MNB HANDBOOKS

DÓRA BAK – LAJOS TAMÁS SZABÓ

Labour Market

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Dóra Bak – Lajos Tamás Szabó

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'Without data, you are just another person with an opinion.'

<div align="right">Andreas Schleicher</div>

Contents

1 Why is it important for the central bank to study labour market data?

Monitoring labour market variables is of the utmost importance for inflation targeting monetary policy. On the one hand, an increase in the wage bill – as the product of the number of private sector employees and average earnings – may be incorporated into the prices of products and services through the rising costs of corporations, resulting in **cost-push inflationary pressure**. On the other hand, as the product of the whole economy labour force and average earnings, the wage bill may lead to **demand-pull inflationary pressure** through an increase in household incomes.

In this Handbook, we briefly describe the main economic models related to the labour market and provide an overview of the wage and labour force indicators available in Hungary, as well as those capturing free workforce capacity. We describe in detail the available data sources and the different types of analysis which they effectively support.

2 A brief overview of certain theories of labour economics

This section presents a brief overview of the economic models that best describe the functioning of the labour market. This is merely intended to give insight into the most important economic theories; we do not provide a detailed analysis. After outlining the neoclassical model, we abandon some of the assumptions of the model or focus on certain specificities of the labour market to introduce a number of new models. In addition, we present two empirical correlations that establish a connection between the number of unemployed persons and changes in output and between unemployment and wage growth. This topic has been discussed comprehensively by Ehrenberg – Smith (2003).

Introductions to economics usually begin with a discussion of the neoclassical approach, the foundations of which were laid down by Alfred Marshall. In the **neoclassical** framework, the wage level is determined by supply and demand in the labour market, as is the case in the goods market. The neoclassical model rests on the following benchmark assumptions:

• there are many corporations and employees (market participants), and they are unable to influence market prices on their own;
• all market participants are exactly the same;
• market participants are rational and strive to maximise their utility;
• market participants make their decisions in light of perfect knowledge.

The labour supply curve is positively sloped; i.e. more and more people are willing to seek employment amid increasing wages. By contrast, the labour demand curve slopes downward because firms will hire fewer and fewer workers amid persistently increasing wages. In the long run, work can be substituted by capital and vice versa; therefore, the shape and the slope of the demand curve can change over time. The demand curve of a particular firm is horizontal, as the firm is unable to influence market wages. In this model, the firm will hire only as many workers as would still ensure that the

marginal product of labour (i.e. the value added that results from employing an added unit of labour) equals the real wage. In this case, the value created by another unit of labour (for example, one working hour) will be identical with the cost of labour. Consequently, in the absence of shocks, over the long run the growth rate of the average private sector wage bill is equal to the growth rate of productivity. This model, however, fails to describe the real labour market accurately, because it does not consider any incentives, the presence of trade unions, differences between the skills of employees, the number of market participants, etc.

In the case of a labour market **monopsony**, a single firm is assumed to seek labour, with the presence of many prospective employees in the market. In such cases, its demand curve is not horizontal as would be the case in the neoclassical scenario; instead, the firm faces a downward-sloping demand curve. In such a market, the firm is no longer a wage taker; it is capable of influencing the market wage. As opposed to the neoclassical scenario, fewer employees are hired and the firm pays lower wages.

The theory of **efficiency wages** abandons the assumption that all employees are the same (whether it concerns their skills or the efforts invested in their work performance). According to the efficiency wage theory, in view of the substantial costs associated with the hiring of a new employee (job advertising, interviews, training, etc.), firms may benefit from paying higher wages than demanded by the market equilibrium, as this offers an incentive to workers to be loyal to the firm and keep their job. In addition, paying workers a higher wage may prompt them to step up their efforts (and hence, increase their productivity); therefore, firms are even more motivated to pay wages higher than the equilibrium wage. For more detail on this theory, see, for example, the papers of Shapiro – Stiglitz (1984) and Yellen (1984).

In this theoretical framework, a **dual labour market** may materialise. Dual labour markets emerge when jobs can be divided into two distinct groups. Access to the secondary labour market is easy; it does not require any social integration. Yellen (1984) emphasises that in this market the wage–productivity relationship is weak or non-existent. Consequently, wages in the secondary labour market are determined on the basis of the neoclassical

theory described above. Entry to the primary labour market, in turn, has severe obstacles and requires a higher level of social integration. In this market, there is a strong relationship between wages and productivity, and the evolution of wages in this sector is described by the efficiency wage theory.

Similar to the commodities market, a **signalling model** is also at work in the job market. The basic idea behind the signalling models is the fact that market participants need to resort to costly methods to communicate that their products or services are of higher quality than those offered by other market participants. In the commodities market, for instance, a merchant may send a signal via long-term guarantee to indicate that the higher price of his product is justified by its excellent quality. In the job market, employees can use their education credentials as such a signal. Obtaining an education is a costly endeavour; it is only worthwhile for those with good skills and abilities. Therefore, if an employee wants to employ highly skilled workers, he selects from applicants on the basis of their education credentials. For more detail on the subject, see, for example, Spence (1973).

In **search models**, neither firms nor workers are the same. The model is characterised by the presence of frictional unemployment. In such cases, vacant jobs and unemployed persons exist simultaneously in the job market due to differences between the education level, experience, and skills required for the job and due to the heterogeneity of workers. Therefore, both employees and firms face a costly and time-consuming process as they try to find the appropriate job or select the suitable candidate. In the model proposed by Pissarides (1988), unemployed workers keep looking for the "right job" until they get an offer that matches at least their reservation wage (the lowest wage at which they are willing to accept a job). In this model, the number of jobseekers changes continuously: some of them might have landed a job, others may be in between jobs or have just entered the job market. In the long-run equilibrium of the model, the number of job finders is identical to the number of job losers. For more detail on the models, see, for example, Mortensen (1970).

In addition to the models outlined above, we also wish to provide a brief description of the empirically observed relationship between unemployment

and output, a phenomenon often referred to as **Okun's Law** in the economic literature. Based on data on the United States, Okun (1962) proposed that a 2 per cent decline in GDP compared to potential output generates a 1 per cent increase in the unemployment rate.

