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Inflation Expectations in Hungary

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The views expressed are those of the authors and do not necessarily reflect the official view of the central bank of Hungary (Magyar Nemzeti Bank).

Contents

Abstract

The aim of this study is to provide an overview of the main characteristics of expectations of professional forecasters, households and firms in respect of Hungarian inflation trends. In countries where an inflation targeting regime is in place, inflation expectations are of key importance from the perspective of monetary policy and play a significant role in central bank decision-making and follow-up communication. The inflation expectations of economic agents are relevant for central banks for two main reasons. On the one hand, inflation expectations can provide direct information concerning the credibility of monetary policy. On the other hand, they may carry important information that can help central banks in forecasting macroeconomic developments. For the purpose of understanding and forecasting inflation developments, most central banks monitor the expectations of individual economic agents on a regular basis. Besides average expectations, the dispersion of inflation expectations may also contain significant information for central banks. For Hungary, inflation expectation data are available from surveys based on quantitative or qualitative questionnaires for households, firms and professional forecasters.

JEL: C83, D84, E31, E52.

Keywords: inflation expectations, survey, central bank.

Összefoglaló

Tanulmányunk célja, hogy áttekintse a hazai inflációs folyamatokra vonatkozó elemzői, lakossági és vállalati inflációs várakozások főbb jellemzőit. Az inflációs célkövető országokban az inflációs várakozások a monetáris politika szempontjából kiemelt jelentőséggel bírnak, a jegybanki döntéshozatalban és a döntéseket követő jegybanki kommunikációban is hangsúlyos szerepet kapnak. A jegybankok számára alapvetően két szempontból lehetnek érdekesek a gazdaság szereplőinek inflációs várakozásai. Egyrészt az inflációs várakozások közvetlen információt nyújthatnak a monetáris politika hitelességével kapcsolatban. Másrészt a várakozások hordozhatnak olyan információt a jegybankok számára, amelyek segíthetnek a makrogazdasági folyamatok előrejelzésében. A legtöbb központi bank rendszeresen monitorozza az egyes gazdasági szereplők várakozásait az inflációs folyamatok megértése, előrejelzése céljából. A várakozások átlaga mellett a jegybankok számára a várakozások szórása is fontos információt hordozhat. Magyarországon az inflációs várakozásokra vonatkozó adat kvantitatív vagy kvalitatív megkérdezésen alapuló felmérésekből áll rendelkezésünkre a háztartások, a vállalatok és piaci elemzők esetében.

1   Introduction

In countries where an inflation targeting regime is in place, inflation expectations are of key significance from the perspective of monetary policy and play an important role in central bank decision-making and follow-up communication. The inflation expectations of economic agents are relevant for central banks for two main reasons. On the one hand, inflation expectations can provide direct information in respect of the credibility of monetary policy. On the other hand, they may carry important information that can help central banks in forecasting macroeconomic developments. For the purpose of understanding and forecasting inflation developments, most central banks monitor the expectations of individual economic agents on a regular basis.

In the course of decision-making process (e.g. wage negotiations, consumption vs. saving dilemma, investments decisions), economic agents take into account expected inflation developments; therefore, changes in inflation expectations have an impact on future realised price changes. If economic agents make their decisions in accordance with the target indicated by the central bank — in other words, the expectations are anchored —, they may contribute to the implementation of a more effective and flexible monetary policy. In case of well-anchored expectations the central bank has more room for manoeuvre in its efforts to stabilise the real economy; for instance, the monetary policy may disregard certain price level increasing shocks (e.g. a global commodity price increase, indirect tax hikes) without threatening medium-term price stability or demand shocks require smaller monetary policy reaction to achieve medium-term inflation targets. Conversely, if inflation expectations rise above the target, they may result in higher actual inflation levels. This in turn may require a stricter monetary policy to bring expectations — and inflation — in line with the desired level.

