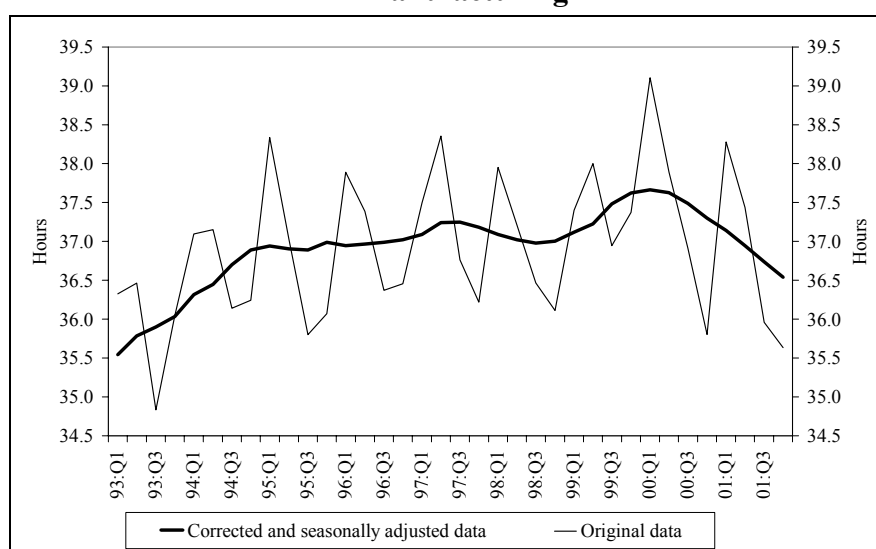
Frequency: quarterly indicator

Date of release: end of the 2nd month following the review quarter

Accessibility: www.mnb.hu, downloadable as time series in electronic format.

The indicator derived by the Bank from certain data in the CSO's institutional labour force statistics (staff, number of hours worked) measures the weekly average number of hours worked by manual workers in industry. The majority of methodological information relevant to the indicator can be found in the chapter discussing the time series used to generate it. The indicator is calculated monthly, then aggregated to a quarterly level by averaging, before adjusting for seasonal effects.

Weekly average number of hours worked by manual workers in manufacturing



In consistency with international experience, the number of hours worked can be categorised into the indicators of business activity, given that companies adjust to changes in demand first by the higher or lower intensity use of labour force already employed. Accordingly, the Bank uses the indicator in forecasting manufacturing output.

Number of reported vacancies

Source: National Employment Office

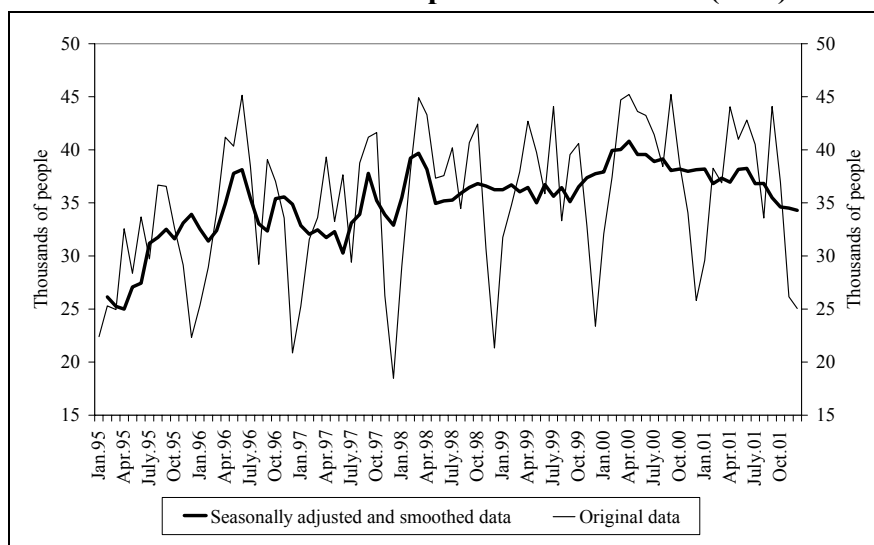
Frequency: monthly indicator

Date of publication: middle of the 2nd month following the review month

Accessibility: only in paper format in 'Munkaerőpiaci Helyzetkép' (Labour Market Report).

The indicator refers to vacant positions which have been reported to the branches of the National Employment Office or those which the branches have discovered. The flow indicator mainly used in the Bank's analyses shows the number of vacant positions reported in a given month. There are a number of stock indicators available as well which include the closing stock at the end of the month under review. The Bank uses both the monthly and quarterly data in the analyses. The latter are derived from the flow and stock indicators by generating averages.

Number of vacancies reported in the month (flow)



The indicator can be interpreted as the degree of unsatisfied demand for labour, but it should be treated with care, as it is well-known that only a fraction of vacant positions actually available are reported to the employment offices. The behaviour of the flow indicator may be analysed against changes in business activity.

Indicators of labour reserves

Certain groups of the unemployed and the inactive³⁷ may be reserves of labour available for extensive economic growth. From the perspective of monetary policy, developments in effective labour reserves are relevant. These include those who do not have a job, but influence wage growth, being substitutes for those in employment. The Bank's research has shown that, from the perspective of the central bank (i.e. wage definition), the groups of economically inactive persons and discouraged workers, distinguished within the category of inactive people, do not represent a relevant reserve of labour for economic growth.³⁸

Unemployment

Number of unemployed derived from labour force survey

Source: CSO

Frequency: quarterly indicator

Date of publication: aggregates are released at the end of the month following the quarter under review, detailed data are released at the end of the 2nd month following the quarter under review

Accessibility: www.ksh.hu, downloadable as time series in electronic format from the KSH-Stadat system, against payment.

According to the definition which reflects the international methodological recommendations (ILO), unemployed is the person who does not have a paid job in the reference week or does not have a job from which he has been away only temporarily; has been looking for work in the previous four weeks and would be ready to start a job within two weeks. The remarks on employment derived from the labour force survey are valid for the method of the survey, the enlargement of the sample and break in the series caused by changes in the methods to obtain full-range data as well as its handling.

From among the unemployed, the group of those being without a job for a short period (maximum 3, 6 or 12 months), or those with higher education, can be regarded as the effective reserves of labour, i.e. which can be utilised easily even over the short term.³⁹ As a result of joint research with the Human Resources Department of the Budapest University of Economic Sciences and Public Administration, there are empirical estimates available for the strength intensity of labour force supply in the various categories of unemployed persons. These appear to reinforce the Bank's presumption that the probability of obtaining a job within the groups showing relatively less advantageous characteristics is below the average.⁴⁰

³⁷ Those who are neither employees nor unemployed, within the working-age population (i.e. those in the 15–74-year age bracket).

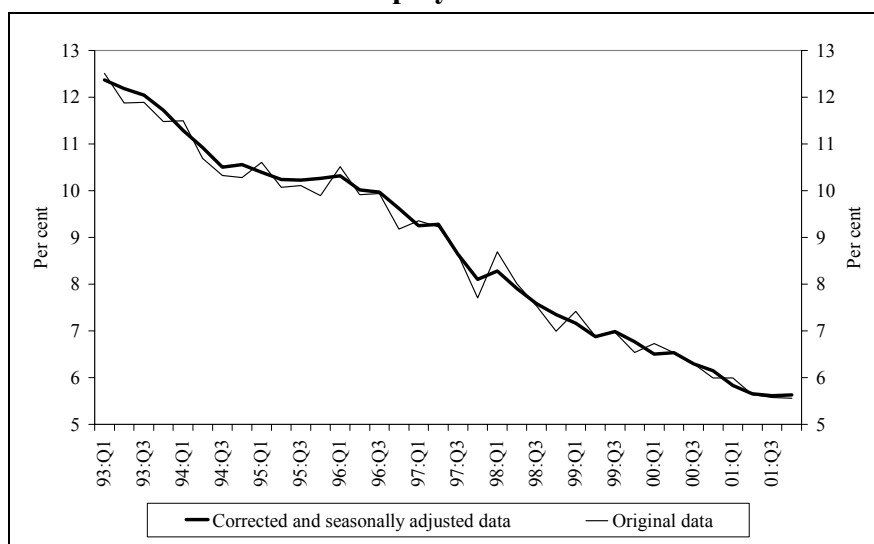
³⁸ See Ferenczi (1999).