Another frequently cited and much-debated economic correlation is the wage **Phillips curve**, which establishes a link between (real) wages and unemployment. Analysing nearly a hundred years' worth of data pertaining to the United Kingdom, Phillips (1958) found that, aside from the rapid recovery observed in post-war years, changes in unemployment explain the behaviour of wages. In other words, with jobseekers' improving bargaining position, a decline in unemployment leads to an increase in wages. In subsequent years, economists adjusted and enhanced the correspondence in various ways, applying it to prices and inflation and also supplementing it with inflation expectations. For more detail on this topic, see the MNB's Handbook on Inflation.

3 Wage indicators[1] available in Hungary

The evolution of wages can be captured primarily by average wage indices, calculated as the quotient of the wage bill and the number of employed persons. The wage change indicated by the average earnings indices, however, does not only reflect the "real" wage-setting decisions of economic agents, but also aggregation effects. Wage inflation – which is the net change in the price of one unit of labour; i.e. the change induced by price-setting decisions – can be best explained by observing individual wages. Using individual wages eliminates the bias stemming from composition effects; therefore, we can gain a more realistic picture regarding, for instance, the tightness of the labour market. Accordingly, wage indicators can be characterised based on their ability to exclude the composition effect or they can be analysed from the perspective of firms or households.

Our analyses are focused on wage-setting in the private sector as it moves closely together with economic activity and may influence both cost-push and demand-pull inflationary pressures. Within the private sector, we concentrate on two main areas: the manufacturing sector and the market services sector.[2] Since the manufacturing sector largely produces for export (the share of exports was 75 per cent in 2015) while market services are geared toward the domestic market, the evolution of wages in the market services sector may exert a greater impact on domestic inflation. Wage developments in the public sector are considered to be the demand effect of fiscal policy and are primarily analysed in that context. In examining household incomes however, public wages are also taken into account.

3.1 Institutional labour statistics

For the analysis of wage developments, we primarily rely on the **gross average earnings** index derived from the institutional labour statistics of

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[1] The terms and concepts presented in italics in the following chapters derive from various publications of the Hungarian Central Statistical Office (HCSO).

[2] According to the NACE Rev. 2 classification by industry, manufacturing: C; market services sector: G,H,I,J,K,L,M,N,R,S,T,U

the Hungarian Central Statistical Office (hereinafter: HCSO). *Gross average earnings are computed by dividing the total sum of earnings for the reference period (month, year,) by the average number of employees in the same period (HCSO 2014a).* In addition to basic wages and salaries, gross average earnings include workplace bonuses and allowances, payments for time not worked, premium, bonuses, and wages and salaries for the 13th and additional months.

The scope of observation of institutional labour statistics covers firms with at least 5 employed persons (firms with 5–49 employees are observed on a representative basis, while enterprises with 50 or more employees are subject to full-scale observation) and, irrespective of the number of employees, budgetary and social security institutions and designated non-profit organisations. Individual business associations supply data on the wage bill of manual and non-manual workers, as well as the related statistical staff number of employees.

The greatest advantage of the statistics is the fact that they become available relatively quickly, in the month following the payment of wages. The problems associated with the use of the statistics are the following.
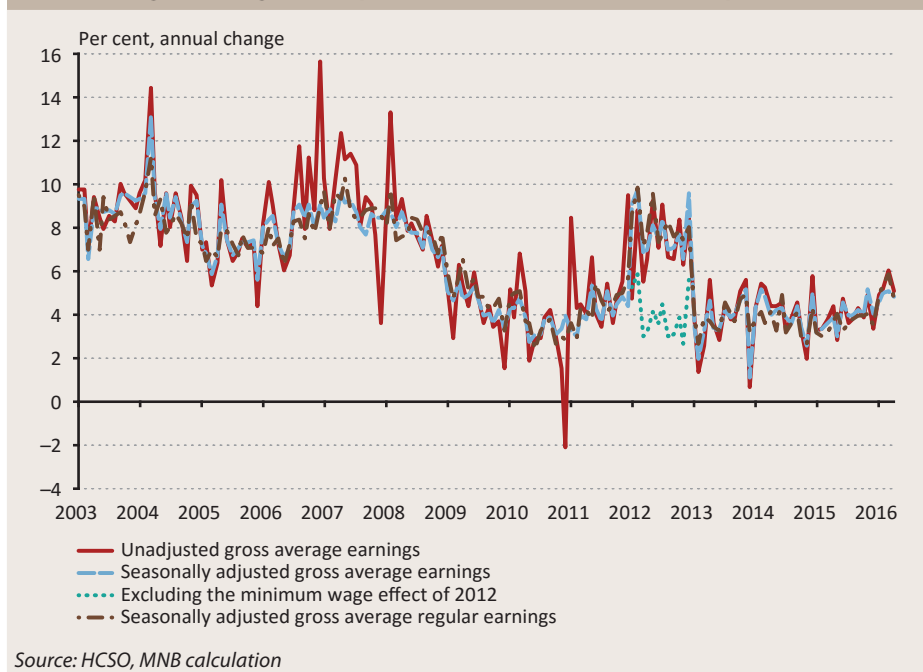
• Due to their scope of observation, the statistics do not cover a broad segment (firms with less than 5 employees are excluded).
• Since they are based on questionnaires, the statistics provide information only about the officially reported employees of the organisations and as such, grey and black employment tend to distort the statistic downward.
• The magnitude of change in average earnings between the two periods reflects both shifts in staff number ratios and the effect of actual changes in wages; in other words, the published average earnings indices also contain, for example, the effect of changes in the composition of manual and non-manual employee groups and sectors.

Data are available in the following breakdown: total economy, business sector total, budgetary institutions total, non-profit institutions total. For the purposes of our analyses, monthly and quarterly data (computed by averaging monthly data) are seasonally adjusted. Moreover, we adjusted wage levels for the results observed in the second half of 2006 in response to government

measures aimed at combating the informal economy (for more detail, see Eppich – Lőrincz 2007).

Within gross monthly average earnings, in its data releases the HCSO distinguishes between gross monthly regular and non-regular earnings. Analysing regular monthly earnings assists in understanding medium-term wage developments. Examining ad-hoc premiums and bonuses separately, in turn, helps to identify additional processes at work. For example, the gross average earnings index exhibited a sharp fall at the end of 2010, which reflected a decline in premium payments. The reason for the decline was the adoption of a favourable change in the taxation scheme from 2011, which prompted firms to reschedule the payment of premiums to the beginning of the following year.

