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ZSOLT KOVALSZKY

Indicators of Economic Development II.

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1 Introduction

The performance and development of the economy, and the changes therein represent highly important indicators for economic policy and macroeconomic analyses. The wealth of households, the profitability of enterprises, the situation of the budget and the economy's balance of payments position all depend strongly on the volume of income generated in the economy. In addition, economic performance also impacts inflation developments. Accordingly, the evaluation of real economy processes – the generation, distribution and use of income – plays a central role in all macroeconomic analyses and forecasts.

In this paper, we present the real economy indicators that can be used in macroeconomic analysis, following the logic of the system of national accounts. In addition to the content of these, we also touch upon the methodology of their production, as well as the possibilities for their use.

2 Expenditure side indicators

The GDP expenditure side approach has special importance in the analytical and forecasting work. On the one hand, in the medium run, fluctuations on the demand side are determinants in the development of economic activity. On the other hand, the GDP expenditure side items are relevant for certain analytical purposes (e.g. export and import for external trade analysis).

On the expenditure side, the **gross domestic product is defined as the sum of the expenses spent by resident units on the final use of products and services**, plus the value of product and services exports, reduced by the value of product and services imports. The weight of certain expenditure side items within the gross domestic product is as follows.

ESA code	Expenditure items	HUF million	Distribution in %
Table 1 **Expenditure side of GDP** *(at current prices, 2015)*			
P.31	Household final consumption expenditure	16,205,207	47.7
P.31	Social benefits in kind granted by the general government	3,442,010	10.1
P.31	Social benefits in kind granted by non-profit institutions serving households	569,827	1.7
P.32	Public consumption	3,369,699	9.9
P.51	Gross fixed capital formation	7,366,895	21.7
P.52	Changes in inventories	15,896	0.0
P.6	Exports	30,846,183	90.7
P.7	Imports	27,816,705	81.8
B.11	Export (+) and import (-) surplus	3,029,478	8.9
B.1g	Total gross domestic product	33,999,013	100.0
Source: HCSO			

The HCSO estimate of expenditure side items is based on a wide range of data sources (e.g. consumption expenditure survey, commercial surveys, and administrative data sources). However, the quarterly data are available only on the 65th day after the period under review, and thus a variety of indicators may be used both for nowcasting and short-term forecasting (1-2 quarters ahead)

of the given expenditure item. In the following, we present the statistical definition of the individual expenditure items and the indicators used for the forecast.

2.1 Household final consumption expenditure

2.1.1 Academic approach of consumption

Upon modelling the consumption expenditure of households, the very first step is to define the purpose of the modelling. **The development of the model describing households' consumption and saving decisions and that of the model suitable for forecast require different structures.** The expected accuracy of the forecast is strongly influenced by the volume of information usable for the estimation available at the given time. Accordingly, the analyses apply variables in the model that can serve as a good approximation of variables which are only available with a substantial lag, and also contain information on unmeasured processes. The liquidity constraints and uncertainties of households cannot be measured directly, but in our opinion they can be estimated pretty well using "unnatural" time series. These variables help forecast the consumption expenditures of Hungarian households. Stemming from the role of the forecast models, the various specifications can be assessed based on their forecast accuracy and stability.

When specifying the consumption functions, we can set out from the general academic framework, but it should also be borne in mind that both international and domestic empirical studies show that **it is not possible to provide a perfect explanation for consumption with the lifecycle/permanent income hypothesis.** This is due to the fact that some consumers face liquidity constraints, they are unable to smooth their consumption, they are risk averse, their future income can be forecast only with uncertainties, and thus their consumption and saving decisions are also influenced by precautionary motives. Due to these reasons, the consumption functions may also incorporate variables that are related to consumer confidence, perception of risk and future labour market situation. The consumer confidence index, which primarily contains information on the uncertainty of households' future income (permanent income), has relatively high explanatory power in each equation.

One cardinal question in studies dealing with household consumption is how to define the specification of the consumption function. If the task is to provide a forecast, due to the data constraints and the fact that it is not possible to give an estimate for certain parameters in the knowledge of macro data, we must realise that it is not optimal either to insist excessively on the academic framework or to reproduce the data purely in the statistical sense. **Thus, it is necessary to achieve a balance between the theory of consumption functions and their practical estimation; Muellbauer and Lattimore (1995) provide a good guidance for this.** Thus, based on the foregoing, our objective is to define a consumption function that does not break away from the theory, but at the same time also satisfies the requirements of a short-horizon forecast, i.e. is a good match for the actual data.

The literature dealing with household consumption builds on Modigliani's and Brumberg's (1954) **life cycle hypothesis** (LCH), **and** on Friedman's (1957) **permanent income hypothesis** (PIH). **According to these, households align their consumption with their full life cycle income or permanent income, rather than with their current income.** Accordingly, households are willing to borrow, if their current income is lower than their permanent or life cycle income, while in the opposite case they have a propensity to save. They repay the debt arising from the consumption that exceeds their income in a later period from their higher income. A standard attribute of the studies fitting in this framework is the **consumption-related Euler equation, where households try to maximise the utility arising in their full life cycle under their given budget constraint.** The theory uses a number of strict constraints, both with regard to the specification and the parameter values. However, the empirical analyses do not corroborate the perfect applicability of the LCH/PIH hypothesis. **According to the LCH/PIH hypothesis, consumption is aligned with the permanent income rather than with the current income, which explains the deviation from the current income.** In his model, Hall (1978) demonstrated that the consumption of households that follow inter-temporal optimisation, subject to certain conditions, performs random motion. However, a number of papers prove the excessive sensitivity of consumption to income, thereby precluding the practical applicability of the aforementioned academic framework. Despite the fact that Hall (1978)

ruled out the significance of the role of historic variables, Davidson and Hendry (1981), as well as Daly and Hadjimatheou (1981) showed significant explanatory power for income, the lagged values of consumption and the liquidity indicators. In the case of the Australian consumption data, Johnson (1983) demonstrated the significance of the unemployment rate. In addition, it is an exaggerated assumption to expect all households to have reasonable expectations. In his simulations, Cochrane (1989) revealed low welfare loss between the consumers behaving almost reasonably and those performing inter-temporal optimisation in possession of a full set of information. The inability to corroborate this academic framework with experience is attributable to its overly strict assumptions. Hall makes no allowance for the existence of consumers with liquidity constraints and the slowly adjustment of consumer habits; he only counts on households behaving almost reasonably, which substantially changes the structure of the model.

Deaton (1987) highlights another paradox between consumption and income. If the consumption of households indeed conformed to permanent income, the degree of consumption shocks would equal the degree of the shocks suffered by permanent income. **In fact, the volatility of consumption is lower than the volatility of income (excessive smoothness of consumption).** In analysing households' consumption decisions, we should not ignore that households are willing to depart from their form consumption pattern only to a limited degree. Due to consumption habit formation, households smooth their consumption, as a result of which consumption shows smaller variance compared to incomes. For the empirical proof of the role of historic data, see Davidson and Hendry (1981).

The standard lifecycle – permanent income hypothesis does not describe consumption correctly when there are consumers with liquidity constraints and precautionary savings motives. In such a case, **it makes sense to also include in the consumption functions variables that refer to consumers' general perception of uncertainty and the existence of future liquidity constraints**. However, the volume of aggregate data that can be found for the latter is rather limited. It would be possible to draw conclusions with regard to this type of information from micro surveys, but usually these are available only with a lag and they often cannot be directly integrated into the macroeconomic

forecasting system. **Thus, we also integrate into the consumption functions indicators which describe the situation of the consumers and may behave as good proxy variables.** Of these variables the most important one is the consumer confidence index and the index calculated from the details of this, which – according to our estimates – give a better explanation of consumption. The consumer confidence indices usually have additional explanatory power compared to the other macro variables. This may be attributable to the fact that the confidence indices may be connected with the subjective perception of the uncertainty of future income. The applicability of the consumer confidence index is tested and accepted by Christopher, Carroll, Fuhrer and Wilcox (1994), Acemoglu and Scott (1994), as well as by Bram and Ludvigson (1998) based on US consumption data, by Parigi and Schlitzer (1997), as well as by Carnazza and Parigi (2001) based on Italian consumption data and by Loundes, Scutella (2000) based on Australian consumption data. Chrystal and Mizen (2001) also use the confidence index calculated from the surveys performed among households in their consumption model. The survey of the Hungarian consumer confidence index was performed by Vadas (2001).

2.2 Indicators of households' consumption expenditures

Households' final consumption expenditure has the **highest weight among the GDP items** and, in addition to consumption expenditure, it also contains **social benefits in kind received by households.** Since the social transfers in kind are determined by the budget, in analysing household consumption we focus on households' consumption expenditure, which is directly influenced by households' decisions.

Households' consumption expenditure is the sum of **purchased consumption** (products and services), **self-produced consumption** (agricultural production and housing services provided by owners), and **wages in kind** (products and services provided by the employer to the employee free of charge or at a reduced price). Since the data sources used for the reckoning of consumption measure the consumption of participants observed in the domestic economy rather than that of residents, the HCSO adjusts this sum by the difference of the purchases made by residents abroad and the purchases made by non-residents in Hungary.

In calculating the quarterly consumption data, which are published mid-year, less information is available than during the compilation of the annual national accounts. **During the quarterly estimation, the two main sources of data** are the quarterly, preliminary data of the **Household Budget Survey (hereinafter: HBS) and of the retail sales volume**.[1] The sub-items of purchased and self-produced consumption can be determined based on these statistics, while in the case of wages in kind HCSO assumes that it has changed during the given quarter at the same rate as purchased consumption.