³⁹ See *Report*, November 1998.

⁴⁰ See *Report*, March 2001.

The indicator of capacity utilisation in the labour market is the unemployment rate. This relates the number of unemployed to the number of economically active persons (employed + unemployed, i.e. those in the labour market). The Bank derives the unemployment rate from the seasonally adjusted time series.

Unemployment rate



Number of registered unemployed

Source: Employment Office

Frequency: monthly indicator

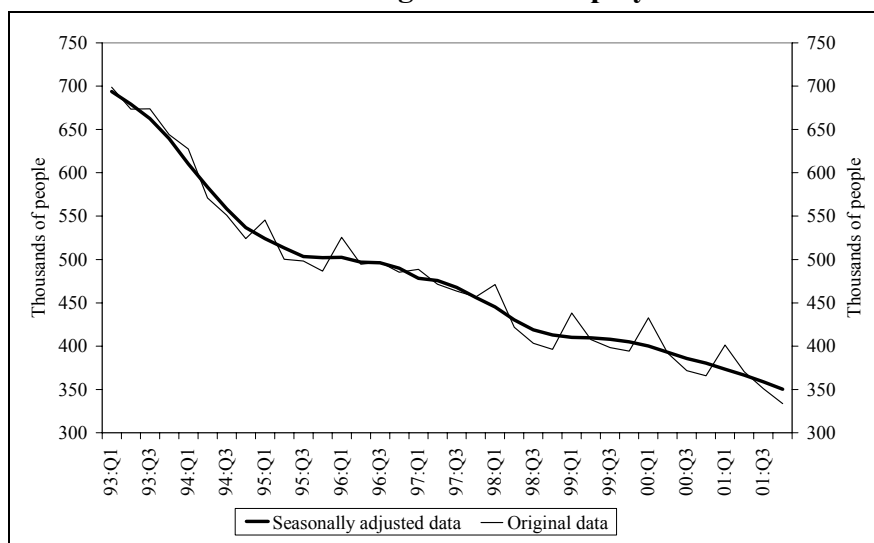
Date of publication: start or middle of the month following the review month, as a press conference; middle of the 2nd month in printed format

Accessibility: only available in printed format (Labour Market Report).

Registered unemployed is the person who does not have a paid job, does not receive employment promotion allowance, is registered with the employment office and is available to accept a job.

Although there is a relatively long time series available for the number of registered unemployed, for theoretical and practical considerations the Bank's analyses of labour force reserves rely on data derived from the CSO's labour force survey discussed earlier. This is justified by the fact that, in contrast with registration, the labour force survey categorises individuals on the basis of their actual positions in the labour market. The official registry of the unemployed is an administrative database in which the number of registered unemployed is strongly determined by existing regulations on the advantages of registration (for example, benefits, support programmes, etc.) and the related obligations. A positive aspect of the latter, however, is that it is free from the estimation errors arising from the sample taking of labour force survey and the distortions caused by the method of data collection based on questionnaires.

Number of registered unemployed



Mass layoffs

Source: National Employment Office

Frequency: monthly indicator

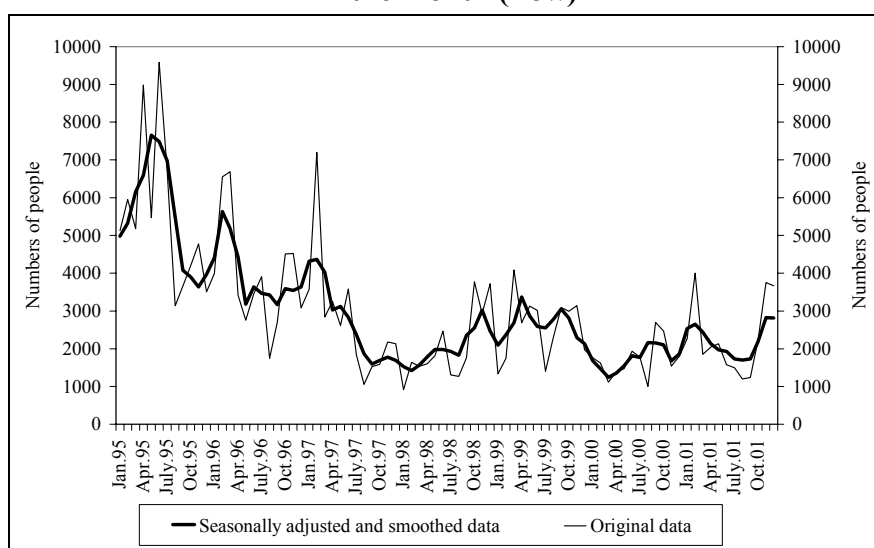
Date of publication: middle of the 2nd month following the review month

Accessibility: only available in printed format (Labour Market Report).

The indicator includes the number of dismissals satisfying the criteria of collective redundancies as defined by the law.⁴¹ The Bank mainly uses the flow data for analytical purposes, which include the number of staff affected by reports received in the month under review. Stock data reflect the number of employees affected by staff reductions due in the review month and the following period, extracted from total reports received up to the end of the review month. In addition to analysing monthly data, the Bank generates quarterly indicators as well. These are derived by adding together the flow data and by averaging the stock data.

⁴¹ Act XXII of 1992, i.e. the Labour Code.

Number of (collective) redundancies reported in the month (flow)



Monthly changes in the reports of mass layoffs may provide information about developments in business activity. From the perspective of labour reserves, it can also be interpreted as the proxy of the number of effective unemployed.

Wage inflation

Source: MNB estimate on the basis of CSO data

Frequency: monthly indicator

Date of release: middle of the 2nd month following the review month

Accessibility: www.mnb.hu, downloadable as a time series in electronic format.

Data released by the CSO cannot be directly used for analysing neither the demand side nor the supply side of the labour market. The CSO's data on *gross* average earnings do not satisfy the criteria required of a genuine indicator of wage inflation for a number of reasons – it is not wage cost based, and it includes the distortions arising from variations in the length of working time (hours worked, length of month, number of working days), the composition of labour and in the administrative form of payments. On the other hand, data on *net* earnings inadequately measure employees' income, given that income cannot be 'netted' on the corporate level (moreover, an indicator of income would make sense on the household level rather than on the level of individual employees). Therefore, it is not surprising that indicators of this kind are not calculated in developed countries.⁴²

From among the various types of data on earnings released by the CSO, the indicator of gross average earnings is perhaps the most useful in assessing labour market developments, specifically for measuring changes in private sector wage inflation, i.e. 'flat' changes or those determined by pricing decisions in a unit of work performed.

⁴² For more details on these issues, see Ferenczi (2000).

Thus, the Bank estimates wage inflation indices on the basis of private sector monthly gross average earnings data released by the CSO. The CSO's category of gross average earnings includes wages and salaries from the employer, in cash or in kind, on the basis of regular employment (or on a contract basis). It includes basic pay, wage supplements, additional salary as well as bonuses, pay awards and 13th month salary and other monthly pay. Gross average earnings data are extracted from the institutional labour force statistics, and relate to full-time employees. The majority of the Bank's analyses rely on quarterly data which are derived by averaging the monthly data.

The problems surrounding changes in the sampling frame and the lack of sector classification prior to 1998 are the same as those discussed in the chapter on the employment data series in the institutional labour market statistics.