Chart 1
Gross average earnings in the private sector with and without premiums

Source: HCSO, MNB calculation

A more detailed analysis of the data provided by the institutional statistics may offer further support in the understanding of wage developments. Data released by the HCSO provide information on the gross wage bill and statistical staff number of full-time employees, part-time employees and employees with less than 60 actually worked hours. On the basis of these figures, we can calculate gross average earnings for part-time employees (comprising part-time employees and workers with less than 60 actually worked hours) and for all employees. In addition, average earnings are available in a sectoral breakdown according to the Nace Rev. 2[3] classification and in a breakdown of manual and non-manual workers. These data allow for the examination of average gross regular earnings above/below specific income thresholds, which is a more suitable tool for assessing wage inflation. The sectoral breakdown also offers a cross-sectional sample, which supports the examination of wage distribution and measures to combat the informal economy, and the exclusion of outliers. Moreover, average gross monthly regular earnings are also available by sector and statistical staff number categories (5–9 persons, 10–19 persons, 20–49 persons, 50–249 persons, 250–999 persons, above 1,000 persons), which helps to identify any sample change bias. The source of the bias is the HCSO's full replacement of the representative sample of firms with 5–49 employees every year in January.

The most suitable indicator for examining demand-pull inflation is the index of "actually received", i.e. **net average earnings**, which is considered to be the real household income indicator. *Net earnings derive from gross earnings at enterprise level after subtracting labour market contribution, personal income tax, health contributions and retirement schemes (HCSO methodology).* The HCSO nets down gross average earnings data on a monthly basis for each institution. The netting can only consider tax allowances that affect all employees. The HCSO prepares a separate estimate for the net earnings average adjusted for family allowances.

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[3] Statistical Classification of Economic Activities in the European Community

In the institutional statistics, in addition to wages and salaries, **other labour incomes** include the following items: other social transfers and social transfers in kind, such as remuneration exceeding the sum of wages and salaries paid to Hungarian employees delegated abroad; dwelling-costs reimbursement; costs reimbursement for meals and drinks; reimbursement of the costs of commuting to work; reimbursement of costs of company cars supplied to employees for own use; jubilee rewards, rewards in kind.

3.2 Alternative wage inflation indicators

Gross average private sector earnings data contain a significant amount of noise both over time and cross-sectionally; consequently, the monthly fluctuations of these figures are significant. One of the reasons behind this is that the private sector is composed of fairly heterogeneous segments, and each segment establishes regular wages, pays out premiums and changes the size and composition of its labour force (manual/non-manual workers) at different times. In theory, seasonal adjustment should smooth out some of this volatility, but seasonality is not entirely stable due to the constantly changing composition of the workforce. Consequently, seasonally adjusted data may be substantially revised in light of new information received. The volatility of the wage index, the outliers observed in specific months and the revisions of the seasonal adjustments hamper the assessment of underlying wage developments.

In order to address this problem, analysts rely on statistical approaches. The essence of the MNB's three alternative wage inflation indicators (trimmed mean,[4] Edgeworth index,[5] weighted median) is the exclusion of sectors with more volatile wage dynamics or those exhibiting extreme deviations from the average. The band obtained using these alternative wage inflation indicators offers an important advantage: owing to the seasonal adjustment of incoming

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[4] For calculating the trimmed mean, we align the annual indices of sectoral wages in each period, trim some of the lowest and highest values before weighting the remainder to an aggregate index.

[5] In the case of the Edgeworth weighted index, the employment weightings of individual sectors are multiplied by the reciprocal of the standard deviation of the wage dynamics measured over the past 24 months. We then aggregate the individual sectors with the modified employment weightings into the whole of the private sector.

fresh data, the past of the time series is revised to a lesser degree than the time series of aggregate gross average earnings. In addition, the indicator is less distorted by outliers associated with specific sectors.

Data volatility and the level of revision are further reduced by the fact that, instead of using the current monthly workforce figure to produce the data series for the entire private sector, we use the annual average workforce figure for the sector in question. As this method filters out changes in the size of the workforce and its composition, these indicators can be considered wage inflation indicators.

Chart 2
Band of wage inflation indicators pertaining to regular monthly earnings in the private sector

Per cent, annual change

Band of alternative wage inflation indicators
Seasonally adjusted gross average regular earnings

Source: HCSO, MNB calculation

3.3 Wage Survey

The National Employment Service (hereinafter: NES) conducts a survey among Hungarian firms on a yearly basis with respect to the structure of earnings. The survey covers a – yearly changing – sample of firms with a statistical headcount of 5–50 employees and above and, irrespective of headcount figures, all budgetary institutions. Entities with a statistical headcount of less than 50 employees and non-profit organisations supply data on all of their employees. Entities with at least 50 employees, non-profit organisations and, depending on their size, budgetary institutions select the employees to be included in the data supply by random sampling (based on date of birth). With respect to their employees (or a sample thereof), firms supply detailed individual data (age, sex, education, service period), contractual characteristics (contract type: definite term, indefinite term, full-time or part-time employment, ISCO code,[6] hours worked in the month of May), and provide detailed information on the structure of earnings. In addition, the survey contains information on the firms themselves (number of non-manual and manual workers, Nace Rev. 2 code, place of business, ratio of resident/non-resident ownership, use of collective bargaining agreement). Neither the employees, nor the employers can be identified individually by name in the survey.

Accordingly, the Wage Survey is a micro database, where the reporting unit is the place of business, and the observation unit is the employee. The database contributes to the MNB's assessment of wage inflation primarily by providing information on the gross earnings level of employees, the structure of earnings, and the distribution of earnings among the employees.

The limitations of the Wage Survey are the following.

• Except for non-profit organisations, it does not cover entities with a statistical headcount of less than 5 employees. The share of this group of companies in

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[6] The Hungarian Standard Classification of Occupation (FEOR'08) contains the list occupations based on the professional characteristics of the activities, classified according to the skills and qualifications required for the given occupation. It is the national equivalent of the internationally used ISCO-08 classification.

employment, however, is not negligible, with a significant potential impact on the distribution of wages.