Expectations consistent with the inflation target indicate the credibility of the target. Medium and long-term expectations are predominant factors in respect of credibility. The economy may sustain numerous short-term shocks, which may temporarily avert expectations from the inflation target; thus biased short-term expectations does not necessarily imply lack of credibility. Long-term expectations reflect expectations for the monetary policy. When expectations on longer horizon remain close to the inflation target despite the inflationary shocks hitting the economy, this signals the credibility of monetary policy. In this case economic agents assume that the monetary policy is able and willing to counterweight the effects of the inflationary shocks hitting the economy, leading to a quick fade out of inflation shocks.

Besides average inflation expectations, the dispersion may also contain significant information for central banks. [1] When the expectations of economic agents are widely dispersed, this may lead to decisions that may subsequently prove to be improper. If the monetary policy coordinates economic agents' expectations properly, their dispersion will be moderate.

Being aware of the inflation expectations of economic agents may help understand and forecast inflation trends. The expectations of different economic agents may have different information content. Although professional forecasters are considered to be the most well-informed group, their forecasts are based on nearly the same information basis as that used by central banks; therefore, the extent to which their forecasts may provide additional information is not obvious. The forecasts of company managers carry information on the side of price setters. At the same time, while they presumably have accurate information about the price developments pertaining to their own products, it is less obvious that they can provide information relevant to the projection of the consumer price index. Households are viewed as the least informed group, but their inflation expectations may influence their consumption and saving decisions and the outcome of wage negotiations. In addition, consumers' high inflation expectations may pave the way for merchants' price increases.

For Hungary, inflation expectation data are derived from surveys based on quantitative or qualitative questionnaires. Surveys based on questionnaire are conducted among different participants of the economy (households, firms and professional fore-

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[1] By dispersion we mean the difference between economic agents' expectations, whereas standard deviation refers to the volatility of the expectation time series.

casters (Table 1). The advantage of quantitative surveys is the fact that the questionnaire includes a direct question about a relevant variable for the monetary policy (i.e. the quantified value of future inflation). As regards qualitative surveys, they only ask about the direction of inflation developments; at the same time, since these questions are easier to answer by households, the information they yield may be less noisy. In respect of the inflation expectations of professional forecasters, the results of two surveys covering several countries are available. In order to quantify the expectations of households, individual countries typically prepare their own surveys; however, comparable data are available in the case of European countries; therefore, the Hungarian household surveys can be analysed in an international comparison. As company surveys aimed at the expected evolution of the consumer price index are rare, it is difficult to evaluate the results of domestic corporate surveys. In what follows, we examine in more detail the inflation expectations of individual economic agents.

Our main findings are the following. The long-term (five and ten-year) inflation expectations of professional forecasters typically hovered around the target which, in itself, may indicate the credibility of the monetary policy framework. Medium-term (two-year) analyst expectations — which should not necessarily reflect current inflationary shocks perceivably — were also around 3 per cent on average over a longer time horizon (2003–2013). At the same time, the volatility of short-term (one-year) expectations is high, which may point to frequent and unforeseeable positive inflationary shocks. In examining the relationship between analyst and central bank forecasts we can state that the expectations of professional forecasters are considerably influenced by central bank projections. The difference between the forecasts of the central bank and professional forecasters declines sharply after the publication of the Inflation Report.

The inflation perceptions and expectations of households consistently overshoot the central bank's inflation target. There is a difference between the inflation target and household expectations in numerous countries; however, the difference observed in Hungary is high even in international comparison. This phenomenon may be due to the fact that the inflation perception of households reacts sensitively to the price changes of those more frequently observed products, which are typically susceptible to price increases (food, fuel, regulated energy prices). In view of this distortion, besides the level of expectations we should also closely monitor the dynamics of the indicators. Household expectations demonstrate close co-variance with actual inflation and inflation perception, which indicates that household expectations are highly retrospective in nature. The distortion and significant dispersion of expectations are nearly equally evident in short-term (one-year) and long-term (five-year) expectations.

The pricing behaviour of firms appears consistent with a Philips curve behaviour both in case of pricing their own products and wage-setting. In line with the intuition, the expected evolution of own prices are influenced by expectations for economic activity, wages, competitors' prices and the aggregate price index. Corporate expectations about the consumer price index continuously overshot the inflation target significantly during the period of our analysis. It should be stressed that there is no significant relationship between the aggregate consumer price index and expectations about the other variables, e.g. about wage increases or the price index of own products. Corporate expectations regarding the consumer price index do not carry substantive forward-looking information.