Labour market data reflect the measure of officially reported compensation, i.e. which serves as a basis for the payment of taxes and social security contribution, and so they are downward biased, taking into account the characteristics of the labour market. In early 2001, the amount of compulsory minimum wage increased significantly, resulting in a spectacular rise in official wages, particularly in market services, as reflected by the statistics. However, the published wage indices probably overestimate the actual rise in the price of labour in a range of those affected.⁴³

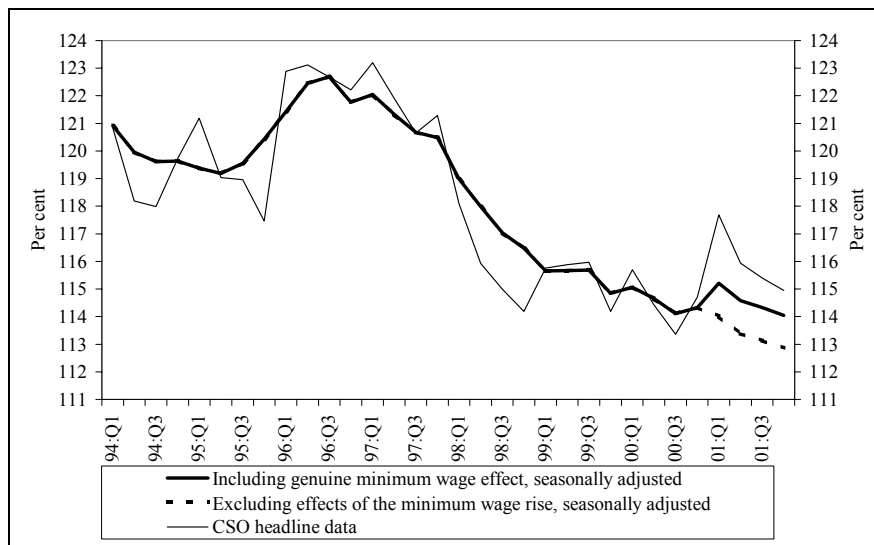
Another problem raised by the published wage indices is that, in the case of manual labour, the basis for calculating monthly wages, i.e. the number of hours worked in a month, is not constant, which may introduce significant distortions into the 12-month wage indices. Although statistical data on the number of hours worked by manual workers in industry are available, the Bank cannot not adjust manual workers' wages for these retrospectively. Explanation for this is that both the sector and the extent to which it is characteristic to pay wages on the basis of hours worked are unknown, and the Bank's times series are generally not suitable for testing this effect using statistical (time series based) methods.

In order to eliminate the problems arising from changes in the range of observation and the distorting effect of the minimum wage increase, the Bank adjusts retrospectively the time series with the help of statistical methods, taking 2001 data as a basis.

⁴³ For more details, see the August 2001 and February 2002 issues of the *Report*.

Private sector wage inflation

Excluding agriculture; same quarter of previous year = 100%



As was noted earlier, the Bank's indicator of wage inflation applicable to the private sector measures changes in the price of labour and, consequently, it serves primarily to characterise the relationship between demand and supply in the labour market and inflationary pressures on the *costs* side (together with the labour cost based real exchange rate in manufacturing, see Chapter 16).

Wages, being an *earnings* category, are practical to use in conjunction with government sector wages and social transfers (old-age pensions, benefits, etc.) and on a net basis. Therefore, the Bank adjusts *total* private sector gross wages for the statistically distorting effect of minimum wage increases, given that the official release of (a part of) compensation paid unofficially earlier does not imply a genuine rise in earnings, then consolidates it with government sector total wages. Taking into account social transfers and the regulations on personal income tax, the Bank generates the indicator of net (i.e. disposable) income of households. This is used in analysing household demand (see Chapter 4).

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Útmutató az intézményi munkaügy-statisztikai kérdőívek kitöltéséhez (Guide to the filling of institutional labour statistics questionnaires), Central Statistical Office, 1998

16. Real exchange rate

Unit labour cost based real exchange rate in manufacturing

Source: MNB estimate based on CSO and OECD data

Frequency: quarterly indicator

Date of publication: date of publication of the *Report*

Accessibility: www.mnb.hu, downloadable in electronic format as a time series.

The unit labour cost based real exchange rate is a frequently used indicator in evaluating international cost competitiveness (see Kovács (1998)). The Bank calculates the unit labour cost based real exchange rate on the basis of the formula below:

$$REERULC = \frac{ulc^f * e}{ulc^h} = \frac{wc^f * l^f / y^f * e}{wc^h * l^h / y^h}$$

where

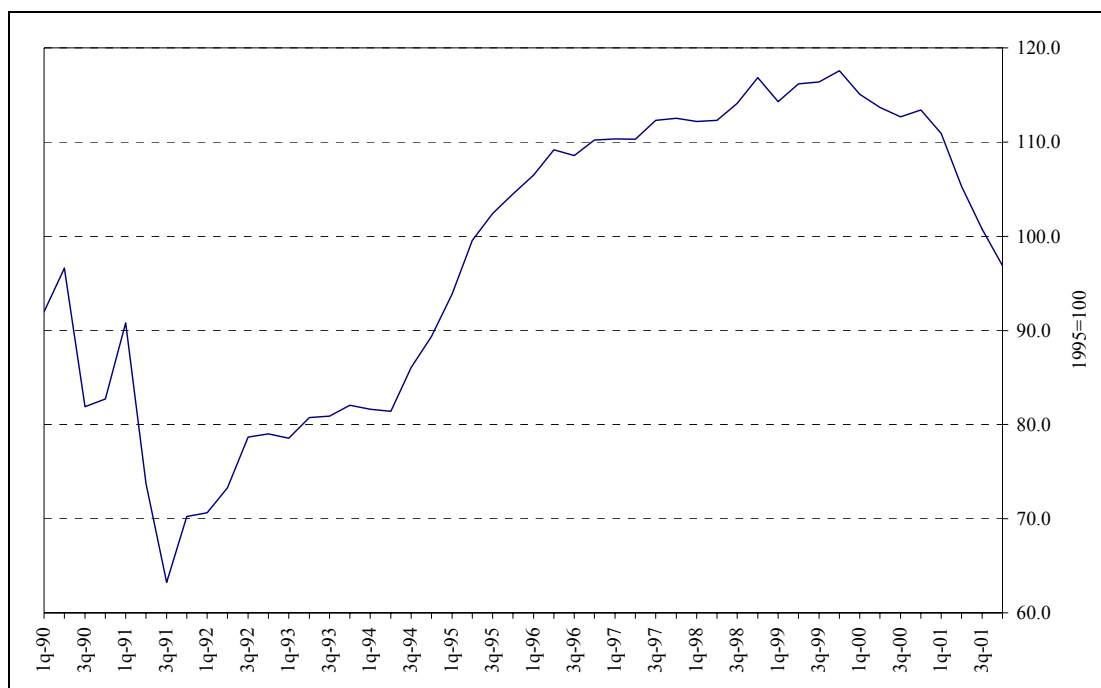
- superscripts 'f' and 'h' denote the foreign (effective variables) and Hungarian variables
- REERULC is the unit labour cost based real exchange rate in manufacturing
- ulc is the unit labour cost in manufacturing
- wc is labour cost in manufacturing
- l is the number of full-time employees in manufacturing
- y is manufacturing value added
- e is the nominal effective exchange rate.

The source of foreign data is the Trade and Competitiveness Indicators, a publication by the OECD. The so-called effective variables are derived from weighting foreign data where the system of weights is partly based on the structure of bilateral foreign trade and partly on the so-called third market competitiveness. Third market competitiveness is measured with the position of Hungary's competitors in markets other than the Hungarian. The domestic variables reflect data released by the CSO. The source of time series on value added is Hungarian System of National Accounts, a publication by the CSO. In the case of employed persons, the adjusted time series for manufacturing staff, as discussed in the chapter on the labour market, is used. Wage costs are calculated by adding various employers' benefits and other wage costs estimated by the CSO to wage inflation indices adjusted for the effect of the minimum wage increase, as discussed in the chapter on the labour market (see CSO: various issues of 'Labour Costs in Hungary'). The time series for domestic and foreign unit labour costs are seasonal, therefore, they are seasonally adjusted by the Bank. From the calculation method of the indicator it follows that index values above 100 represent real depreciation relative to the base period.

The Bank uses the unit labour cost based real exchange rate in assessing and forecasting export and import competitiveness (see Jakab, Kovács and Lőrincz (2000)).

Unit labour cost based real exchange rate in manufacturing*

1995 = 100



*Increase denotes real appreciation.

References

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CSO: Various issues of 'Labour costs in Hungary'

17. Fiscal demand impact

Source: MNB

Frequency: yearly indicator

Date of publication: publication of the Quarterly Report on Inflation

Accessibility: www.mnb.hu, downloadable in electronic format as a time series.