- The survey is conducted with an annual frequency and becomes available with a substantial lag; therefore, it is not suitable for examining short-term changes in wage developments.
- Its scope is limited to employees; it does not include, for example, the self-employed, workers with mandate contracts, etc.
- Since the information is supplied by firms, it contains only formal employment and contractual characteristics.
- One obstacle to dynamic analyses is that individuals cannot be linked clearly in the database; only employers are assigned unique panel identifiers (derived from the encryption of corporate tax numbers). That notwithstanding, by establishing links though the unique characteristics, changes in individual earnings can be examined to a limited degree. As part of this exercise, individuals are linked based on date of birth (month and year), education, sex and the employer's unique identifier, excluding those cases where this information is the same for more than one individuals.

Since the sample of employers with 5–50 employees changes in the corporate database and employees themselves change jobs, only about one third of the employees can be linked across individual years. This sample is partly biased: in the case of the employees contained in the database the average age, service time and wage are higher, and a higher number of employees work at large corporations than in the total sample.

3.4 Labour Cost Survey

In order to monitor **labour costs**, in 1992 the HCSO introduced a Labour Cost Survey. The related data collection was initially conducted at four-year intervals and subsequently on a yearly basis. Labour costs mean the total expenditure borne by employers for the purpose of employing staff. *In addition to the compensation of employees for their work (wages and salaries), labour costs include*

- *employers' retirement and health insurance contributions;*
- *employers' contribution to unemployment funds and disability schemes;*

- *contributions in kind and social contributions; and*
- *reimbursements and costs of vocational education, training, retraining, costs of workforce recruitment.*

Costs relating to the employment of human labour are increased by tax items related to employees' remuneration or to the number of employees and reduced by wage and employment contribution subsidies (HCSO, 2014b).

The Labour Cost Survey covers enterprises and budgetary institutions with at least 5 employees, but small enterprises (5–49 employees) are only included at four-year intervals. The survey supports analyses using the concepts and definitions of the ILO and hence supports international comparisons. The HCSO publishes data on average monthly labour cost developments on an annual basis.
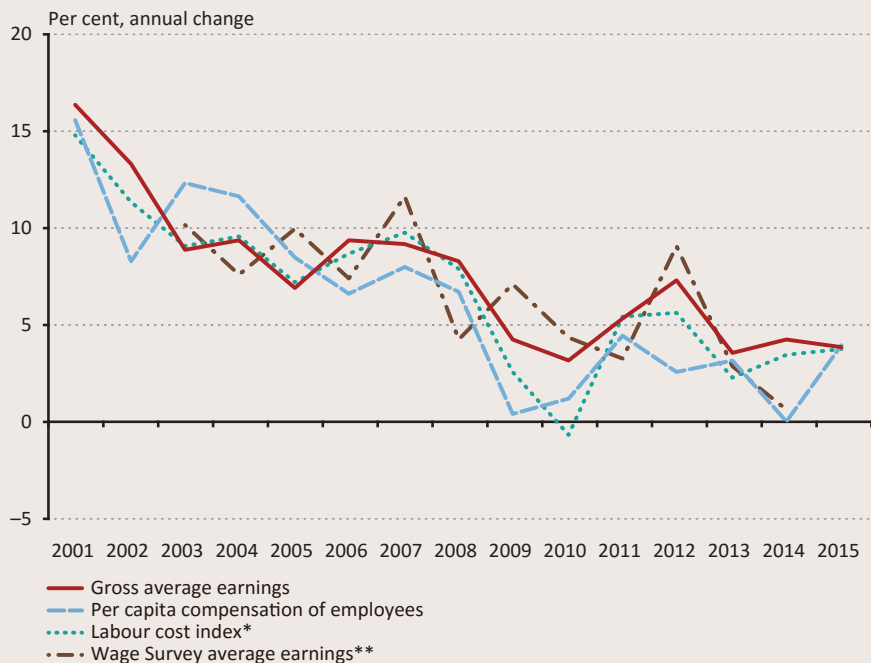
*The **labour cost index** captures short-term developments in the total hourly costs borne by employers for the purpose of employing staff. The index covers all sectors other than agriculture, forestry, fishing, education, health and other community, social and personal service activities (HCSO methodology).* Eurostat publishes hourly labour costs in the form of the Laspeyres Index. Since it is computed by sector, the index is unable to filter out changes in the labour force composition within the sector. The monthly and quarterly index is available in a working day and seasonally adjusted form.

In the framework of the national accounts, within incomes generated in the national economy, the HCSO presents quarterly changes in the total compensation of employees. ***Total compensation of employees** include gross cash payments (e.g. regular wages and salaries, supplementary and ad-hoc payments, commissions and benefits), as well as in-kind products and services (free and preferential welfare services such as kindergarten, recreational services, housing allowances, passenger car use, interest subsidy) paid by the employer to the employee in return for work. They also include the employers' social insurance contributions (HCSO methodology).* The HCSO relies on the Labour Cost Survey for the calculation of the total compensation of employees.

Per capita compensation of employees is calculated by dividing the total compensation of employees by the number of persons engaged in the

production of GDP. *Within the system of national accounts, the number of persons engaged in the production of GDP is identical with the number of persons engaged in any kind of production activity (employees and independent workers, including unpaid family workers). Consequently, the definition of employees within the meaning of the national accounts is different from the concepts used in the Labour Force Survey and in the institutional statistics. This is partly because activities deemed production activities in the system of national accounts do not always qualify as income earning activities (based on the ILO concepts used in the Labour Force Survey), and partly because the system of national accounts is based on the domestic approach (see in more detail the chapter on Employment) (HCSO methodology).*

Chart 3
Annual change in the private sector wage indicators available in Hungary

Per cent, annual change

Gross average earnings
Per capita compensation of employees
Labour cost index*
Wage Survey average earnings**

Source: HCSO, Eurostat, NES

*Excluding the sectors of Agriculture, forestry and fishing (A), Arts, entertainment and recreation (R) and Other services (S)

**Data relating to full-time, non-retired, non-subsidised employees

3.5 Calculation of unit labour costs

The MNB monitors wage developments primarily for the purpose of determining the inflationary pressure. At the same time, the **average cost of labour per unit of value added** (unit labour costs, ULC) can be also used to examine competitiveness. Although we should use national account data for determining labour costs, these statistics do not contain the required data on earnings. Therefore, we use the following calculation in order to determine labour costs: we identify average labour costs by adding up the gross average earnings of employees and any other wage costs incurred by firms, and multiply the result by the number of full-time equivalent employees (which excludes workers employed abroad) in the private sector. Scaled by value added, this figure will give us the average cost of labour per unit of value added.