The structure of the study is as follows: in the second chapter we give an overview of the inflation expectations of professional forecasters, followed by a detailed analysis of the inflation expectations of households and firms in the third and fourth chapters, respectively. The study is concluded by a conclusion of the main results.

Table 1
Available measures of inflation expectations

	Data source	Horizon	Frequency	Other
Professional forecasters	Reuters	current and next calendar year	monthly	international
	Consensus Economics	current and next calendar year	monthly	international
		long term (5-10 years)	semi-annually	
Households	European Commission	qualitative, 12 months	monthly	international
	Medián/Tárki	quantitative, 12 months	quarterly	publicly available results are limited to a few countries
		qualitative, 5 years	quarterly	
Firms	European Commission	3 months	monthly	international
	Medián/Tárki	quantitative, 12 months	quarterly	on a global scale, corporate surveys are rare

2 Professional forecasters' inflation expectations

Professional forecasters tend to have up-to-date information about economic developments, and they also consider complex economic models in forming their expectations. Of all economic agents, analysts can be considered the best informed; therefore, their expectations may contain important information for central banks.

Box 1: Factors influencing professional forecasters' inflation expectations in VAR models

In the international literature, studies mainly examine, on a retrospective basis spanning several decades, professional forecasters' expectations influencing inflation trends in the United States. Based on Clark and Davig (2008), and Clark and Nakata (2008), the most important findings are the following:

- Shocks to the actual consumer price index cause both short- and long-term expectations to rise. Short-term expectations typically respond more sharply to inflationary shocks; however, the effect is more persistently perceived in long-term expectations.

- Shocks to monetary policy, ceteris paribus, affect short- and long-term inflation expectations. A shock raising the key policy rate lowers short- and long-term expectations after about one year.

- Shocks to economic activity elicit a rise mainly in short-term expectations.

- Analysts' expectations respond sensitively to an increase in food prices; food price inflation raises both short- and long-term inflation expectations.

- After the 1970s expectations became better anchored, and inflationary shocks have had a smaller impact on long-term expectations, and were less permanent. However, the relatively low volatility of expectations is largely due to smaller shocks to inflation.

As regards domestic analyst expectations, two surveys are available:

- Consensus Economics polls Hungarian and foreign financial and economic analysts in respect of their expectations. Short-term (current and next year) and long-term (five and ten-years ahead) expectations are published with a monthly and a semi-annual frequency, respectively. More than 180 analysts (international and CEE) are interviewed in respect of their expectations about the Central and Eastern European region.

- The Reuters survey asks 20–25 market analysts on a monthly basis about their inflation expectations for the current year and for the next two years.

2.1 What do professional forecasters' inflation expectations indicate about central bank credibility?

From the aspect of central bank credibility, longer-term inflation expectations have more relevance. Numerous studies — focusing mainly on the euro area and the USA — have found that long-term expectations are well-anchored, hovering close to the

central bank inflation target, with no sizeable reaction to even the increased uncertainty of recent years (Galati et al. (2011), Trehan–Zorilla (2012)[2] , Cunninhgam et al. (2010), ECB (2012)). This statement also holds for countries in the region. In recent years, long-term inflation expectations have moved in a relatively narrow range close to the central bank inflation target, reflecting confidence in the central bank and the credibility of monetary policy (Figure 1). In addition to this, changes in expectations regarding the accession to the euro area may also have influenced the evolution of longer-term inflation expectations. Looking at individual countries, expectations in the Czech Republic stayed under the 3 per cent target between 2006 and 2010, which may suggest that analysts expected the reduction of the inflation target. This phenomenon, however, was not observed in the other three countries.