The impact of the government sector on demand can be written:

$$FI_t = FId_t + Fli_t$$

$$FId_t = (Pd_t - Pd_{t-1}) = (Pdo_t - Pdo_{t-1}) + (Pda_t - Pda_{t-1})$$

$$Fli_t = (Ri_t - Ri_{t-1}) = \{(Rihuf_{t-1} + Rihuf_t + Rihuf_{t+1})/3 - (Rihuf_{t-2} + Rihuf_{t-1} + Rihuf_t)/3\} + (Rifx_t - Rifx_{t-1}) + (CBdo_t - CBdo_{t-1}),$$

where:

FI = the demand impact,

FId = direct demand impact,

Fli = indirect demand impact,

Pd = SNA primary balance (excluding transfers by MNB),

Pdo = official primary balance (excluding transfers by MNB),

Pda = SNA based corrections of the official primary balance,

Ri = net real interest expenditure consolidated with MNB,

Rihuf = net real interest expenditure in forint consolidated with MNB,

Rifx = net real interest expenditure in foreign currency consolidated with MNB,

Cbdo = non-interest components of the SNA based balance of MNB,

t denotes the period (year).

Description of the indicator:

The calculation of the demand impact is based on an analytical indicator instead of official accounts.⁴⁴ More detailed presentation of the differences can be found in the special topics.

The demand impact, being an indicator derived from changes in balance, is a *yearly indicator*. In addition to some components affecting changes in balance, such as tax receipts, of course a number of other expenditure items whose within-year developments do not show regular patterns can also be interpreted on monthly and quarterly bases.. All this stems from the fact that the Budget Act affects a year, i.e. objectives and appropriations are defined for an entire year and this itself does not imply within-year scheduling in the majority of cases. One characteristic feature of the demand impact is that it is based on variations relative to the base period, which may be disadvantageous in calculating the within-year demand impact, given that

⁴⁴ Official fiscal indicators have become similar to some distorted monetary indicators (Goodhart's law). That is, the official deficit figures are subject to frequent upward revisions ex-post.

fluctuations in its within-year dynamics would make quarterly interpretation of the indicator more difficult. This problem is reflected in the 1999 issues of the *Report*.

It is not really informative to analyse separately the balances of each sub-sector (central government, social security, extra-budgetary funds, local government) within the overall general government balance providing the background for calculating the demand impact (*see Box IV.2 in the MNB Annual Report for 1999*). It is nevertheless useful to make a distinction on the basis of the three categories of revenue and expenditure. The first includes items *determined by macroeconomic events*, such as tax receipts, employment benefits and pension expenses on account of the Swiss indexation system. The second category may be called *discretionary measures*, which is comprised of fiscal policy measures relating to changes to the tax regime and the definition of the non-determined range of expenditure estimates.⁴⁵ *Fiscal developments*, constituting the third category, is a collective noun which includes the effects of all other factors. This category comprises decisions taken by local authorities, institutions and budget chapters, given that it is useful to separate them from the intentions of fiscal policy decision-makers, i.e. Parliament and the Government. (These decentralised decisions may divert actual developments in expenditure from the central intentions, i.e. from the funds appropriated in the budget.) On the other hand, this category reflects the effect of certain expenditure items which are determined by recourse to them, and so they are to some extent also independent of the intentions of fiscal policy. There may be technical explanations for this, for example, the time requirements of tenders; however, another explanation may be that the number of persons entitled to family allowances, receiving pharmaceutical subsidies or about to retire develop differently from projections.

The Bank prepares a *detailed forecast* of revenue and expenditure items underlying the official release of primary balance, on the basis of the categorisation noted above. As their developments are observable on the basis of the official data, the extent to which the macroeconomically determined items are consistent with the given macroeconomic developments (i.e. with developments in the tax base) can also be analysed continuously, on monthly and quarterly bases. There are relatively rare changes in the category of discretionary measures, they being determined basically by the approval of the Budget Act and by supplementary measures taken in the course of the year, such as the potential freezing of appropriations by the government, or increases in appropriations by the parliament in the course of approving the execution of the previous year's budget, usually in September. As long as the measure of these is unknown, the Bank uses estimates. Forecasts of fiscal developments can be performed partly on the basis of the likely behaviour and opportunities (funding sources, residues) of local authorities and institutions and partly on the basis of trends in uses and disbursements of certain expenditure items.

The SNA adjustments complementing the official primary balance can be categorised into several groups. In the first group are those types of revenues which are reflected in official figures and in the data reports by the privatisation agency (ÁPV Rt) and which are shown against *reductions in claims* (repayment of debt, disposal of shares, use of privatisation reserves). Under the SNA methodology, such revenues do not

⁴⁵ These have overlapping parts, as discretionary measures affect macroeconomic developments. The most obvious example of this is the increase in government sector wages, whose taxes for both employers and employees flow back into general government simultaneously. In this case, it may be justified to account for the effect of measures on a net basis, i.e. to isolate developments in government sector wages from macroeconomic events.

reduce the budget deficit and may not provide cover for reorganisation and other expenses of ÁPV Rt, but may only be accounted for as below-the-line financing. In this case, forecasting is relatively easy, as there are estimates available in the Budget Act, and meeting the estimates in the course of the year may be monitored. Adjustments on an *accrual basis* can be categorised into the second group (see *Box IV.1 in the Bank's 1999 Annual Report*). A part of these cannot be observed directly; consequently, not only the forecast but actual performance against the forecast as well are based on estimates (VAT refunds are estimated using the SEATS/TRAMO software). Another part of them, for example, concession fees paid as a once-for-all payment in advance, can be found in the official data. Accounting for *quasi-fiscal activities and road construction financed from borrowing by MFB Rt* comprise the third group. The Bank has only partial information about these (for example, from government resolutions, press releases and in some cases regular data), so actual outturn can only be estimated as well.

In estimating the indirect demand impact, not only changes in the primary deficit, but also changes in real interest expenditures consolidated with MNB, are taken into account. Consolidating with MNB means that not only the interest component of the profits/losses, but the Bank's non-interest transactions as well, augment the fiscal deficit. In calculating the operational deficit, the Bank has departed from the earlier method of defining the deficit from below-the-line, on the basis of the inflation-adjusted change in stocks (see Barabás, Hamecz and Neményi (1998)). Instead, using a less detailed calculation, the effect of inflation is eliminated directly from above-the-line, i.e. from interest expenditures. An advantage of this is that it can be better used due to its simplicity. In the case of interest expenditures in HUF, in addition to eliminating the inflation compensation factor, the Bank uses the modified version of moving averages suggested by Blanchard in order to smooth fluctuations in real interest rates (Blanchard (1990)). Instead of a three-year forward-looking average, the Bank uses a moving average which looks one year forward and one year backward (see P. Kiss (2002)).

Theoretical background

In the case of a small, open economy, the fiscal impact on demand is supposed to have a moderate effect on inflation. The simulation conducted using the NIGEM model reinforced the view that, even if the spillover effects are taken into account, an only 0.3% inflationary impact can be revealed in case of a fiscal expansion of 2.5% of GDP (see *Report 3/2001*). Consequently, the impact on demand will all the more influence external balance and economic performance (i.e. the level of GDP). However, investment spending and government wage bill, for example, have different effects on external balance and GDP; consequently, *the composition of the demand impact* also matters. In the *Report*, therefore, developments in government investment and the full impact of fiscal policy on household income are analysed separately. The Bank deals with developments in government sector wage bill only as one of the important factors of household income – it is not taken into account as a factor of wage inflation, given that currently the effect on private sector wage developments cannot be demonstrated. For the analytical background of the analytical tools defined by the Bank, see P. Kiss (2002).

Special topic:

Indicators of general government demand in Hungary

By default, Hungary's general government deficit can be defined in four ways. There exist two statistical indicators – one is the deficit according to the GFS86 introduced by the IMF, the other being in accordance with the ESA95⁴⁶ used by the EU. In addition, there are two indicators which are not fully comparable with the two statistical systems noted above. These are the official deficit category and the SNA deficit used by the MNB for analytical purposes. All these indicators are built on different assumptions, which defines the validity and limitations of these indicators by virtue of the reality of assumptions.

Let us first have a look at the common assumption underlying the four basic indicators which can be used as a starting point, i.e. when (any one) category of the overall deficit provides a realistic picture of the impact of general government on aggregate demand and macroeconomic balance. One can place developments in the overall deficit in the focal point of the analysis, if it can be assumed that private agents do not distinguish between the various types of compulsory payments (taxes) and government transfers. This means that, in the case of a unit measure of government transfer (or tax), a sector always increases (reduces) its consumption to the same extent, independent of the fact whether it expects them to be permanent or temporary (i.e. depending on the business or political cycle); and, in the case of interest income, it does not distinguish between inflation compensation incorporated in interest and the real interest component. This suggests money illusion and/or a liquidity constraint on the part of every private agent.