Table 1
Summary table on the wage indicators available in Hungary

	For households	For firms
Includes composition effects	Net average earnings Gross average earnings	Per capita compensation of employees
Excludes composition effects	Alternative wage inflation indicators	Labour cost index
	Wage Survey	

4 Labour supply

In order to measure activity, we rely on the HCSO's monthly **Labour Force Survey** (hereinafter: LFS), compiled in accordance with the recommendations of the International Labour Organisation (ILO). The survey is based on data collected from around 38,000 households and provides information on the economic activity of ages 15–74. Each household remains in the sample for six quarters on average; and one sixth of the sample is replaced every quarter.

5 Labour demand

5.1 Employment

Information on staff number developments can be gleaned from a number of resources; however, the available resources use different samples and become available for use in different intervals. Accordingly, depending of the purpose of individual analyses, we may use various staff number statistics. In the following, we sum up the most important features of these statistics.

Table 2 Data sources on employment and unemployment			
	Sector	**Data source**	**Frequency**
Employment	National economy	LFS	quarterly, monthly
		Institutional statistics	monthly
		Wage Survey (NES)	annual
		Based on the National Accounts	quarterly
	Private sector	LFS	quarterly
		Institutional statistics	monthly
		Wage Survey	annual
		Based on the National Accounts	quarterly
		NTCA database	annual
Unemployment		LFS	quarterly, monthly
		NES	monthly

For the purposes of the **Labour Force Survey** (hereinafter: LFS), persons who worked one hour or more for pay during the week preceding the survey qualify as employed persons. Sectoral information is only available at a quarterly frequency. The micro-database of the LFS is also available for purchase. In addition to hours worked, this database includes key data on demography, residence and education, as well as selected corporate characteristics (for more detail, see HCSO 2013).

Advantages of the survey

- Compared to other statistics, the LFS is more comprehensive and it covers all firm sizes; therefore, it is a reliable indicator of employment levels.
- Since it is based on individual questionnaires, it also covers a part of informal employment.
- As it is compiled in accordance with Eurostat recommendations, it is internationally comparable.
- Data are published at a monthly frequency.

Disadvantages of the survey

- It is based on the national approach; therefore, rather than being consistent with GDP, it is consistent with national income statistics (GNI, GNDI). It also includes some the employees working abroad, but belonging to Hungarian households (111,000 persons in 2015), which may distort labour cost data and other indicators affecting corporations. Therefore, this information should be excluded.

Institutional labour statistics are also compiled by the HCSO. They are released at a monthly frequency. Institutional statistics contain the data of firms employing more than 5 persons. The HCSO applies sampling in the case of enterprises with 5–50 employed persons, while data supply is mandatory for those with more than 50 employees. Central budgetary institutions are subject to full-scale observation. The statistics also cover hours worked.

Advantages of the survey

- It is available at monthly intervals for individual sectors and staff number categories.

Disadvantages of the survey

- It contains no information on micro-enterprises of less than 5 persons. It cannot be compared internationally.
- Since the entire sample of enterprises with 5–50 employees is replaced every year, the survey is prone to exhibit level shifts between individual years.
- It only contains legally employed persons.

Based on the employment data of the LFS, the HCSO also calculates, consistent with the national accounts, the number of **employees contributing to GDP production**, *which, in the system of national accounts, covers all persons engaged in some productive activity that falls within the boundary of the system (HCSO methodology).* A breakdown by industries and branches is also available. It is compiled on the basis of the LFS, with the assistance of a number of adjustment items.

It does not cover:

• resident persons who work for non-resident producer units (cross-border commuters from Hungary).

It covers:

• non-resident persons who work for resident producer units (cross-border commuters to Hungary);
• employed persons living permanently in an institution (social rehabilitation institutions, residential homes, hospitals, prisons, hotels, etc.);
• employees older than the age-limit applied in the LFS;
• specific estimates of the number of workers engaged in production undertaken entirely for their own final consumption or own capital formation, the number of paid staff providing domestic services in private service, employment in illegal activities (HCSO methodology).

Advantages of the survey

• In economic analyses, this would be the most useful employment indicator, as it completely covers the group of those participating in the generation of Hungarian GDP.

Disadvantages of the survey

• It is released with a fairly significant lag; therefore, it is not suitable for short-term analyses.
• It does not reveal the quantitative values of specific adjustment items (e.g. how many persons above 74 hold a job).

The **NTCA** (Tax and Customs Administration, NAV [APEH]) **database** is compiled from corporate tax returns. It does not include data on the self-employed. Gathering data that are as precise as possible is not the purpose of this data collection (it is not even compulsory to supply workforce data), and thus this database is not listed among the most reliable employment statistics. In addition, since the reporting of some firms does not coincide with the calendar year, time series analyses may become biased.

The **Wage Survey** is an annual survey conducted by the NES. As the purpose of the data supply is to provide information on earnings, it is less suitable for the analysis of employment figures. The database also contains a number of corporate and individual features.