A wider range of data sources is available for compiling the annual national accounts. In addition to the data of the HBS and the retail sales volume, a number of other statistical surveys and administrative data sources are used (see Table 2).

Table 2
Sub-items of households' consumption expenditure

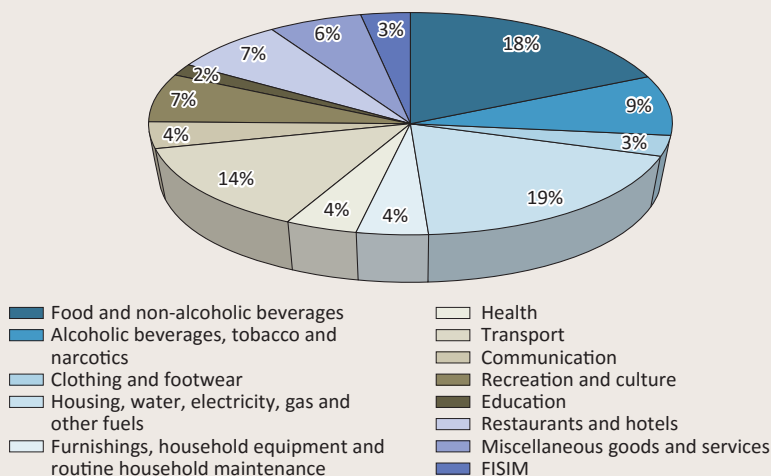|	Purchased consumption	Self-produced consumption		Wages in kind	Adjustment
		Agricultural production	Imputed rent and own housing service		
Sources of data	HBS, retail data, supplementary data sources	Agricultural statistics	Stock of dwellings expert statistics, HBS	Corporate tax return of enterprises, reports of general government organisations (aggregate data)	Survey of tourism demand
Data	Products and services by (COICOP1 categories)	Volume and procurement price data by agricultural products	Calculation of imputed rent with the user cost method	Products and services provided by the employers to the employees free of charge or at reduced price	Adjustment for the balance of the purchases made by residents abroad and by non-residents in Hungary

* In the case of products and services categorised as purchased consumption, e.g. communal statistics (electricity, natural and manufactured gas, district heating, etc.), supplementary data sources include the data of transportation statistics, postal services and telecommunication data, cultural statistics, tourism statistics, insurers' and banks' data.
Source: HCSO

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[1] The monthly retail sales volume data are only available by shop types; the quarterly statistics prepared on the basis of a product group breakdown provide a more accurate picture of consumption expenditure by product group.

The consumption of households is shared roughly equally between products and services (Chart 1). Information on product consumption is available monthly through the retail sales volume data supply. In the case of services, the availability of more frequent full statistics is limited, and thus only the statistics of the individual sub-segments can be used (e.g. tourism data, healthcare provision data), part of which is available only with a frequency longer than one month.

Chart 1
Structure of households' consumption expenditure based on the COICOP product groups
(2014)

Legend:
- Food and non-alcoholic beverages
- Alcoholic beverages, tobacco and narcotics
- Clothing and footwear
- Housing, water, electricity, gas and other fuels
- Furnishings, household equipment and routine household maintenance
- Health
- Transport
- Communication
- Recreation and culture
- Education
- Restaurants and hotels
- Miscellaneous goods and services
- FISIM

FISIM: Financial Intermediation Services Indirectly Measured
Source: HCSO.

We briefly present below the indicators that can be used for the analysis of household consumption.

2.2.1 Retail sales volume

The retail sales volume statistics published monthly by the HCSO is broken down by activity groups, and thus the full sales turnover appears in the product group corresponding to the given shop's core activity. In our analyses, we use this statistic due to its monthly frequency. However, the statistics based on the retail sales volume reported in a product group breakdown (COICOP), which are prepared on a quarterly basis, provide a more accurate picture of turnover in individual goods, and thus the HCSO also uses these latter data for the calculation of consumption according to the national account.

It should be noted, however, that the content of the data of both retail trade statistics, i.e. the monthly statistic broken down by activity groups and the quarterly statistic broken down by product groups, differs from the actual consumption expenditures stated in the national accounts. Actual household consumption contains resident households' purchases of domestic or foreign products and services. By contrast, the retail sales volume contains only part[2] of the products purchased in the territory of the country, irrespective of whether it was purchased by residents or non-residents. On the other hand, the retail sales volume also contains purchases made for business purposes.

The time series of retail sales volume, which also contains vehicle and spare part sales (**total retail sales volume)**, can be used for analytical purposes. The HCSO publishes only the raw index of this rather than the seasonally adjusted data. Strong co-movement can be observed between the adjusted total retail sales volume and consumption expenditure, and thus it can be regarded as a good indicator of consumption expenditures (Chart 2).

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[2] For example, the range of household energy products is wider in the national accounts than in the retail trade statistics.

Chart 2
Retail sales volume and households' consumption expenditure

Quarterly change (per cent)   Quarterly change (per cent)

—— Retail sales
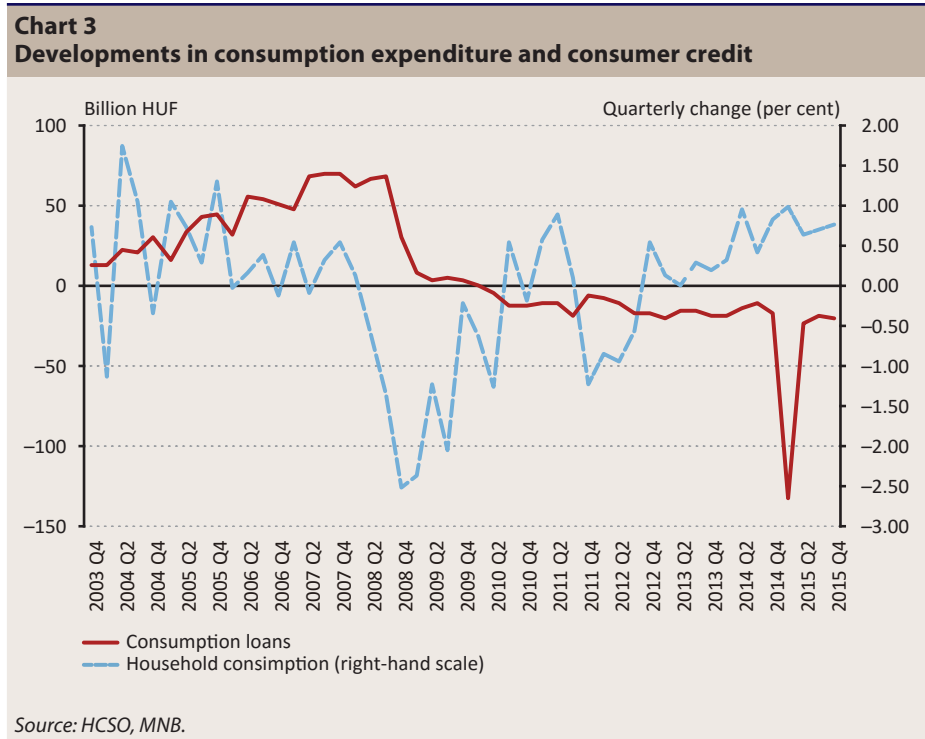----- Households consumption

Source: HCSO.
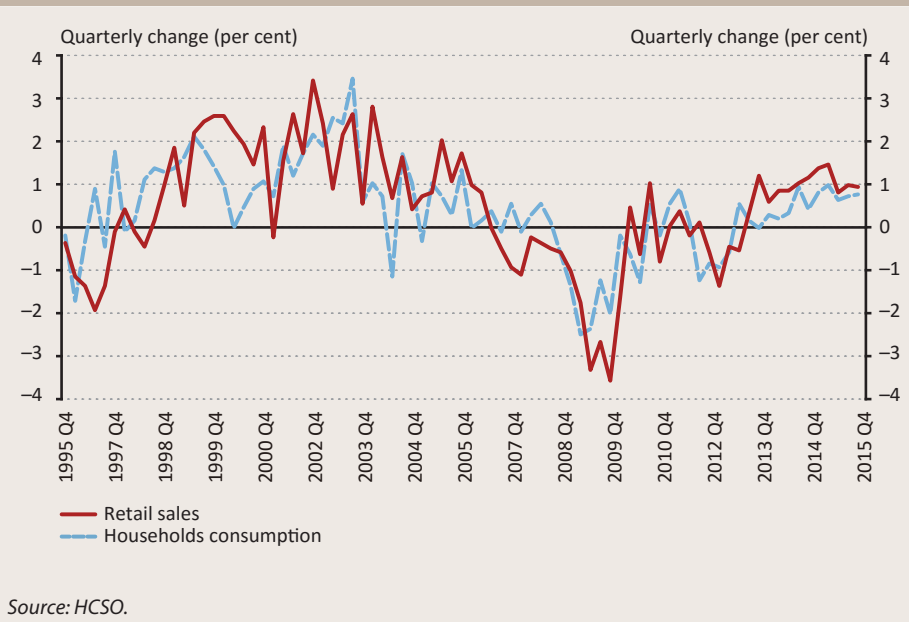
2.2.2 Consumer loans

The MNB publishes the changes in household financial savings monthly, based on the banking sector's data, while these time series are available in the financial accounts quarterly, considering the data provided by other monetary financial institutions in addition to those provided by banks. The two largest items of loans to households are consumer credits and housing loans. Consumer credits (e.g. hire purchase loans, car purchase loans, personal loans) are direct determinants in terms of consumption expenditure; however, housing loans also play an indirect role, e.g. in the case of indebtedness, by limiting disposable income.