However, the four basic indicators are not fully consistent in addressing the issue. One end point is represented by the GFS86 methodology which starts from total myopia and liquidity constraint, the other being the ESA95 which postulates a certain degree of intertemporal foresight. Owing to this, the approach of the two systems is different in respect of the issue of what is the timely impact of a government tax or transfer, whether at the time of performance in cash or during the period actually underlying the transaction, i.e. on an accrual basis.

However, a more important difference than the one above occurs among the four indicators of the overall deficit, depending on where the actual, i.e. not legal, borderlines of general government are drawn. Most of the problems can be traced to this sector classification.⁴⁷ Let us take a detailed look at the four indicators:

The ESA95 deficit is a statistical and legal fiscal indicator. A characteristic feature of **ESA95** is that generally it starts by postulating the conditions of a developed market economy, although it departs from this view on some points following practical considerations. For example, it presumes that the liquidity of private agents is not constrained, and so their consumption is determined by accrual-based events rather

⁴⁶ http://europa.eu.int/eur-lex/en/consleg/pdf/1996/en_1996R2223_do_001.pdf

⁴⁷ For example, a transaction can be labelled as a below-the-line loan or an above-the-line transfer in statistics, but actually the debtor's behaviour is the most relevant factor, as if he would be obliged to repay it or treat it as a non-repayable subsidy.

than by their cash revenues and expenditures.⁴⁸ For the sake of simplicity, however, it presumes that, in taking consumption decisions, private agents generally do not distinguish between permanent and temporary income in a myopic manner.⁴⁹

- In defining the general government sector, the ESA95 does not follow the legal definition, but it includes all state-controlled units which qualify as ‘non-market producers’. With this the ESA95 implies that the selling price does not even cover half of costs. This assumes that the real size of costs can be defined precisely, i.e. there are no hidden losses, and that accounting for depreciation is realistic. In the range of units classified as market producers, the ESA95 uses the assumption that, in the course of their operations, they do not expect additional reimbursement for losses from the state, occurring accidentally in a period of a couple of years, above the normal subsidies. In this case, it is legitimate to account for such unexpected capital transfers in the year of receipt, according to the ESA95, as they actually have an economic effect.⁵⁰
- As to credit and grants extended by the state, the ESA95 also assumes that they are much the same as credit and guarantees extended on a market basis. In the case of state property, it implicitly assumes that they are fully marketable and so they can be evaluated adequately. In the ESA95, there is obstacle to evaluating non-classical categories of debt, such as compensation vouchers, on a market basis. Consequently, it defines the net wealth of general government, a wider range of the customary general government debt, which includes holdings of equity securities (shares), credit extended by the state and non-classic debt as well, in addition to public sector debt and deposits by the state. The change in financial assets and liabilities, after eliminating the effect of revaluation, is consistent with general government debt as defined by the ESA95. Accordingly, privatisation revenue and the recovery of earlier loans do not reduce, and lending does not increase, the deficit, as these items are below-the-line financing transactions. However, the ESA95 does not regard the once-for-all payment of concession fees as borrowing, except if the period of concession is five years at maximum. In the case of a period longer than this, it reduces the deficit with a lump sum, similarly to the final sale of a real asset, instead of accounting for revenues on an accrual basis. Strictly speaking, this hypothesises that the concession right will be valueless in the moment of passing back on to the state, i.e. when it cannot be sold again.

⁴⁸ This also postulates that, for example, wages are actually paid after periods worked, and, in a similar vein, that taxpaying obligations are fulfilled.

⁴⁹ The ESA95 is a version of the System of National Accounts adapted by the EU. In addition to operationalising the general rules, there may be other differences between the ESA95 and the SNA. For example, under the ESA95 capital enlargement preceding privatisation by maximum one year can be treated as an item financing the deficit, i.e. only this can clearly be the counterpart to later privatisation proceeds. On the other hand, the ESA95 deviated from the standard SNA93 approach in the case of concession fee payments, which would account for concession similarly to rent, i.e. independent of the time of fulfilment.

⁵⁰ Capital transfer increases the general government deficit as it covers corporate losses accumulated in the past or expected in the future, i.e. despite its form it does not qualify as acquisition of financial asset (financing item), except in the case when privatisation of that enterprise actually takes place within a year. In this case, there is a large probability of the additional government funds does not cover losses, but rather increase privatisation revenue (Obviously, purchases by the state on the stock market imply a change to the ownership structure and not corporate capital transfer.)

- However, the ESA95 specifies the actual deficit and financial wealth of general government applying a special treatment of a few transactions, in addition to extending the government sector to non-market producers. An example of this correction is that the indirect sale of shares (privatisation), i.e. those which are held by a state-owned company, is treated in the ESA95 as financing, just like a disposal of indirect property. Within the central bank's profits, only the payment of actual income, i.e. which does not stem from the revaluation or sale of foreign exchange reserves, can reduce the deficit; the items noted earlier can only be treated as financing. This correction, however, is not symmetrical, being valid up to 'zero' payment, and, in the case of a loss, the government sector deficit only increases in the case of an actual state transfer, in accordance with the general rules. Borrowings under state guarantee are treated as a liability if exercise by the state is certain, and their use as an expenditure, increasing the deficit.⁵¹

Accounting in **Government Finance Statistics (GFS86)** is in accordance with the economic circumstances of developing countries, so it is mainly used for the purposes of liquidity management in the case of developed market economies.⁵²

- The GFS86 method of accounting is only a relevant indicator of the demand impact if the condition is met that institutional units are short-sighted and/or their liquidity is fully constrained, i.e. their consumption immediately and fully adjusts to their incomes realised on a cash basis. What simplifies accounting on an accrual basis even further is that, in the course of its practical use, the GFS86 records only payments in cash, so it neglects payments via the transfer of bonds or compensation vouchers or debt forgiveness without the involvement of cash. This way it does not run into problems of evaluating these financial assets which are not necessarily marketable.
- The GFS86 treats lending for policy purposes and capitalisation on the premise that these are not distributed on a market basis, i.e. it can be assumed that recipients do not use these on the basis of profitability considerations, but, for example, to cover quasi-fiscal expenditure. At bottom, this means that it is useless to be concerned with these claims, as they are non-marketable, except a couple of ownership claims. If they cover corporate losses, they will not be recovered, so, putting it simply, the real value of such claims approaches to zero even at the time of their emergence. If, on the contrary, someone repays a loan to the state, or a state-owned enterprise is privatised (the proceeds of which are considered as a loan repayment by GFS86), then that will be an extraordinary event, relative to the assumed zero value, and so this revenue will reduce the GFS deficit.
- The GFS86 system separates state-owned enterprises more markedly from general government.⁵³ Whether they operate as 'true' private sector firms or pursue significant

⁵¹ Three conditions must be met in order to define this. First, the regulation on issuing debt obliges the state to repay debt. Second, the annual budget acts include (specify) the amount of principal repayment. Third, the repayment of debt (capital plus interest) issued by the enterprise is assumed by the state regularly.

⁵² The statements relating to GFS86 reflect the rules applied up to now. After its revision currently underway, the GFS2001 became similar to the system of national accounts. The GFS86 deficit can be derived easily – apart from revaluation of foreign currency debt and loans extended by the state (for policy purposes), the GFS86 treats the change in net public sector debt, shown at face value, as the deficit. Expenditure arising from repayments of debt or revenue from issuing bonds are below-the-line items and, consequently, the deficit derives as the sum of other expenditure and revenue changing the government deposits.

⁵³ An enterprise, acting as an agent of the state, can only be reclassified from the corporate sector into general government if it clearly pursues government activities (e.g. it collects taxes or has quasi-

activities as producers of services or as sellers outside general government, independent of the measure of loss, it is a sufficient condition for the unit in question to remain within the corporate sector. In this case, the deficit only shows the actual position of general government, if state-owned enterprises only able to accumulate debt to a limited extent, i.e., at bottom, the owner regularly reimburses for the losses, providing cover for depreciation as well, and so the actual losses are always reflected in the fiscal deficit.

The **Hungarian official (legal) indicator of deficit** follows the GFS86 methodology, with a couple of differences. From 2003, the ESA95 approach will be introduced.