Advantages of the survey

• It contains some features that are not included in any other database on employment (first and foremost, the detailed structure of wages and salaries). For example, this data source shows the number of employees working at minimum wages in the private sector.
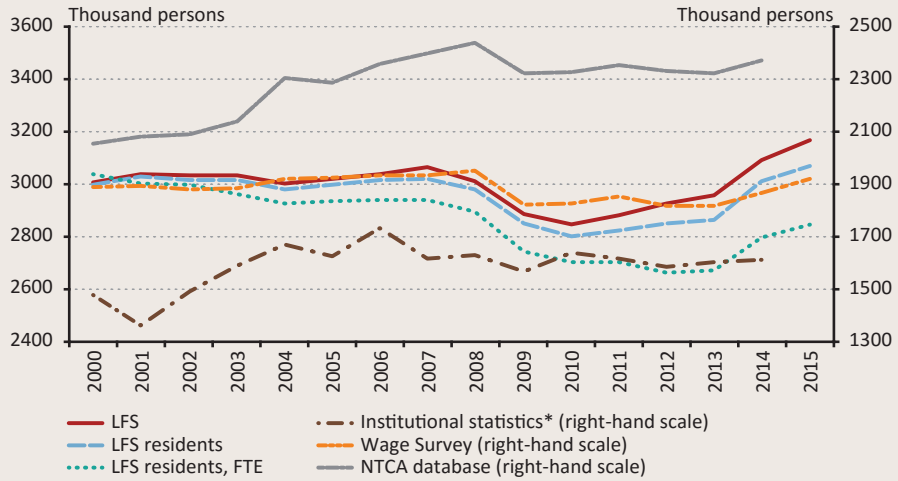
Disadvantages of the survey

• As it excludes firms with less than 5 employees, it cannot be listed among employment statistics. It is only available at an annual frequency and with a lag of around half a year.

Table 3 **Data collections in selected staff number categories**						
	Informal employment	**Self-employed**	**2–4 persons**	**5–20 persons**	**21–50 persons**	**Above 50 persons**
LFS	S	S	S	S	S	S
Institutional statistics				S	S	F
Wage Survey				S	F	F
NTCA*			F	F	F	F
*S: sampling, F: full-scale observation, *provision of staff numbers is not compulsory.*						

Chart 4
Number of employees in the private sector according to different surveys

*persons employed at least 60 hours per month

Source: HCSO, NES, NTCA

6 Staff number data in the MNB's analyses

In staff number analyses, the MNB mainly focuses on private sector employment as this constitutes an element of cost inflation pressure and may also play an important role in the development of demand-pull inflationary pressure.
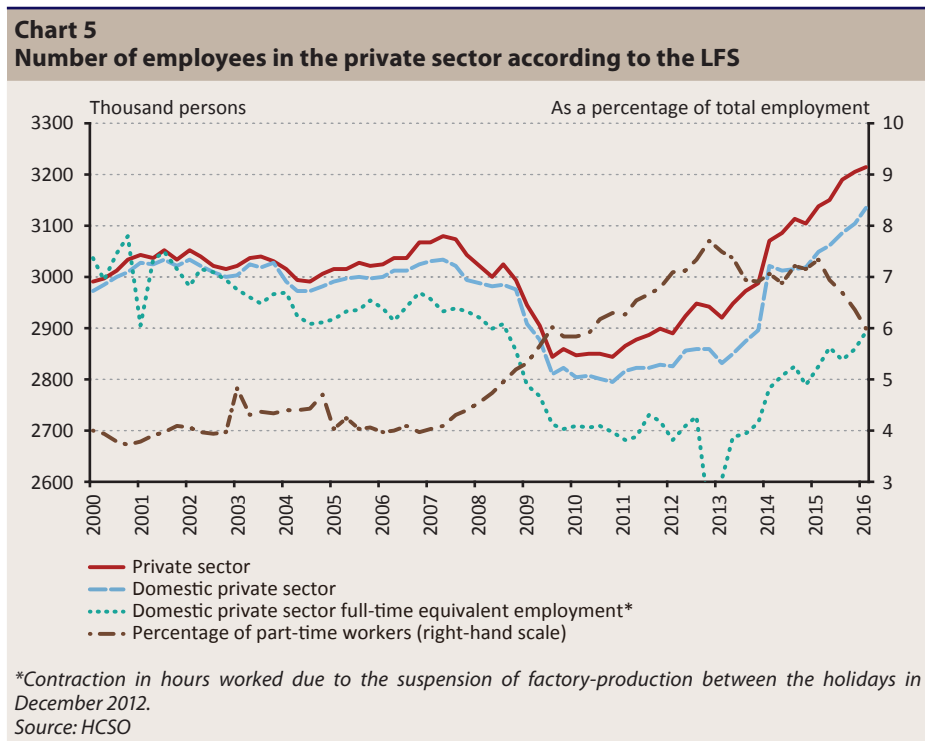
Staff number analyses primarily rely on employment data from the LFS, as this database includes employees of firms with less than 5 workers as well as some informal employment data. At the same time, due to the methodological specificities of the survey (i.e. the observation unit is comprised of households), it includes even those persons who have Hungarian residence but work or seek work abroad. While the number of such persons rose slightly until 2007, this increase was not significant (less than 25,000 persons). After 2007, however, a sharp increase was observed in their number (for more detail, see Bodnár – Szabó 2014). We need to adjust for this and therefore, in our analysis we exclude this item. In addition, the number of full-time equivalent employees can be also determined by using the micro database. This is computed as follows:

$$\frac{total\ hours\ worked}{average\ hours\ worked\ by\ full\text{-}time\ employees}$$

In addition to being a more precise indicator of the quantity of labour used in the national economy, the number of full-time equivalent employees moves more closely together with economic activity (Chart 6). This is because firms can respond to changes in economic activity faster and more cost-efficiently by changing the hours worked than by changing the number of employees. A larger divergence between the employment figure and full-time equivalent employment occurs if the ratio of part-time workers is considerable (Chart 5). In Hungary, the ratio of part-time workers began to rise in the years leading up to the crisis and continued growing gradually during the crisis (for more detail, see Bodnár 2014). In recent years, however, the spread of part-time employment halted. The drawback of this indicator is that it is only available with a lag of approximately one quarter and may also be sensitive to one-off
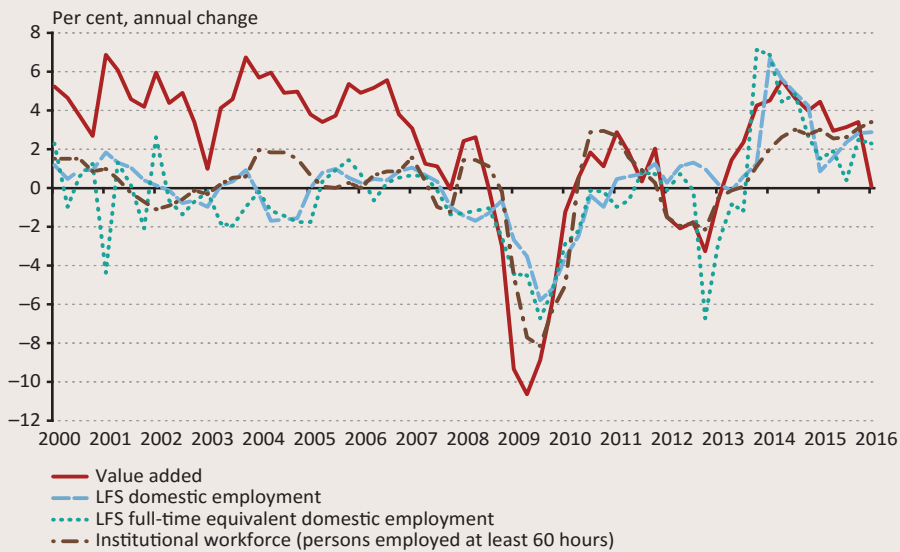
impacts (see, for instance, the sharp decline by caused mass holidays among workers in the fourth quarter of 2012).