Changes in aggregate consumption expenditure are primarily determined by **net new borrowing**, as the difference between new loans and loan repayments. However, in addition to this, it also makes sense to monitor changes in **gross borrowing**, as this reflects the strengthening/weakening of credit activity.

When looking at the developments in net new borrowing of consumer credits, it is clear that although in theory growth in net new borrowing should mean extra consumption, in fact there is no co-movement between the time series apart from the pre-crisis indebtedness and the period of strong deleveraging during the crisis (Chart 3).

Chart 3
Developments in consumption expenditure and consumer credit

Billion HUF   Quarterly change (per cent)

- Consumption loans
- Household consimption (right-hand scale)

Source: HCSO, MNB.

It should be noted that the changes in loans in the financial accounts only contain the principal repayments. The **interest paid on loans** is recognised as FISIM (Financial Intermediation Services Indirectly Measured) allocated to households, as consumers; i.e. it forms part of **consumption expenditure**. This item accounts for roughly 3 per cent of the consumption expenditure stated in the national accounts (Chart 1).
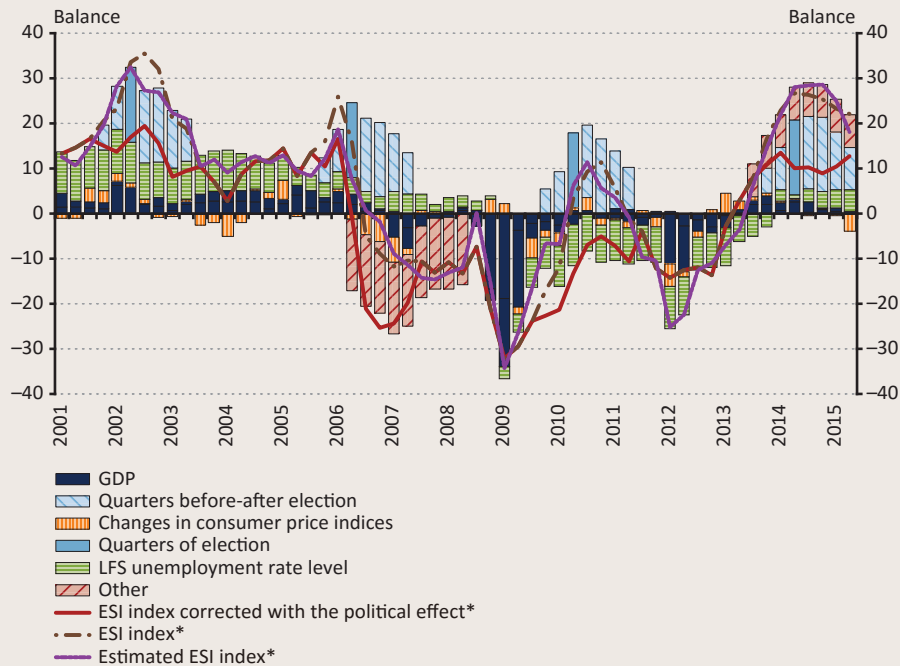
2.2.3 Consumer confidence index

The consumer confidence survey performed by GKI Economic Research Co. has been available since 1993. The enquiry is performed on the basis of the methodology harmonised at the EU level and comprises 12 and 3 questions asked monthly and quarterly, respectively; however, the latter ones are available only for a shorter time series. At present, the survey is based on a telephone interview of 1,000 persons.

Of the monthly questions, five relate to micro-level decisions or expectations (i.e. households' individual consumption and savings decisions), while seven concern some sort of macroeconomic process (e.g. the country's economic situation, inflation, unemployment, is it worth saving or buying consumer durables). Six questions are retrospective or related to the present situation, while six questions deal with the 12 months that follow the enquiry. The quarterly questions are related to micro-level decisions (purchasing or building property, housing-related expenditures, car purchase) and they are forward-looking.

Since one of the objectives of the confidence indices is to survey households' expectations, they may serve as forward-looking indicators in the forecast of consumption. In addition, another positive feature of the indicator is the short publication lag. On the other hand, the Hungarian index reflected the impact of political cycles to a higher degree than the indicators of other countries (Bodnár, 2014). The confidence index usually starts to improve one year before the elections, and from the 2nd quarter before the elections until the 4th quarter thereafter it is above the average level (Chart 4). In these periods, the confidence index usually breaks away from the value that would be justified by real economy indicators. Accordingly, the confidence index should be used for the analysis and forecast of consumption considering the aforementioned factors.

Chart 4
Factors determining developments in the consumer confidence index

Balance / Balance

■	GDP
▨	Quarters before-after election
▥	Changes in consumer price indices
▨	Quarters of election
▤	LFS unemployment rate level
▨	Other
—	ESI index corrected with the political effect*
–·–	ESI index*
—	Estimated ESI index*

*Note: * denotes the deviation of the ESI index from the long-term average.*
Source: HCSO, ESI.

2.3 Fixed capital formation

Fixed capital formation (investment) makes **a major contribution to short-term developments in GDP**, as an item of aggregate demand with significant weight and high volatility. In addition, on the supply side of the economy it serves as one of the bases of longer-term growth, as the **capital stock expands and regenerates through the investments**.

The sectoral breakdown (corporate, public, households) of gross fixed capital formation is available only in the annual national accounts; in the quarterly data release no direct information is available on the sectoral breakdown of the investments. On the other hand, **the time series of the investment expert statistics**, broken down by TEÁOR (Standard Classification

of All Economic Activities) sectors, **is available quarterly**. In terms of its contents, the expert statistics are narrower than fixed capital formation (the latter also contains intangible assets and non-produced financial assets), and thus the level of the two time series is not identical, but their dynamics develop similarly (Chart 5).

Chart 5
Annual change in fixed capital formation and whole-economy fixed investment
(1996 Q1 – 2015 Q4)

Source: HCSO.
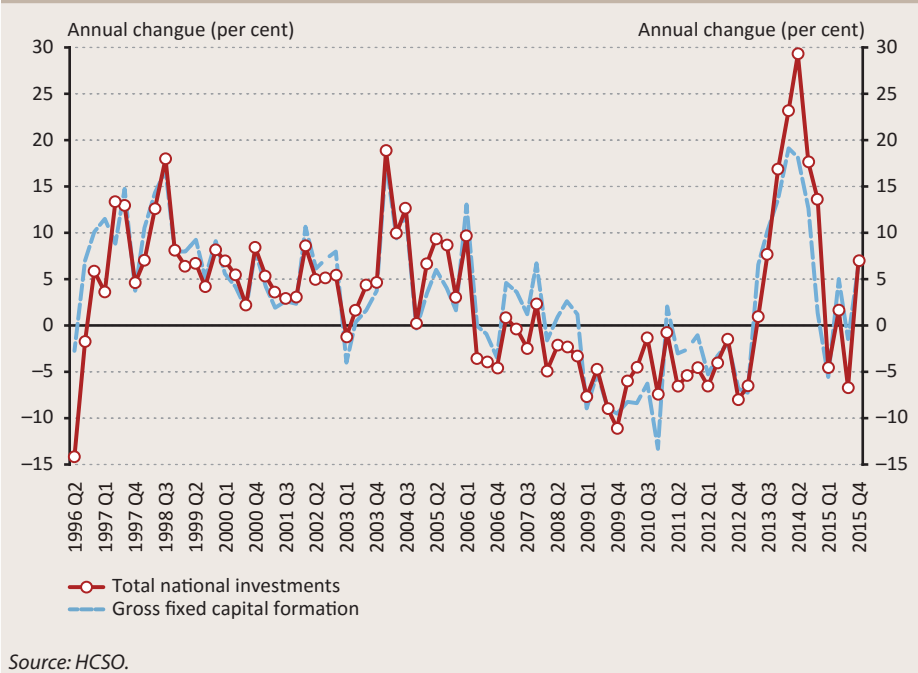
2.3.1 Investment expert statistics

The time series of the investment expert statistics, which we use for analytical purposes, is of quarterly frequency and is published at the end of the second month following the reporting period. The enquiry is complete only in the case of enterprises with more than 50 employees; below that threshold a representative sampling is used, and for the smallest companies it is prepared based on estimates. An annual enquiry is also prepared from the statistics, the advantage of which is that it is comprehensive.

The investment expert statistics contain the procurement of new tangible assets, the production or replacement thereof within own business, as well as the expansion, transformation, reconstruction and renovation of existing tangible assets. Accordingly, the dismantling, sales and transfer of tangible assets are not included in the expert statistics. In addition, the expert statistics also do not contain the acquisition value of leased tangible assets. Its most important advantage is that the statistics are published in a first-level (denoted by letter) and second-level (two-digit) TEÁOR sectoral breakdown, which permits a disaggregated analysis of investment developments. In addition, the data release also includes a breakdown by material and technical (building and machinery) and legal form.