- Although theoretically the privatisation agency (ÁPV Rt) could be treated as part of general government on the basis of the GFS86, just as in the ESA95 approach, in practice it does not happen in fiscal statistics. All this would not influence the GFS86 deficit anyway, as in this approach privatisation proceeds providing a cover for the quasi-fiscal expenditures of ÁPV Rt are revenues reducing the deficit.
- Part of state property has actually proved to be marketable, so it has resulted in significant and in some years saliently high one-off revenues. Accordingly, the official indicator does not accept the implicit assumption of the GFS86 according to which the value of state-owned enterprises is insignificant, as a result of losses and indebtedness. Accordingly, the official deficit, similarly to the recommendations of the ESA95, records privatisation receipts not as revenue but as a financing item, i.e. it can be viewed as an indicator somewhere between the GFS86 and the ESA95. However, attempts to apply the category ‘GFS deficit excluding privatisation proceeds’ to the social security on a consistent basis have failed. Disposals by the social security of shares should be excluded from above-the-line revenues during 1997–1999, i.e. to increase the official deficit.
- The official indicator uses the cash flow method of the GFS86 by assuming that all private agents are myopic and/or liquidity is fully constrained, i.e. their consumption immediately and fully adjusts to their incomes realised on a cash basis. The practice of recording, i.e. the treatment of advances, may be a departure from the cash basis of accounting, but generally⁵⁴ this does not imply a problem on a yearly level. Accounting for the amounts placed on deposit accounts in the official deficit at the end of 2000 also caused a difference with the cash basis accounting. In fact, inflation compensation for state employees and pensioners related to 2000, and as such it can be treated as recording on an accrual basis, similar to the ESA95 method. However, other types of funds placed on deposit accounts are not compatible with the statistical recommendations of either the GFS86 or the ESA95, but they can be classified as an economic adjustment, pointing in the direction of structural deficit.⁵⁵

governmental expenses). According to this approach, the GFS would presumably treat ÁPV Rt as part of the general government sector.

⁵⁴ A more significant difference occurred both from the cash and accrual based flows when, after a change to the accounting method, the recording of pharmaceuticals subsidies became asymmetrical. Explanation for this is that the advances for 1998 granted at end-1997 were accounted for official deficit to affect the 1998 accounts just as those granted at end-1999 for 1999. Accordingly, unlike in other years, the official deficit reflected pharmaceuticals subsidies for 13 months.

⁵⁵ Approximating the structural deficit may be legitimate, because the temporary effects (improving the balance in 2000) arising from developments the business cycle or inflation could be eliminated. These transitional effects may reverse in the following period, i.e. they do not represent expendable resources.

- In the course of the practical use of the GFS86, a number of extraordinary transactions, such as the bank consolidation, did not appear in the deficit, due to the lack of actual cash movement. Although this solution meant that the debt dynamics disaffiliated from developments in the official deficit, the demand impact (i.e. the change in deficit) got closer to reality than in using the SNA93/ESA95. According to this, debt and deficit should have been raised by these extraordinary transactions, despite the fact that actually the underlying economic effect (i.e. the accumulation of loss) spread over longer periods.

The so-called **SNA deficit**, used in the Bank's analyses and published in the *Reports*, is an **analytical** indicator which represents a transition between the statistical approaches of the GFS86 and the ESA95/SNA93, but, as its name suggests, it stands closer to the latter. However, it concentrates on adjustments which are relevant and feasible from the perspective of assessing fiscal policy (demand impact and savings-investment balance) (see P. Kiss and Szapáry (2000)).

- The category of overall deficit is only treated as a starting point towards more important indicators from the perspective of evaluation and analysis, such as the primary balance and operational deficit. The official primary deficit excludes central bank profits and losses by definition. That is why the considerable simplification applied in earlier reports has not caused a problem, i.e. that the official deficit has not been adjusted for certain transactions by the central bank which the ESA95, in a reasonable approach, only treats as financing.⁵⁶ Explanation for this is that consolidation with the central bank was implemented by calculating the operational deficit. The consolidation of the Balance Sheets also means that the Bank does not follow the asymmetric recording method of the ESA95, i.e. the central bank's losses after adjusted for the financing items are also incorporated in the comprehensive measure of operational deficit.
- In accordance with the ESA95 methodology, the Bank treats ÁPV Rt as a unit of general government, and road construction financed by the state-owned development bank (MFB Rt) from borrowing has been accounted for in the SNA deficit. In addition, MFB Rt also pursues quasi-fiscal activities in respect of which the corresponding ESA95 classification is not clear, but it is necessary to estimate its impact on demand. From practical considerations, non-profit organisations reclassified by the Central Statistical Office (CSO) and those state-owned enterprises which are probably non-market producers, such as the Railway Company (MÁV Rt), cannot be taken into account, whose losses (i.e. their expenditures covered by debt) should be recorded in the deficit for the review period.
- The postulation of myopia and/or liquidity constraint (GFS86) appears to be acceptable in the case of the majority of households (and part of enterprises), i.e. the cash-based accounts available for a significant part of revenue and expenditure appear to be adequate. However, for a large group of investors and big taxpayers these assumptions are unrealistic, therefore, the Bank follows the SNA93 accrual

⁵⁶ For example, transfers from indirect privatisation (e.g. CIB and HIB) are matched with a fall in the state's financial assets, just as in the case of direct privatisation, i.e. there is a mere exchange of financial assets. Payments of profit from revaluation is as much a financing item as losses from revaluation of the state following debt swap, which clearly does not constitute a part of the deficit.

basis of accounting in the case of interest expenses, VAT refunds and concession fee receipts.

- Loans and guarantees extended by the state are generally treated as loans and guarantees extended under market conditions, due to the high amounts of repayments and the low amounts of default. The Bank's treatment of the on-lent funds, extended by budget chapters, is currently different, where the Bank does not assume repayment.⁵⁷ In contrast, the deficit has been raised by the amount of guarantees exercised as expenditure, similar to the official accounts, on the assumption that the state does not enforce its claim.⁵⁸
- However, similarly to the ESA95, the Bank does not treat capital transfers as market investments, except in the case in which these funds are actually repaid approximately within a year through privatisation.⁵⁹ But this does not mean that all capital transfers are accounted for in the deficit. There are extraordinary capital transfers, such as bank consolidation programmes, assumption of MÁV's debt, assumption of credit to construct the Bős-Nagymaros Dam or home-building loans, whose payment dates are arbitrary and are generally different from the time of underlying economic effect. These transfers may be categorised into various groups, depending on the types of future or past losses they cover, or whether they settle the consequences of an earlier state decision at a later date. If they provide an extraordinary cover for recurrent losses (past or future), then it would be important to divide up and convert the capital transfer into current subsidy, in order to quantify both the demand impact and the structural level of deficit more precisely (P. Kiss (2002)).⁶⁰ In order to be able to interpret the demand impact, the Bank has chosen the simplification that it does not account for extraordinary expenditure within the deficit, similarly to the official methodological approach. This solution cannot cause larger distortions in the data for past years; however, this assumption cannot be applied for the early part of the 90s. Therefore, without distributing into current subsidies, a comparable time series cannot be assembled.

⁵⁷ Due to its relatively low amount and the low repayment rate, assuming a 'non-market' nature has not caused larger distortions, so it has been recorded as a subsidy instead of a loan. In the future, the classification of these items can be changed, based on the actual data on repayment.

⁵⁸ If it does so, then the Bank records it as a revenue, similar to the official accounts. It should be noted that, taking the 90s as a whole, the state recovered one-fourth of guarantees exercised.

⁵⁹ Transfers by ÁPV Rt are monitored accordingly and, in case the expenditure pays back within a year, then the deficit is not increased by this expenditure. Expenditures linked with privatisation and executed ex post which clearly may be associated with revenue realised. i.e. which constitute unconditional (non-guarantee) payment, are also eliminated.

⁶⁰ Attempts have been made to distribute individual extraordinary expenditure items, based on certain guiding principles. It has been found that the deficit would have been higher by 1%–2% of GDP in the 90s almost each year, whereas distribution would result in a much smaller change relative to the demand impact calculated excluding extraordinary expenditure. The basic principle of the distribution was that expenditure should be recorded in the general government deficit when past losses actually occurred, or when future losses (payment obligations) would have occurred if the obligations had not been taken over (subsidised home-building loans, electricity supplies due to the debt service of the Bős-Nagymaros Dam). The case of repayments by Russia of its debt mostly with military equipment is slightly different from this, where the problem is caused by repayments effected in irregular intervals and the resulting volatile defence expenditure. In normal circumstances, purchases or rents of military equipment should be distributed over several years.