Figure 1

Development of five-year ahead inflation expectations in the region

(Data series on the figure indicate five-year ahead expectations at the given time. Red lines mark the inflation target, while squares show inflation expectations five-year ahead. In the case of Hungary, the red lines and triangles in the period preceding 2007 indicate the edges of the end-of year inflation target band. Source: Consensus Economics and national central banks)
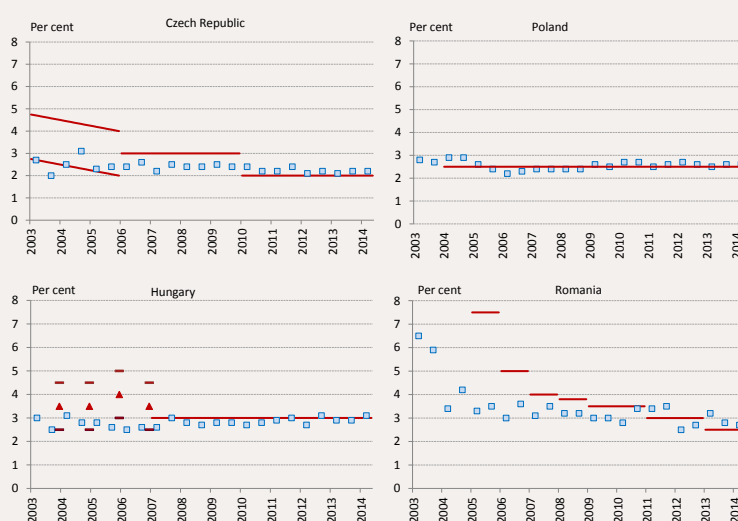
Inflationary shocks (e.g. food price and oil price shocks) are reflected in short-term analysts' expectations; therefore, it is a natural phenomenon that they are more volatile than longer-term expectations. Consequently, higher-than-target short-term expectations do not necessarily indicate the lack of central bank credibility. At the same time, the inflationary effect of shocks is more moderate in case of higher central bank credibility; thus, with all else being equal, the volatility of short-term expectations is also smaller. As regards short-term expectations, analysts' inflation expectations for the euro area one-year ahead [3] — at the given time, pertaining to the average inflation of the year following the year of the survey — have been relatively stable in the past two years, moving below the 2 per cent target (Figure 2, left panel). Expectations have been volatile in the United Kingdom as well, staying above the target since 2011. [4]

Short-term analysts' expectations in the region exhibited more volatility compared to the larger Member States of the euro area (Figure 2, right panel). In the period following 2007, expectations in Hungary and Romania demonstrated the highest volatility. The diverging inflation expectations examined for the two groups of countries may be attributed to indirect tax changes and other administrative measures, which have been more pronounced and more frequent in countries of the region in recent years. In addition, higher inflationary shocks may be also explained by the different effects of cost shocks in the considered

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[2] Long-term inflation expectations remained stable in the USA during the crisis, while they exhibited an increase in the UK: after the crisis, the level of five-year expectations stood above the 2 per cent inflation target.

[3] Accordingly, two-years expectations are equal to expectations for the average inflation of the second year following the survey.

[4] Also in the United Kingdom, decision-makers closely monitor the evolution of inflation expectations. Actual inflation has been above the target since mid-2010, which carries the risk of expectations becoming less anchored, potentially leading to more persistent inflation. According to the study of Maule and Pugh (2013), most inflation expectation indicators are consistent with the inflation target, with the exception of inflation expectations derived from financial instruments, which tended to respond less sharply to economic developments during the past period. For the time being, there are no meaningful signs indicating a pass-through of the higher inflation expectations into prices or wages; however, since these indicators are surrounded by significant uncertainty, decision-makers tend to track their evolution closely.

countries, stemming from the higher weight of food and energy prices in the consumption basket of the region compared to the euro area.