The basis of gross fixed capital formation, included in the national accounts, is the investment expert statistics; however, it includes not only the acquisition of tangible assets, but also the sales and transfer thereof, and in addition to tangible assets other items also appear in it. These other items are intangible assets (e.g. exploration of minerals, computer software, originals of works of arts) and non-produced non-financial assets (typically soil improvement). Fixed capital formation is published as part of the detailed GDP data at the beginning of the third month after the reporting period.
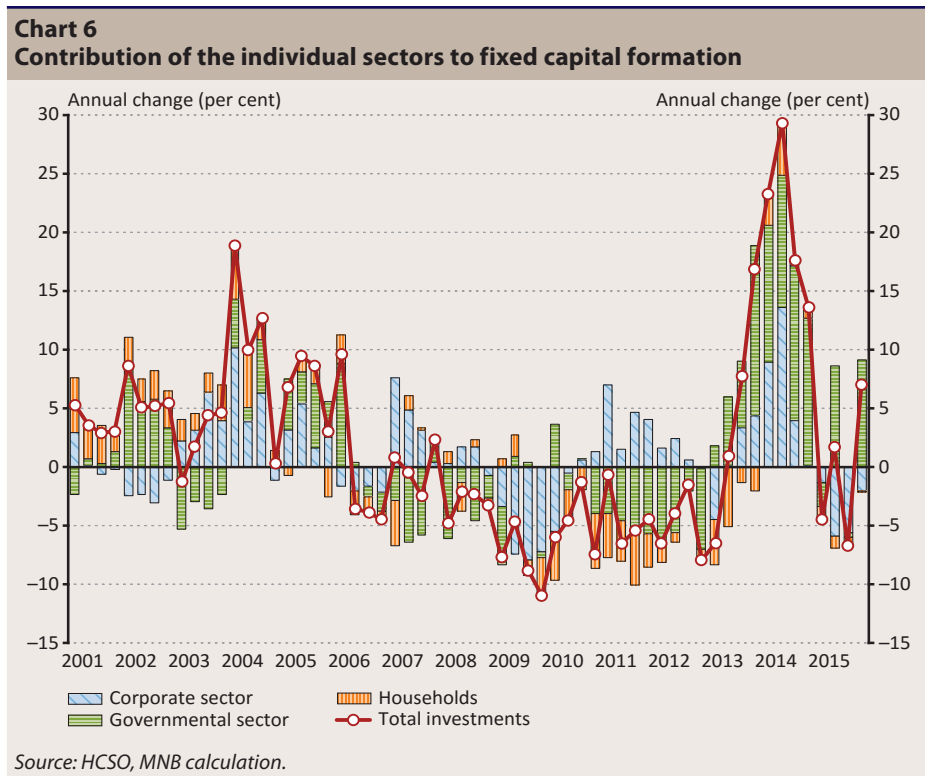
On the whole, the investment expert statistics and gross fixed capital formation are published almost simultaneously (with only a few days' difference) and with the same frequency. The content of the investment expert statistics is narrower (tangible assets only), but it has the advantage that it is available at a disaggregated level, which gives clues as to the sectoral breakdown of fixed capital formation, which is available in the national accounts only with a long delay.

Of the sectors, quarterly time series are prepared only for the general government statistics. Corporate and household data are available only annually and as part of the integrated accounts, i.e. at the end of the third quarter after the reporting year. During the nowcasting of corporate and household investments, we can set out from the breakdown of the expert statistics by sector. The annual national accounts contain industry-sectoral cross tables in respect of gross fixed capital formation, which are published

by the HCSO also with a substantial delay; however, they can provide a picture of the distribution of individual industries' investments between the sectors.

In addition, based on the behaviour of the actors of the individual industries, we also create our own groups from the data of the expert statistics (Chart 6). The factors driving investments in the short run become clearer through this breakdown:

• primarily the producing industries, determined by external demand ("external traders": manufacturing sector, agriculture, mining),
• primarily the group of market service provider companies mostly influenced by domestic demand ("domestic traders": construction, trade, financial services, catering),
• the group determined directly mostly by public activity ("narrow state": public administration, education and healthcare),

Chart 6
Contribution of the individual sectors to fixed capital formation

Source: HCSO, MNB calculation.

- the group performing quasi-fiscal activity, where state-owned companies have a high weight ("quasi fiscal": energy, transportation and other services),
- property transactions and economic services exhibiting the strongest relation to household investments ("households").
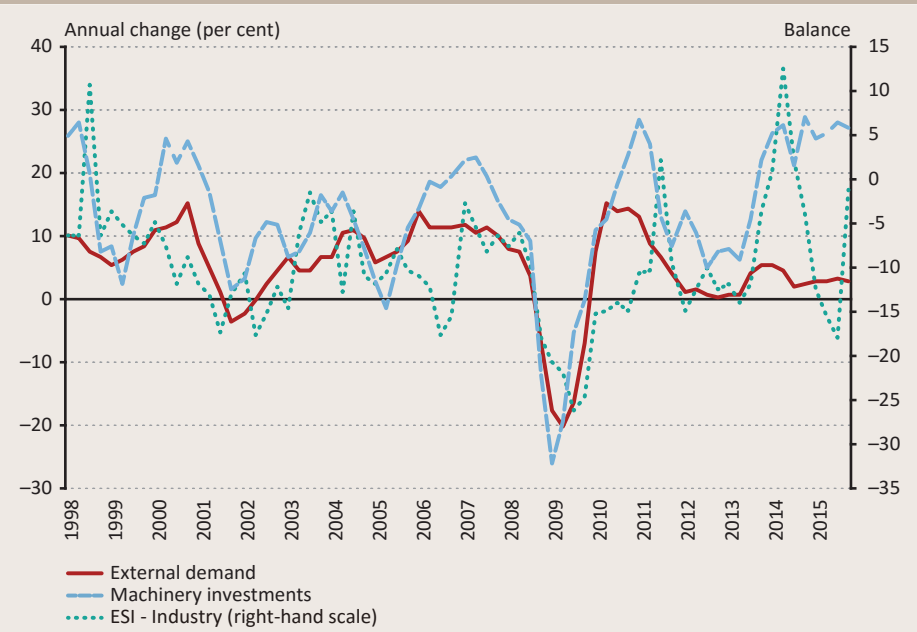
2.3.2 Sectoral investment indicators

We primarily allocate investments financed and implemented by enterprises to the **corporate group**, but publicly financed investments implemented by companies belonging to the private sector are also handled here. In the case of the quasi-fiscal sectors, efforts should be made to segregate whether in the statistics the given investments is stated under the corporate or the public sector. With the pick-up in EU transfers, the importance of these items has increased, since a part of the high-value infrastructural investments financed by the European Union was implemented by private companies (e.g. sewage treatment and water purification projects). One clue for the segregation of quasi-fiscal investments may be found in the data published in the Budget Act.

Several indicators can be used for the analysis and forecasting of business investments. Business investments are dominated by machinery-type investments, and thus within the external trade statistics **machinery import data**[3] is a potential indicator of business investments. **External demand** is a good indicator in terms of the investments made by companies producing for export, while the **ESI industrial activity indicator** and the **capacity utilisation** indicator provide information on developments in business investments as a whole (Chart 7). In addition, the ESI investment survey is prepared twice a year, and in the spring of the year following the reporting year, which assesses enterprises' investment intentions, and thus it provides information on the volume of investments, the factors hindering investments, as well as on the structure of investments.

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[3] The data collection is performed using the combined nomenclature and the title of the product group is "machinery and transport equipment".

Chart 7
Business investment indicators

Annual change (per cent)   Balance

- External demand
- Machinery investments
- ESI - Industry (right-hand scale)

Source: HCSO, ESI, MNB calculation.

For the analysis of public investments, the investment expert statistics data of industries, which can be allocated to this category, and government finance statistics can both be used. However, in relation to the latter data source it is a problem that the public investment data measured by the government finance statistics and by the HCSO can only be mapped indirectly. The government finance statistics include the amounts paid for investment purposes, while the HCSO data only contain already completed investments. Thus, there is a difference between the two statistics in terms of time (and most probably in terms of coverage), the exact degree of which is not known.

The analysis and forecasting of public sector investments sets out from the developments in general government payments for investments. The forecast of investment payments partially relies on the expenditure estimates and partially on the historic outturns, also considering – in the case of local governments – the estimated changes in the available funds. The dynamics of the general government's investment payments appear in the investment statistics with a certain time lag.

The **household group** includes investments financed by households, which mostly relate to the property market (purchase of new housing, renovation of existing property), and the investments of sole traders. The latter primarily represents the machinery investment of sole traders engaged in agriculture, the weight of which is roughly 25 per cent within household investments. Due to the high ratio of home construction, we can use the **number of building permits issued and the number of dwellings built** as indicators for the estimation of household investments and within the expert statistics it shows good co-movement with the investment of the real property transactions sector (Chart 8).

Chart 8
Household investment indicators
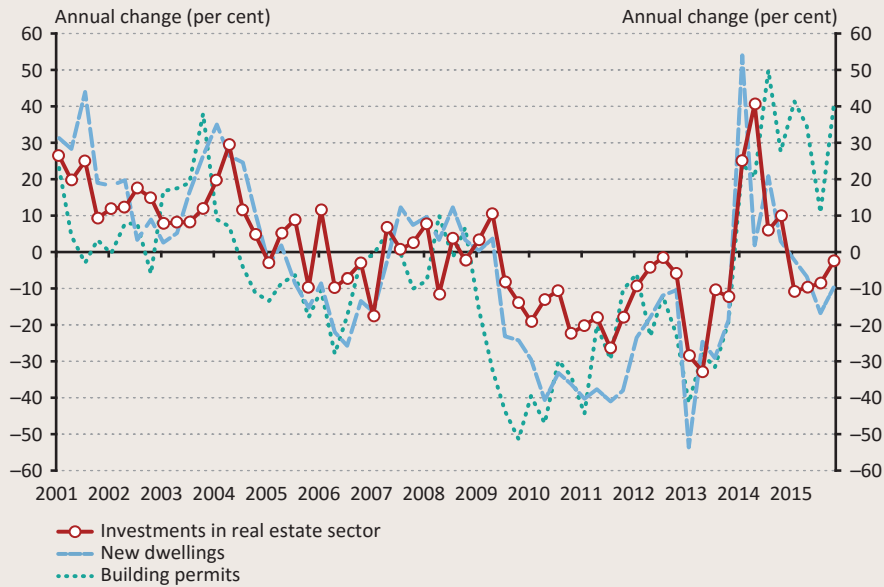
Source: HCSO.