The sectoral breakdown of institutional statistics is released earlier than the LFS and, due to its monthly frequency, it can be used for short-term in-depth analyses. The Wage Survey and the NTCA database can be applied effectively in micro analyses and for the examination of individual corporate characteristics. At the same time, these statistics are less suitable for drawing conclusions about staff number developments.

Chart 5
Number of employees in the private sector according to the LFS

Contraction in hours worked due to the suspension of factory-production between the holidays in December 2012.
Source: HCSO

In the private sector, before the crisis it was the employment figure of the institutional statistics that followed GDP changes most closely (Chart 6). Since the crisis, however, changes in economic activity have been reflected more precisely in the number of full-time equivalent employees gained from the LFS. The latter employment figure is the most suitable indicator to capture the quantity of labour used in the private sector.

Chart 6
Annual changes in private sector employees and value added in the private sector

Per cent, annual change

- Value added
- LFS domestic employment
- LFS full-time equivalent domestic employment
- Institutional workforce (persons employed at least 60 hours)

Source: HCSO

Box 1

Measuring the number of public workers

Public work schemes have had a significant impact on the number of employees in recent years. Below we provide an overview of the statistics available with respect to the number of public workers.

The number of public workers is derived from the micro database of the LFS as the net result of two questions.[7] Since 2014, specific questions have been applied in relation to public workers. The number of public workers has been presented in the institutional statistics since 2008 as well; however, the scope of observation has changed from time to time.[8] The two datasets are fairly similar both in terms of level and dynamics.
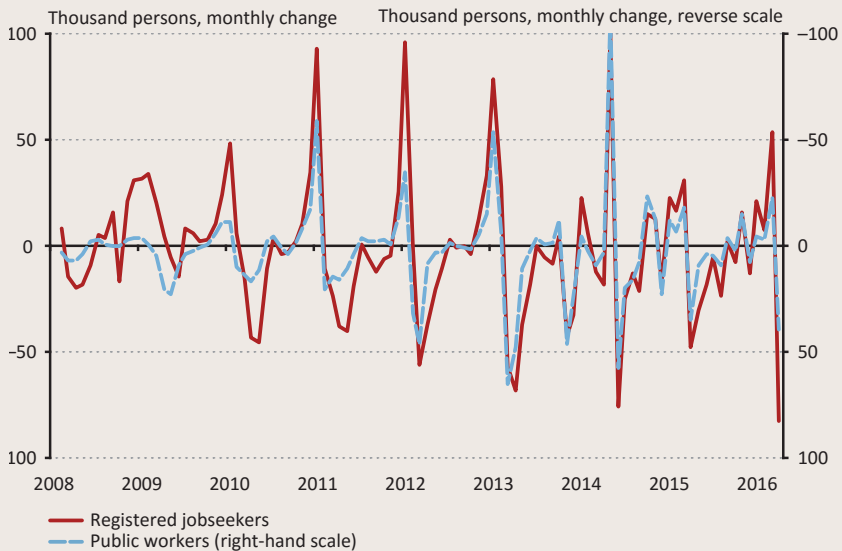
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[7] 'Why do you work under a fixed-term labour contract?' (recipient of subsidies [performs public benefit, public-purpose or public work], and 'Do you receive any of the following allowances?' ('no, but performs public benefit, public-purpose or public work).

[8] E.g. 2010: public benefit, public purpose and public employment programme; 2011: workers employed under short-term, longer-term and nationwide public employment programmes. 2012: public employment at budgetary institutions – under short-term, longer-term and national public employment programmes; 2013: in the framework of public employment at enterprises with at least 5 employees, at all budgetary institutions and at the observed non-profit organisations.

In addition, the number of new subsidised vacancies registered at the NES is also available. Although these data contain other subsidised jobs as well (such as the 'First Job Guaranteed Programme'), the dominance of public employment programmes is significant.

We can also draw conclusions with respect to the number of public workers from the number or registered jobseekers. Before participating in the public employment programme, all jobseekers are required to register with the labour centre. Parallel to rising public employment, the seasonality of registered jobseekers has changed as well, mainly as a result of public employment programmes (Chart 7). Since the NES's statistical datasets are released earlier, they can help estimate the number of public workers. The unemployed registration of public workers is not cancelled; it is merely suspended. This number is shown in the NES statistics under the heading 'Registration suspended due to public employment'. This information, however, is not public.

Chart 7
Number of registered jobseekers and public workers

Source. NES, HCSO

7 Free labour market capacities

7.1 Unemployment

Unemployment can be defined in a number of ways. According to the definition of the International Labour Organisation (ILO), the unemployed comprise all persons who meet all three of the following criteria: are not in paid employment; are available for paid employment within two weeks; actively sought paid employment for four weeks preceding the survey. This definition of unemployment, therefore, does not require the registration of jobseekers as unemployed persons. The data source for unemployment within the meaning of the ILO definition is the **LFS.** By contrast, the **registered unemployed** data only include those persons who have been registered as jobseekers.

As is the case with employment, traditionally, the MNB relies on LFS data in the case of unemployment as well. However, the crisis demonstrated that the alternative indicators of unemployment may also carry additional important information (for more detail, see Special Topic 6.2 of the June 2014 *Inflation Report*).