- In accordance with the SNA methodology,⁶¹ concession fees are recorded on an accrual basis and not at the time of cash payment, similarly to rent. The Bank does not share the concern that using this accounting method the central budget's position would be twice as good – first, it prepays its debt and as such it saves interest expenses and, second, it records continuous revenues in the accrual method. The situation is that the one-time payment can be classified as lending, which, in turn, means implicit payment of interest in the price. Consequently, repayment of debt from borrowing has an insignificant saving of interest, and it may be even more costly.

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⁶¹ Accordingly, renting fees should be (SNA 7.128.), irrespective of actual payment which, as in our case, may represent prepayment or else lending. Despite the decision by Eurostat, in the United Kingdom concession proceeds are accounted for as rents. The OECD noted this problem in its overview of 2000–2001.

18. Current account

Source: MNB

Frequency: monthly indicator

Date of release: preliminary data are released on the 3rd of the month following the review month, final data are released on the 18th following the review month

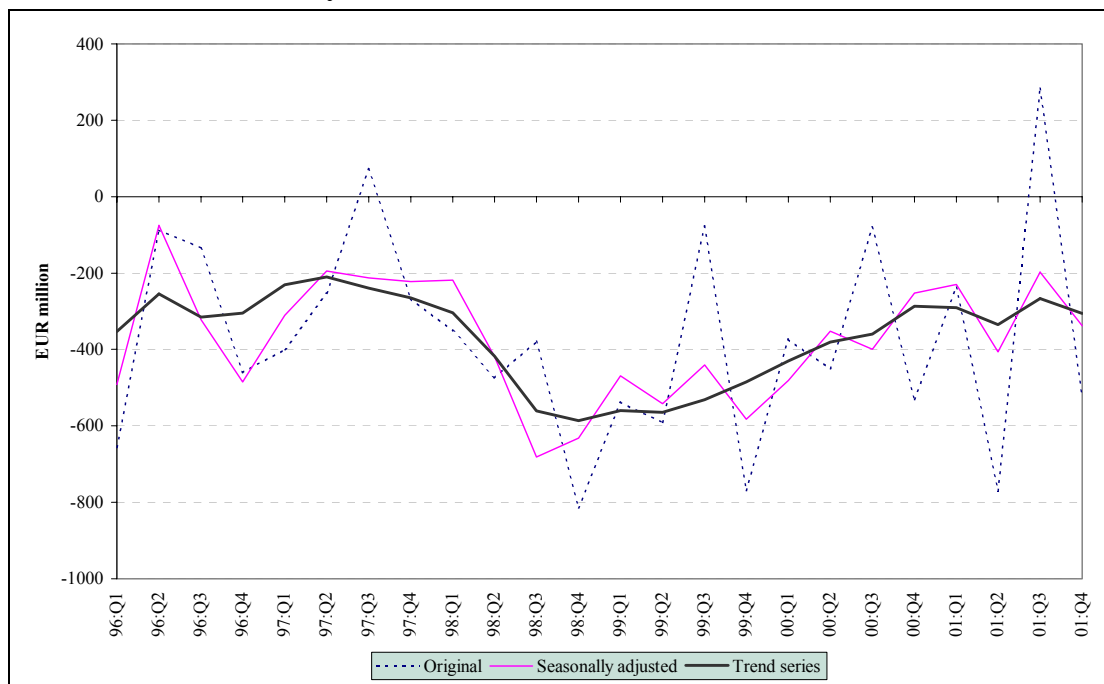
Accessibility: www.mnb.hu, downloadable in electronic format as time series.

The current account summarises transactions between residents and non-residents in goods and services, income flows related to investment and work performed as well as unrequited current transfers. The combined balance on the current account and the capital account which includes unrequited capital transfers corresponds to the country's net claims vis-à-vis the rest of the world.⁶²

The current account statistics are primarily based on reports by domestic financial institutions and companies holding accounts abroad. The underlying data stem from the observation of changes in the stocks of financial assets and liabilities and are cash-flow based. As the original data on the current account exhibit considerable seasonal patterns, the seasonally adjusted quarterly and yearly data are suitable for analytical purposes. The seasonal adjustment is indirect, i.e. the major sub-accounts (the credit and debit sides of goods, services and income accounts) are separately seasonally adjusted, and the sum of these produces the seasonally adjusted time series of the current account balance.

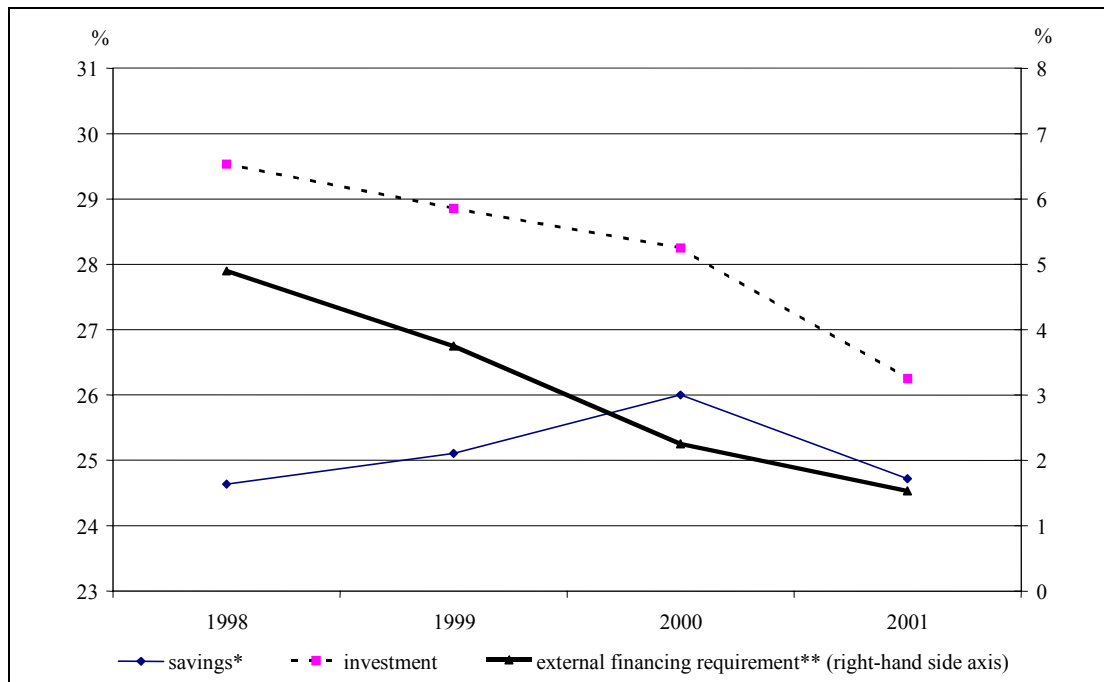
⁶² Except changes in stocks due to price and exchange rate movements as well as other volume changes.

Quarterly time series of the current account balance



The current account balance equals the difference between residents' savings in a given period, i.e. the not consumed portion of their disposable income, and their investment spending. If the balance on the current account is negative, then the sum of consumption and investment spending is higher than disposable income in the given period; the difference between them (i.e. the current account balance) shows the amount of external financing requirement.

Residents' nominal savings, investment and external financing requirement as a proportion of GDP



* Savings mean the not consumed portion of the sectors' disposable income.

** External borrowing requirement is the balance of the sum of the balances on the current account and the capital account including current transfers, multiplied by minus 1.

In the case of a given sector, the difference between the not consumed portion of disposable income and investment spending equals the sector's **net financing capacity**. If this is negative, the given sector can only borrow funds from other sectors, so, at bottom, the sum of the domestic sectors' net financing capacity will equal the external borrowing requirement. *Accordingly, changes in the current account deficit can be decomposed into changes in financing capacities or requirements of the various domestic sectors.*

A consistent relationship between the financing capacities of the various sectors and the external borrowing requirement can only be created through the current account, as in the case of Hungary there is a significant, although not systematic discrepancy between foreign trade data recorded on accrual and cash-flow bases.⁶³ Current account data play an important role in a number of analyses.