2.4 Inventories

Inventories are produced assets, which contain the value of materials, goods and services purchased[4] (at acquisition price), as well as the value of finished products, unfinished products (slaughter animals) and work in progress – including afforestation for wood production – valued at production cost.

Developments in inventories may be important for the purpose of assessing the cyclical situation. The growth in production facilitates stockbuilding, while the curbing of production helps reduce the overly high inventory level, i.e. the low inventory level may project a pick-up in growth, while the high level thereof may signal deceleration.

The HCSO publishes two types of quarterly time series with regard to inventories: changes in inventories in line with the national accounts and the inventories statistics, which are based on the data of the mid-year integrated economic statistical questionnaire.

In the quarterly data release of the national accounts, the main data source of changes in inventories is the inventories statistics, and thus the two statistics exhibit good co-movement (Chart 9). In the case of the annual national accounts, in addition to the annual data of the inventories statistics, the HCSO also uses the industry inventory data calculated from corporate tax returns, the advantage of which is that these data pertain to a broader population than the statistical data collections.

2.4.1 Inventory expert statistics

The inventory statistics contains inventory data at current prices, broken down by sectors based on the two-digit TEÁOR (Standard Classification of All Economic Activities) codes. The data are broken down by enterprise size: in the case of enterprises with more than 50 employees the enquiry is comprehensive, while in the case of enterprises with employees between 5

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[4] In line with the Hungarian accounting practice, the acquisition of assets the value of which is lower than HUF 50,000 does not count as gross fixed capital formation; such assets appear among the items of the changes in inventories.

and 50, the HCSO collects data using a sampling procedure. Within this, self-produced inventories (finished products and work in progress) and purchased inventories (materials and products for resale) are separated. On the other hand, no statistics are available for the value change resulting from inventory revaluation, and thus deflation of the current price data can only be achieved using other price indices (e.g. producer price index).

Chart 9
Inventories stated in the national accounts and developments in own and purchased inventories included in the inventories statistics


Source: HCSO.
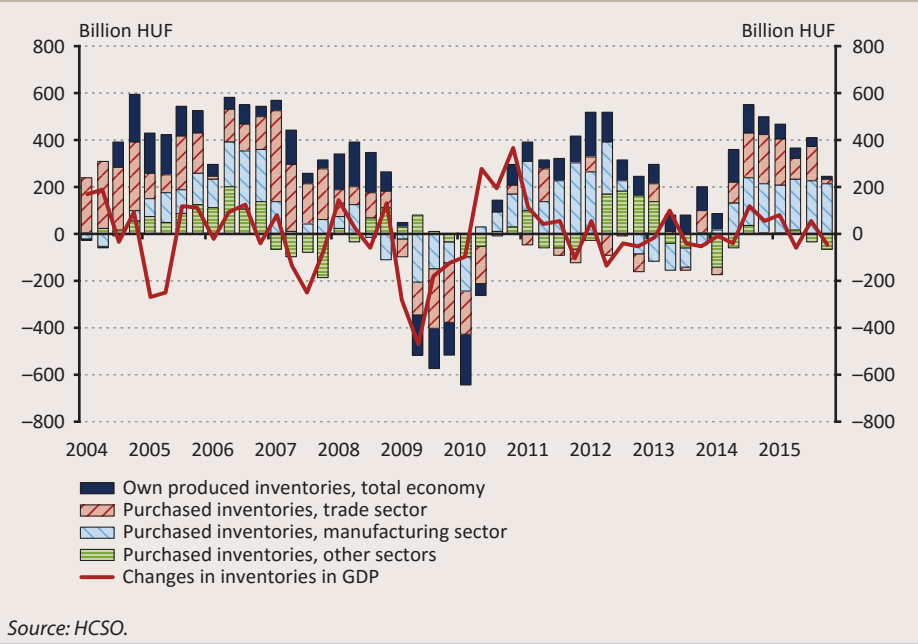
2.5 External trade, external demand

One of the areas that is widely analysed and interpreted in the economic literature is the topic of external trade relations. **In the Ricardian model**, which may be regarded as the simplest external trade model, **each party realises a profit on the trade between the countries. This model is built on the exploitation of competitive advantages.** According to this, a country exports those products to another country in the production of which it has a relative rather than an absolute advantage (it can produce them with the

highest efficiency). Even this simple model explains why it is worth trading for the developed countries with the developing countries.

The trade between countries can be described by the gravitation equation, which this name coming from physics. In this framework, the migration of the labour force, as well as commuting can be examined, in addition to trade relations. In the original formulation, which comes from Tinbergen (1962) and Pöyhönen (1963), the larger the individual countries are, the higher the trade between two countries is. The size of the economy is usually captured by the national income. On the other hand, the geographic distance between the two countries also plays a substantial role in the volume of trade between them. The farther two countries are from each other, the more expensive transportation is, the smaller the volume of trade is. The length of the common borders, as well as the cultural and linguistic similarities may also be included in the models as other variables. This theory is illustrated in Chart 10.

Chart 10
Hungary's trading partners, according to distance, development level and their weight in Hungary's exports

Source: HCSO.
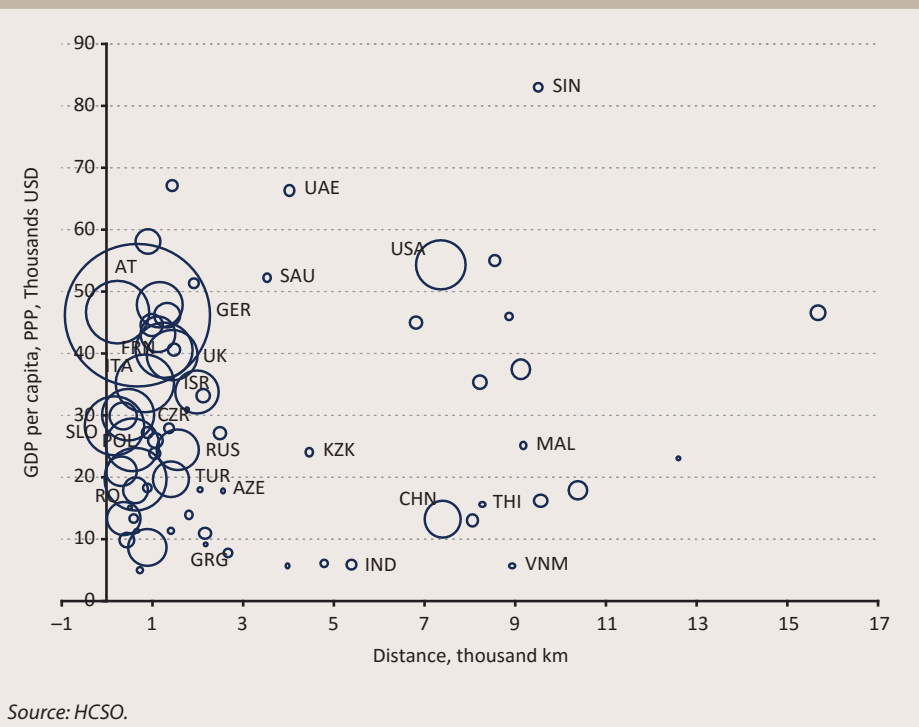
Hungary is a small, open economy, with external trade accounting for a major weight in the structure of the gross domestic product. In 2015, exports accounted for 92 per cent of GDP, while imports rose to 84 per cent of GDP. In analysing external trade data, we focus on several areas simultaneously: trade in goods accounts for roughly four-fifths of trading activity, while trade in services accounts for 20 per cent of total trade. Hungary transacts two-thirds of its exports with EU Member States, but since it is not part of the euro area, the exchange rate also plays an important role in the assessment of developments. Hungary is a major importer of energy, and thus developments in oil and gas prices are also important elements in trading activity. In order to interpret the export dynamics, it is important to assess the import demand of Hungary's trading partners and thus to analyse external demand for domestic products.

The export and import data of the national accounts measure the external trade turnover in goods and services, on an accruals basis (Chart 11). The external trade process can also be analysed with monthly frequency. The external trade expert statistics provide detailed information on trade in goods, while the MNB's monthly balance of payments data release (flash estimate) provides information on the external trade of services.

Chart 11
Generation of trade data consistent with the national accounts
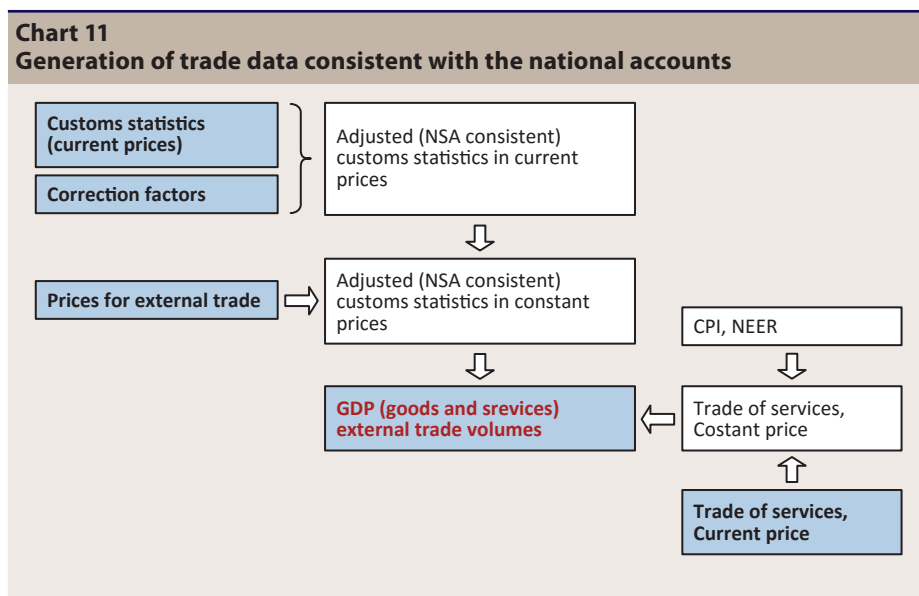
External trade expert statistics

Detailed data sources are available for the assessment of external trade data; in Hungary these data are collected by the Hungarian Central Statistical Office (HCSO).[5] Compilation of the external trade statistics in international practice takes place in accordance with the UN recommendations, international treaties (Kyoto Agreement, General Agreement on Tariffs and Trade, Customs Valuation Agreement) and the EU laws, which determine – among others – the range of products to be monitored, the valuation principles and the type of transactions to be recognised.