The second main source for unemployment is the statistical dataset of the NES, which contains fairly detailed figures pertaining to jobseekers (age, sex, education, job finders, long-term jobseekers, number of recipients of various allowances, etc.). In addition, it also contains the main features of new vacancies (subsidised, non-subsidised, geographical location, sector, type of employment, etc.), as well as collective redundancies.

Jobseekers who have not yet registered as such are included in the unemployment data of the LFS, but are not considered unemployed according to the registered unemployed definition. Those who have registered but worked in the informal economy or performed odd jobs in the meantime are taken into account among the registered unemployed, but are not considered

unemployed in the LFS. Unemployment in the LFS is lower than the number of registered unemployed persons.

7.2 Alternative unemployment indicators

Supplementary LFS unemployment indicators have been available from the micro database since 1999, and several alternative unemployment indicators can be derived from them. These take into account those who would belong to the category of inactive persons or employed persons based on the ILO's definition, but would be classified as unemployed persons based on the role they play in the labour market. They comprise the following groups:

• part-time workers who wish to work longer hours (underemployed part-timers);
• inactive persons included in the group of potential labour reserves;
  – those who would be able to work but are unwilling to do so (discouraged workers);
  – those who are willing to work but are unable to do so for whatever reason (e.g. university students who wish to find employment after graduation).

The groups belonging to potential labour reserves can be analysed with the assistance of the LFS's micro database. For more detail, see Special Topic 6.2 in the June 2014 *Inflation Report*.

7.3 Selected indicators measuring labour market tightness

Wage-setting is influenced by the relationship between free workforce capacity and labour demand. Several possible indicators can be drawn up to measure this item. The datasets of both the HCSO and the NES assist in determining the tightness of the labour market. For this exercise, we use the number of (non-subsidised) vacancies, as they are apt indicators of market trends.

The labour market is considered tight if there are numerous unfilled vacancies in the private sector while unemployment is low. In such cases, employees are in a position to negotiate higher wages; in other words, inflationary pressure

from the labour market intensifies. However, when the number of vacancies is low and unemployment is high, the labour market is loose, with insignificant or non-existent inflationary pressure. The tightness of the labour market has increased gradually in recent years.
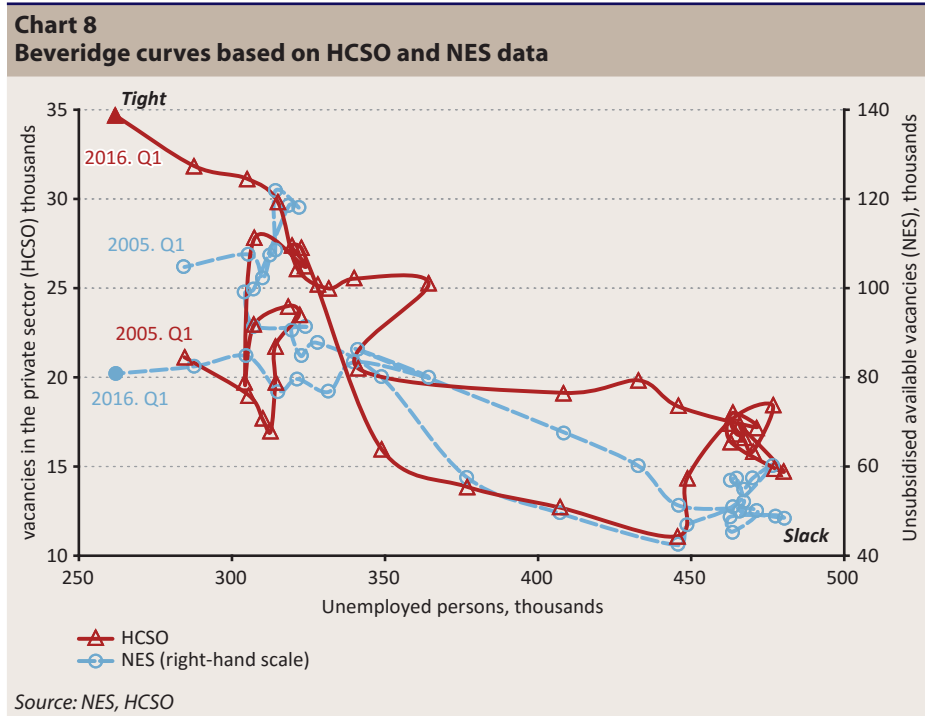
The **NES** dataset also includes new vacancies registered in the reference month, unfilled vacancies at the end of the month, and the number of **available positions** derived from the aggregate of the first two items (unfilled vacancies at the end of the previous month + new vacancies registered during the reference month). Of this, statistics distinguish between subsidised and non-subsidised vacancies. Subsidised vacancies include jobs announced in public employment programmes or other programmes announced by the government (e.g. 'Facilitating Summer Student Work', 'First Job Guaranteed Programme', etc.). Changes in the number of non-subsidised vacancies help reveal market trends. The NES dataset also contains the collective redundancy data reported in the reference month.

The **HCSO** also publishes **vacancy** data, calculated on the basis of Eurostat's recommendations. In these statistics, vacancies are interpreted as newly announced or newly vacated jobs and any other jobs expected to become vacant in the near future (within 3 months), which the employer takes active steps to fill (by announcements, requesting the help of the National Employment Service, etc.).

The Beveridge curve shows the number of unemployed persons and the number of job vacancies (Chart 8). The Beveridge curve can also be drawn up in a ratio form, where both the number of unemployed persons and the number of job vacancies are divided by the number of the economically active population.

From the **micro database of the LFS** we can calculate flow data, which indicate realignment between the specific labour market categories (employed, unemployed, inactive). Similar to continental Europe, the Hungarian labour market is less flexible than Anglo-Saxon countries, where transitions between specific stages are more frequently observed. In Hungary, demographic features are among the main determinants of labour market participation.

Although the labour market participation of individual demographic groups is rather diverse, it can be stated that the dynamics of the labour market are fundamentally defined by shocks sustained by the economy (changes in the economic environment, labour market regulation and institutional system), rather than demographic changes.

Chart 8
Beveridge curves based on HCSO and NES data

Source: NES, HCSO

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