- First, the balance on the current account shows the nominal changes in external balance with which real developments in consumption and investment are associated. The current account-based savings-investment analysis sheds light on the way in which the various sectors' financing requirements change along with real economic developments. This allows to analyse the consistency between nominal and real developments.
- In contrast with households and the general government sector, no data are available on corporate sector net financing requirement. The Bank estimates the

⁶³ The *Indicators of foreign trade* chapter discusses in detail foreign trade data recorded on various bases of accounting (p.37).

sector's net borrowing requirement from the current account balance on the basis of the residue principle.

- In the case of the corporate sector, there are no reliable data available on disposable income. Developments in the sector's income are estimated as the sum of borrowing requirement estimated on the basis of the current account balance and investment spending.
- Statistical data on the current account serve as an important input for preparing the flow of funds matrix being the basis of monetary programming. (For more details, see Barabás and Major (2001).)

Reference

Barabás, Gy. and Major, K. (2001) 'A monetáris program' (The monetary programme) MNB Occasional Papers, No. 21

19. Reuters analysts' expectations

Source: MNB estimate based on data provided by *Reuters*

Frequency: monthly

Date of release: between the 15th and 20th of every month

Accessibility: www.mnb.hu, downloadable in electronic format as a time series.

Reuters questions domestic and foreign analysts with a monthly frequency about their expectations of the most major macroeconomic indicators since 1995. The majority of those questioned are macroanalysts of financial institutions, mostly banks, investment funds and insurers. The largest Hungarian research institutes are also represented in the sample.

Currently, questions are asked on expected developments in the following macroeconomic variables: inflation, core inflation, producer prices in industry, central bank policy rate, forint-euro exchange rate, 1 and 3-year government securities yields, GDP growth, industrial output growth, current account deficit and general government deficit. For the majority of variables, the forecast horizon is usually the next month or quarter corresponding to the not yet published data as well as the (ends of the) review year and the next.

Methodological considerations

Although theoretically a more accurate picture can be obtained of future developments in the given variable using the widest possible number of forecasts, experience has shown that it may be legitimate to eliminate a few data if one is curious about the average of expectations. It often happens that a forecaster fails to build in his forecast changes taking place in the last one month, and in such cases the average of forecasts adjusts more slowly to the changed circumstances.

Another reason why it is perhaps more useful to take into account a narrower sample is that the individual forecasts are occasionally spectacularly different from the majority expectation and, although eliminating them may lead to the loss of important information, the average calculated excluding the extreme values better reflects the so-called market consensus.

Another phenomenon which is also a counterargument against using the full average of forecasts is the change from month to month in the range of analysts and institutions who publish their forecasts. It is easy to see that the large dispersion of forecasts and the relatively small sample (characteristically there are 10–20 forecasters in every survey) may lead to undesired fluctuations in the average derived from all contributed data, and the trends underlying the shifts in expectations are then more difficult to pinpoint.

There is no recipe for eliminating outliers which could lead to optimal results in all cases. Mostly the lower and upper 5%–10% is recommended eliminating (depending

on the distribution). Taking into account the small size of sample, the Bank uses the trimmed mean calculated by eliminating the smallest lower and upper value for both its own internal use and its publications.

Interpreting analysts' expectations

Reuters' monthly surveys reflect economic agents' expectations of future performance, though not every group is covered. It appears from other surveys that, for example, households' inflation expectations significantly and permanently differ from forecasts by the financial market and research institutes. Managements of companies domiciled in Hungary also shape their expectations in a different manner.

Financial market participants' expectations deserve special attention primarily because of their dominant role played in developments in monetary conditions and the monetary transmission mechanism. A significant portion of those covered by the *Reuters* survey prepare their forecasts using a vast number of information and, possibly, modelling techniques, and so presumably they are able to provide more accurate forecasts than the other segments of participants noted above.⁶⁴

As the Bank has only sporadic information in respect of the time series and forecasting features of analysts' expectations published by *Reuters*, Bank staff currently do not process them on a systematic basis. Information derived from the survey is utilised on an *ad hoc* basis, and staff rely on them mainly in interpreting expectations indirectly reflected in the forint exchange rate and the yield curve.

Not only the average of expectations, but their distribution and the relationships between forecasts of the various variables as well, may all carry relevant pieces of information in a given month. For example, the higher dispersion of forecasts generally indicates a more uncertain business environment. An example of the latter may be that higher interest rate expectations, coupled with weaker exchange rate expectations, suggest a higher expected premium on forint yields.

A practical example: illustrating a higher expected path of inflation

Most of the questions in the *Reuters* survey are concentrated on perhaps the most important variable from the perspective of monetary policy – the expected course of inflation. Questions are asked separately on the expected 12-month increase in consumer prices in the review month, the end of the review year and the next, in the review and the next on average and, most recently, in June of the review year. This means 6 independent pieces of information about inflation expectations, from which a fairly precise picture of the path expected for the next 1 to 2 years emerges.

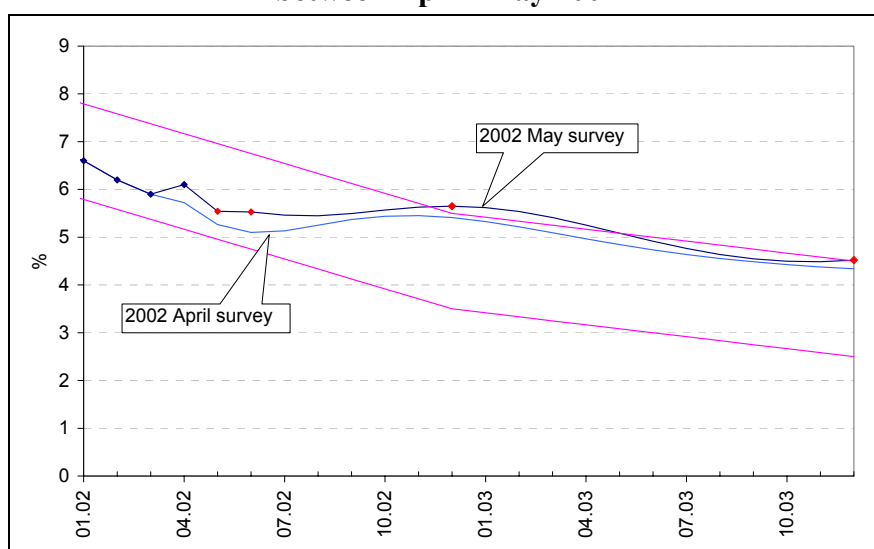
In order to visualise this picture, staff impose a special form of function on the trimmed means of forecasts. The class of function applied is chosen with the requirement that it should be flexible enough over the short term, adequately

⁶⁴ The history of *Reuters* surveys has only very recently entered the stage where it can be subjected to methodologically more rigorous tests. Krekó and Vonnák (2002) test the accuracy of inflation forecasts and other properties using statistical methods.

horizontal over the long term and it should contain as few as possible parameters to be estimated.⁶⁵

As a result of the procedure, staff not only obtain a visually sound and continuous approximation of market inflation expectations, but 12-month ahead inflation expectations of can also be inferred, which is not explicitly stated in the Reuters survey, and which, moreover, may be needed in many cases (mostly in calculating real interest rates). In the current monetary policy regime of inflation targeting, the position of the path of inflation expectations relative to the target band is of particular relevance. The relationship between the target and expectations is regularly discussed in the Report.

**Shift in the estimated path of inflation expectations
between April–May 2002**



Reference

Krekó, J. and Vonnák, B. (2002) ‘Piaci inflációs előrejelzések vizsgálata’ (Analysing market inflation forecasts) MNB Background Studies, currently under publication

⁶⁵ According to our experience, the following function meets these expectations: $f(t) = e^{-a_1 t} (a_2 t^4 + a_3 t^3 + a_4 t^2 + a_5 t + a_6) + a_7$, i.e. a biquadratic polynomial function multiplied by an exponential term. The latter is needed in order for the modelled expectations to ‘flatten out’ with the increase in the horizon of the forecast, which is an assumption consonant with the intuition. The co-efficients a_1, \dots, a_7 are estimated, and t is the time variable (expressed in months). As there is one more parameter than observations, it is required that the imposed curve should be as smooth as possible, which is achieved by minimising the squared sum of second differences, in addition to the perfect fit to actual data.