The customs statistics data, which monitor the trade in goods activity, are available monthly. Before accession to the European Union, i.e. prior to 1 May 2004, **Hungarian external trade product turnover statistics were based on the data originating from customs documents.** Since then the **movements of products between foreign and domestic traders, physically crossing the borders, are measured within the framework** of two sub-systems, i.e. **Extrastat and Intrastat.** The measurement of product turnover outside the EU (Extrastat) and the processing of uniform customs documents is performed by the Hungarian Tax Authority (NAV), which then transfers the data to the HCSO. In the case of trade within the EU (Intrastat), the HCSO performs questionnaire-based survey within its own competence, among the businesses transacting at least HUF 100 million at current value. Due to the high concentration of trading activity, although the HCSO obliges only roughly 10 per cent of the businesses to supply data, it directly observes 95 per cent of the product turnover.

In the case of **external trade prices**, until 2003 the HCSO performed unit value index calculation based on the turnover statistics. After accession to the EU, it changed over – as part of the methodological harmonisation – to the calculation of price index based on the observation of actual market prices. This practice permits the calculation of price indices that express the real price change, eliminating not only the impact of the change in the product

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[5] Until 30 April 2002, the Ministry for Economics and the HCSO were jointly responsible for the customs statistics data.

and country composition, but also that of the change in services related to the product.

The external trade turnover data are available in various dimensions, due to the level of detail included in the external trade statistics. In our analyses, we can break down the trade data recognised in different currencies (HUF, EUR, USD) by partner country, and a variety of classifications are also available for the breakdown of the turnover statistics at the product level.
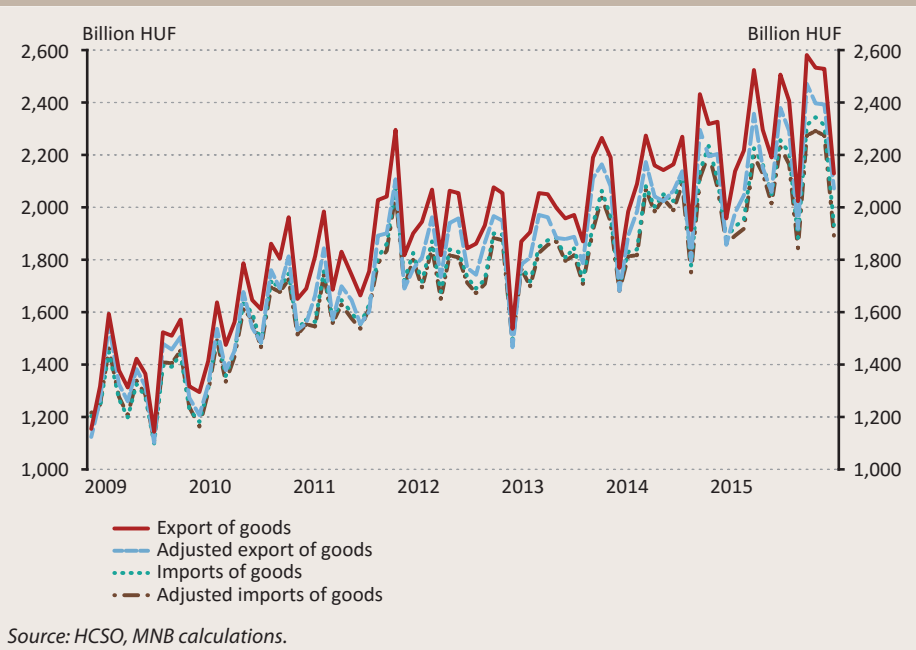
• The **SITC** (Standard International Trade Classification) nomenclature applies product categories suitable for economic analyses, which we also use for our economic activity analysis. The nomenclature organises the products based on their level of processing, possibility to use and significance on the world market; at present the effective nomenclature is the SITC Revision 4.

• The **BEC** (Broad Economic Categories) classification is an approach harmonised with the SITC categories, which groups the products released to international trade by the way of their use. Based on these, exports and imports can be broken down into investment, capital formation and production categories.

The HCSO publishes monthly turnover data in HUF, EUR and USD according to the SITC classification, in double-digit depth. The price indices are available in a depth of one digit. It is practical to **adjust** the monthly turnover data **with the activity of the VAT residents**.[6] VAT residents are enterprises registered in Hungary due to taxation considerations, but which perform no income generating activity in the country. These enterprises are characterised by high trade flows. The adjustment primarily reduces the level of exports and has much smaller impact on the import data (Chart 12).

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[6] The MNB and HCSO perform adjustments to the trade flow data in the balance of payments and national accounts since September 2008, to ensure that the value added recognised through VAT registrations performed by non-resident enterprises in Hungary and by resident enterprises abroad cause no statistical error.

Chart 12
VAT resident adjustment in the case of monthly external trade turnover data

Billion HUF   Billion HUF

—— Export of goods
—— Adjusted export of goods
····· Imports of goods
·—· Adjusted imports of goods

Source: HCSO, MNB calculations.

2.5.1 Services external trade data

Information on services trade is provided in part by the HCSO's own surveys and in part by the balance of payments. The HCSO introduced the survey related to business services and tourism data starting from 2004, and in 2005 it supplemented this with survey related to transportation, financial, insurance and government services. These data are available quarterly, after publishing the detailed GDP data.

2.5.2 Balance of payments data

The trade data included in the **balance of payments statistics** published by the MNB differ, in conceptual terms, from the customs statistics data collection. Through the transactions of resident financial and non-financial enterprises, the balance of payments quantifies the external trade processes on a cash basis, thereby presenting not only the goods trade, but also the services trade.

The monthly current-price services trade data are estimated by the MNB within the framework of the balance of payments statistics, using the transaction

data of resident economic agents. Since the monthly turnover data are used for the compilation of the balance of payments, the estimate for the monthly trade in services is available later.

The balance of payments contains a quarterly breakdown of the external trade of services, which corresponds to the HCSO's services external trade data release.

2.5.3 External demand

One of the most important independent variables of the change in exports is the demand of our export markets (external demand). In addition, the export market share is an important indicator for the assessment of export performance, which shows exports as a proportion of import demand in Hungary's export markets (Chart 13).

Chart 13
Changes in Hungary's export market share

Source: HCSO, MNB calculations.
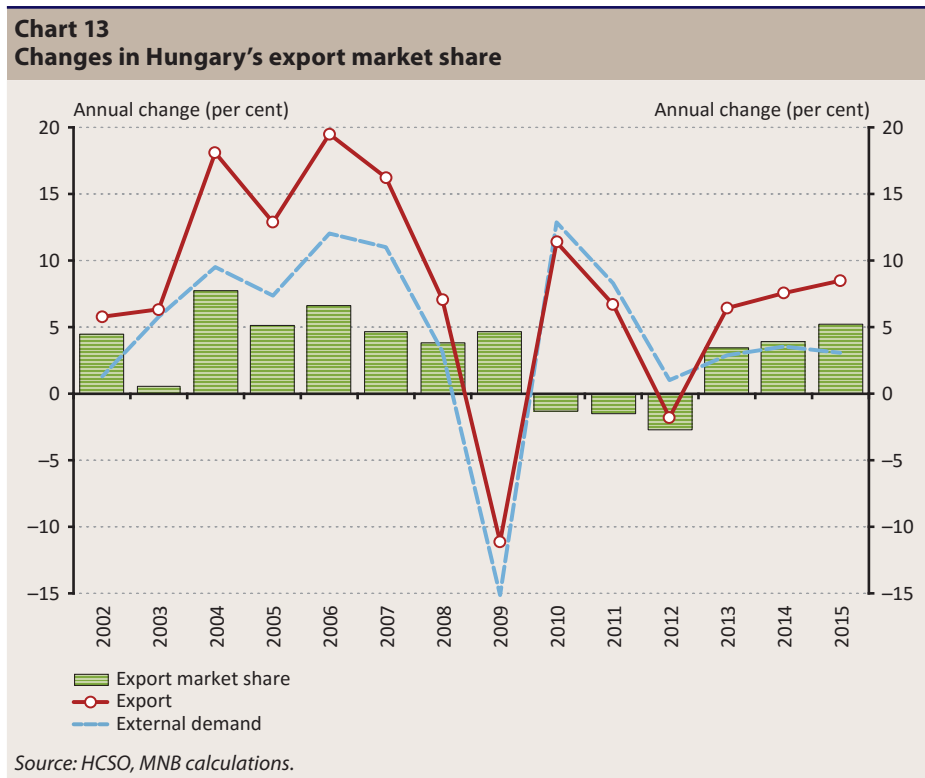
External demand can be measured by the import demand of the entire world. Current price data related to this are provided annually by UNCTAD and WTO,

both for goods and services trade. More frequent analysis is possible only with the use of approximating indicators.

• The Dutch CPB institution publishes the goods import volume of the world's countries monthly, after seasonal adjustment. In addition to the aggregated data, the index is also available for the main groups of countries.[7]

• For its own analytical purposes, on a quarterly basis the MNB calculates the goods and services import volume of Hungary's main export markets (import-based external demand), as well as GDP growth in Hungary's export markets (GDP-based external demand).

In the MNB's indicator, we use as a weight the ratio of the 28 most important trading partners (on average having at least 1 per cent share in Hungarian exports) calculated from goods export (normalising the sum of these to 100 per cent). The weights change over time to ensure that they adequately follow changes in export structure; on the other hand, the moving averaging ensures that temporary fluctuations in the composition of exports do not cause significant change in the weights (Table 3). We weight together the constant price GDP and import volumes of the partner countries taken from the quarterly national accounts (in the form of base year = 100), as a Fisher index.

Table 3			
Weight of certain partner countries in Hungary's external demand			
Germany	27.9	Netherlands	3.1
Romania	5.0	China	2.1
Austria	4.8	Belgium	1.8
France	4.8	Ukraine	1.5
Italy	4.7	Russia	1.5
Slovak Republic	4.7	Croatia	1.5
Czech Republic	4.1	Serbia	1.4
Poland	4.1	Sweden	1.2
Great Britain	3.8	Slovenia	1.0
United States	3.4	Switzerland	0.9
Spain	3.2	Japan	0.8
Source: HCSO export statistics, 2013.			

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[7] The range of countries relevant in terms of external demand includes those countries, where at least 1 per cent of Hungarian exports is directed to. Based on the 2013 data, this covered 85 per cent of the total export weight, which we re-weighted to 100 per cent upon calculating the external demand.

About 70 per cent of Hungarian exports are directed to the EU Member States. Hungary's most important trading partner is Germany, the destination for more than one-quarter of Hungarian exports (Table 3). The high concentration of external trade means that developments in exports and imports primarily depend on euro-area business activity, and particularly on the performance of the German economy. However, it should be emphasised that Hungarian exports are not solely for final use; Hungary also acts as a major supplier for German industry. The production practice of the present multinational corporations creates global product chains across countries, which Hungarian exports also connect into. Thus the range of end-user countries differs from the original export structure, and therefore it makes sense to take into consideration indirect exports as well, in addition to direct export performance (Chart 14).

Chart 14
**Developments in Hungary's external demand by various country groups**
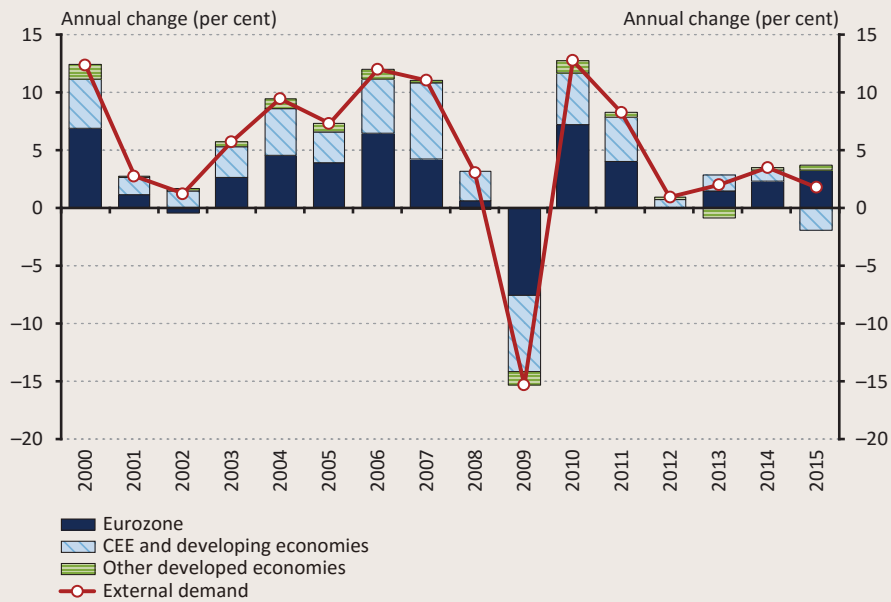
Source: HCSO, MNB calculations.

2.5.4 Exported added value

In examining the Hungarian export structure, it should be noted that Hungarian exports are not made 100 per cent for final use; Hungarian companies connect to the industry of the EU and in particular of Germany as suppliers through the international production chains. The products exported through the supplier relations are re-exported after further processing, and thus the direct and indirect structure of Hungarian exports differ (Chart 15).

The World Input Output Database, developed with the cooperation of several international organisations and the OECD's Trade in Value Added (TiVA) database facilitates the analysis of indirect trade relations. Based on this, it is clear that since 2000 the structure of Hungarian exports has been gradually changing. The ratio of developing countries is gradually increasing in the case of direct export, while the indirect export structure, surveying the supplier relations, shows somewhat even higher deviation towards the developing countries.

Chart 15
Changes in the geographic structure of Hungarian exports

Source: HCSO.
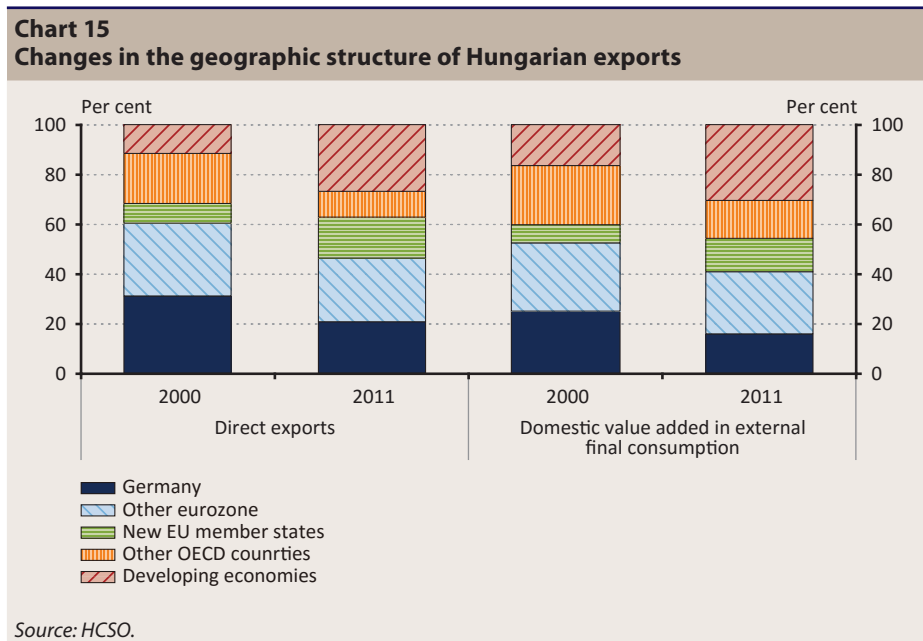
2.5.5 Real exchange rate indicators

In addition to external demand, the real exchange rate is another important independent variable of export. The real exchange rate shows the ratio of the foreign and domestic price level of a product basket, expressed in common currency. The real exchange rate may be bilateral (calculated in respect of a specific country), but multilateral indicators (calculated in respect of a country group) are more common.

In the case of several partner countries, we talk about the **real effective exchange rate**, as each partner is included in the indicator with a weight corresponding to its actual importance. The weighting system of the country group considered as a partner shows that the domestic producers compete with the producers of which countries (i) in Hungary, (ii) in the partner countries, (iii) in third countries. The methodology of calculating the weighting system is described by Schmitz et al. (2012).

Based on the selected range of goods, the real exchange rate may be:

• consumer price-based,
• producer price-based,
• export deflator-based,
• GDP deflator-based,
• unit labour cost-based.

The MNB calculates real exchange rate indicators for its own analytical purposes. In addition, the European Commission (DG ECFIN) also creates real exchange rate indicators, which are published by Eurostat as well (Chart 16). Finally, the European Central Bank also publishes real exchange rate time series. The advantage of the indicators calculated by the international institutions is that they are produced using a standard methodology for several countries. Their disadvantage is that they may have substantial publication lag, and the components (domestic and foreign price level, nominal effective exchange rate) are not necessarily published.

Chart 16
Developments in the labour cost-based real exchange rate in the region
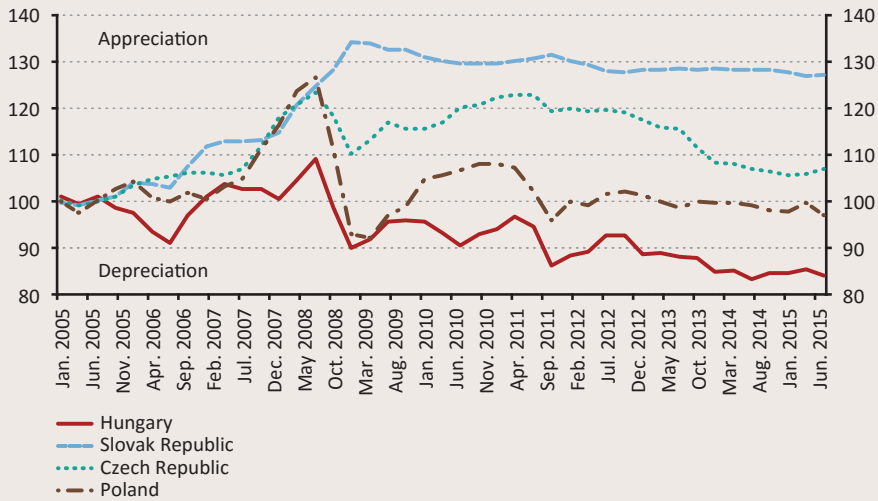
Source: HCSO, EUROSTAT.

2.5.6 Terms of trade

In addition to the changes in the volume of exports and imports, the changes in export and import prices relative to each other, referred to as **terms of trade**, also play an important role in the developments of the external trade balance. For small, open economies, the terms of trade is an indicator of fundamental importance. The terms of trade shows the volume of import a country is able to acquire by one unit of export. If the terms of trade rise, then under given external trade volumes, higher nominal income is realised by the resident institutional units (to the detriment of non-residents). Accordingly, the improvement in the terms of trade may also boost domestic consumption and investment demand.

The developments in the terms of trade essentially depend on the external trade structure and the pricing behaviour of exporters and importers. For small, open economies, the world price of products involved in external trade is a feature they have no control over. However, the product structure of exports and imports may differ from each other, and thus the change in the relative price of the various products (e.g. commodities, finished

products) may have different impact on the price level of exports and imports. On the other hand, the terms of trade may also be influenced by the exchange rate of the national currency. For example, if exporters try to keep the prices stable in the currency of the target country (*pricing to market)*, after the depreciation of the exchange rate, the import prices calculated in the national currency remain stable, but the export prices rise. Accordingly, the exchange rate depreciation may improve the terms of trade.

The Hungarian terms of trade are significantly influenced by three product groups: **machinery and transport equipment, food and fuels** (Chart 17).

Chart 17
Developments in the terms of trade of merchandise trade by main groups of products in Hungary
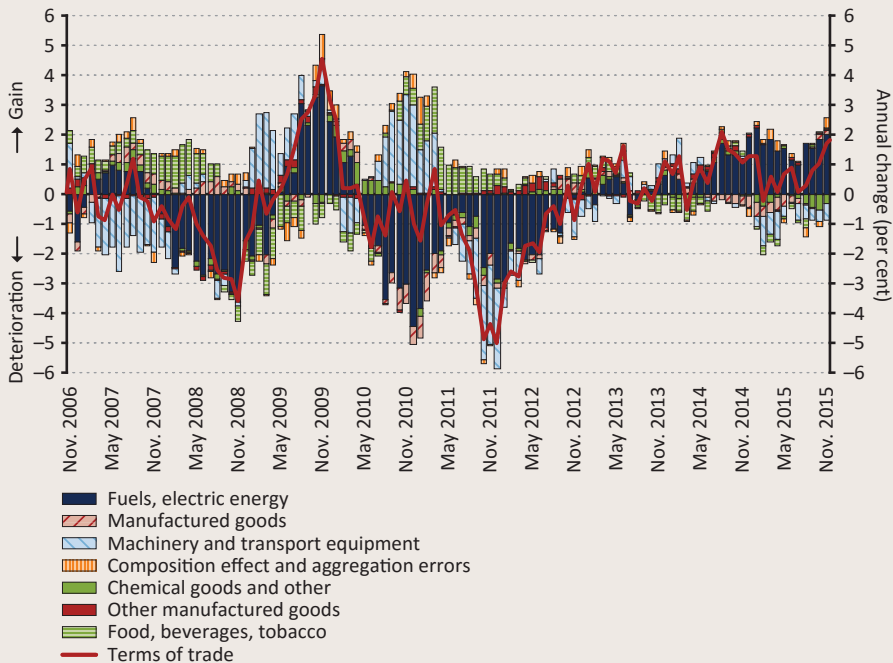
Note: Merchandise trade data; the external trade price indices are Fisher indices, and hence their exact decomposition is not possible.
Source: HCSO, MNB calculations.

Machinery and transport equipment account for the largest part of trade flow, and **thus they are determinant in the changes in export and import price indices**. **However, the change in the terms of trade is much less attributable** to this product group. This is partly due to the fact that a large part of Hungarian exporters operate within the framework of international production chains, and thus these product groups are characterised by intensive, bi-directional trade. It can be also assumed that the multinational corporations harmonise the changes in their export and import prices. In addition, the prices of processed goods are less volatile compared to that of other goods (e.g. commodities). **The terms of trade of machinery and transport equipment are not significantly influenced by the exchange rate**, since in the international supply chains the settlement (and the fixing of the prices) typically take place not in the currency of the trading partner countries, but rather in a vehicle currency, e.g. in EUR.

Food and agricultural commodities account for 8 and 5 per cent of exports and imports, respectively. Since the world price of agricultural commodities is extremely volatile, despite their relatively minor weight, these products may have a substantial impact on external trade prices.

Fuels play a defining role in changes in the terms of trade. This product group accounts for 4 and 12 per cent of Hungarian exports and imports, respectively. Although, on its own, neither ratio is extremely high, the difference between them is: net energy imports account for roughly 6 per cent of GDP. The importance of the product group is further increased by the fact that the world price of fuels is rather volatile. The trend-like increase in fuel prices in the 2000s caused lasting terms of trade losses to Hungary. During the crisis, the decline in world demand reduced energy prices, but this was followed by an adjustment in the years after.

3 References

Acemoglu, D. and Scott, A. (1994). 'Consumer confidence and rational expectations: are agents' beliefs consistent with the theory?' The Economic Journal, vol. 104, pp. 1–19

Bram, J. and Ludvigson, S. (1998) 'Does consumer confidence forecast household expenditure? A sentiment index horse race' FRBNY Economic Policy Review, pp. 59–78.

Carnazza, P. and Parigi, G. (2001) 'The evolution of confidence for European consumer and business in France, Germany and Italy' Temi di Discussione, No. 406.

Christopher, D., Carroll, D., Fuhrer, J.C. and Wilcox, D.W. (1994) 'Does consumer sentiment forecast household spending? If so, why?' The American Economic Review, pp. 1397–1408.

Chrystal, K. and Mizen, P. (2001) 'Consumption, money and lending: a joint model for UK household sector' Working Paper No. 134, Bank of England.

Davidson, J., Hendry, D.. Srba, F. and Yeo, S. (1978) 'Econometric modelling of the aggregate time-series relationship between consumers' expenditure and income in the United Kingdom' Economic Journal, vol. 88, pp. 661–692.

Deaton, A. (1987) 'Life-cycle models of consumption: is the evidence consistent with theory' Advances in Econometrics, Fifth World Congress, vol. 2, Cambridge and New York: Cambridge University Press, 121–148.

Ferenczi, B. – Jakab, M.Z. (2002): Kézikönyv a magyar gazdasági adatok használatához (Manual for the use of the Hungarian economic figures) Magyar Nemzeti Bank, December 2002

Friedman, M. (1957) 'A theory of the consumption function' Princeton University Press.

Hall, R.E. (1978) 'Stochastic implications of the life cycle-permanent income hypothesis: theory and evidence' Journal of Political Economy, vol. 96, pp. 971–987.

HCSO (2009): GNI Inventory 2.1, Budapest, HCSO. http://www.ksh.hu/apps/shop.kiadvany?p_kiadvany_id=9143&p_temakor_kod=KSH&p_session_id=15633711316962&p_lang=HU

HCSO (2007): A külkereskedelmi termékforgalmi árstatisztika módszertana (External trade product turnover price statistics methodology), Budapest, HCSO. http://www.ksh.hu/docs/hun/xftp/idoszaki/pdf/kulkarmodsz.pdf

HCSO (2005): A magyar külkereskedelmi statisztika módszertana, (Methodology of the Hungarian external trade statistics) Budapest, HCSO. http://www.ksh.hu/docs/hun/xftp/idoszaki/pdf/kulkermodsz.pdf

Loundes, J. and Scutella, R. (2000) 'Consumer sentiment and Australian consumer spending' Melbourne Institute Working Paper No. 21/00.

Modigliani, F. and Brumberg, R. (1954) 'Utility analysis and the consumption function: an interpretation of the cross-section data' Post-Keynesian Economics, New Brunswick, New Jersey: Rutgers University Press.

MNB (2014): Magyarország fizetésimérleg és külfölddel szembeni befektetési pozíció-statisztikái (Hungary's balance of payments and international investment position statistics), Budapest: MNB. http://fma.mnb.hu/Root/Dokumentumtar/MNB/Kiadvanyok/mnbhu_statisztikai_kiadvanyok/Magyarorszagfizetesimerlegeskulfolddelszembenibefektetespoziciostatisztikai2014.pdf

Muellbauer, J. and Lattimore, R. (1995) 'The consumption function: a theoretical and empirical overview' Handbook of Applied Econometrics, Macroeconomics, Blackwell.

Parigi, G. and Schlitzer, G. (1997) 'Predicting consumption of Italian households by means of survey indicators' International Journal of Forecasting, vol. 13, pp. 197–209.

Pöyhönen, P. (1963): A Tentative Model for the Volume of Trade Between Countries, Weltwirtschaftliches Archiv, 90(1), pp. 93–100.

Schmitz, M. – De Clercq, M. – Fidora, M. – Lauro, B. – Pinheiro, C. (2012): Revisiting the effective exchange rates of the euro, ECB Occasional Paper No. 134.

Tinbergen, J. (1962): Shaping the World Economy: Suggestions for an International Economic Policy. New York: The Twentieth Century Fund.

Vadas, G. (2001): Túl a makrováltozókon: Lakossági bizalmi index és a magyar háztartások fogyasztási kiadása (Beyond Macro Variables: Consumer Confidence Index and Household Expenditure in Hungary), MNB Background Studies, 2001/2.