Figure 2

**Development of one-year ahead analysts' expectations**

(Data series on the charts indicate average inflation expectations for the year following the date of the survey. Source: Consensus Economics)
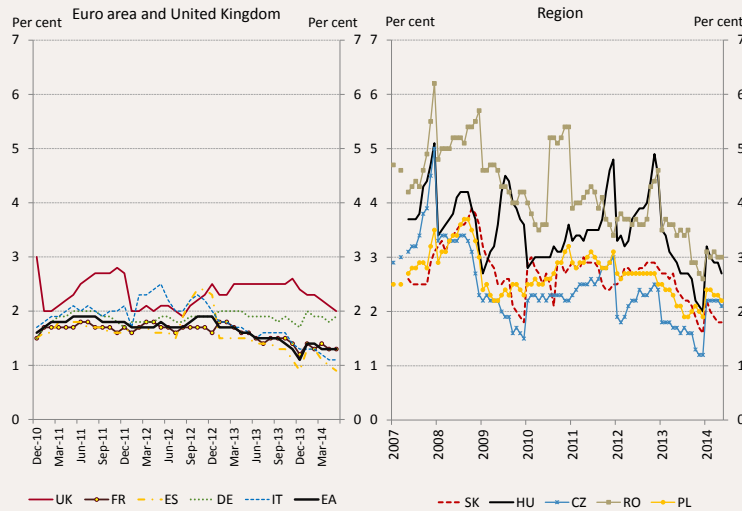
Looking at analysts' expectations in Hungary, it can be stated that the volatility of one-year ahead expectations is extremely high, reflecting the impact of unexpected inflationary shocks (Figure 3, Table 2). Although long-term, five- and ten-year ahead analysts' expectations also responded somewhat to short-term inflationary shocks, this reaction was subdued and long-term expectations remained close to the inflation target in Hungary as well. Two-year ahead analysts' expectations — which should not necessarily reflect current inflationary shocks any longer — were also around 3 per cent on average over a longer-term time horizon.

Figure 3

Development of one-year, five-year and ten-year ahead expectations of professional forecasters in Hungary

(Source: Consensus Economics, Reuters)
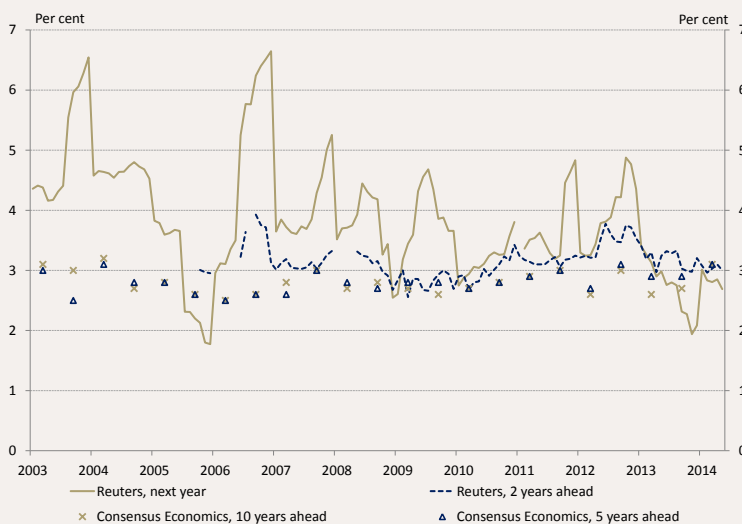
Besides the mean of analysts' inflation expectations — in particular, longer term expectations — to be consistent with the infla-tion target, a successful central bank coordination of the expectations needs to prevent the excessive dispersion of individual forecasters' expectations. According to empirical results, uncertainty rose both in the euro area and in the United Kingdom in the wake of the crisis, [5] which called attention to a more intensive monitoring of expectations. While the dispersion of one-year ahead expectations is relatively high in Hungary, the relative dispersion compared to the expectations' mean can be considered average (Figure 4). This may suggest that in a higher inflation environment uncertainty surrounding the expected evolution of inflation is greater.

Table 2

Mean and standard deviation of one-year, five-years and ten-years ahead expectations of professional forecasters in Hungary (January 2003 – May 2014)

	Time horizon	Mean	Standard deviation
Expectations	one-year ahead	3.7	0.8
	five-year ahead	2.8	0.2
	ten-year ahead	2.8	0.2
Actual inflation		4.7	2.0

Source: Consensus Economics, CSO

Figure 4

Average dispersion of one-year ahead professional forecasters' expectations in the euro area, the United Kingdom and CEE countries (December 2010 – May 2014)

*(Source: Consensus Economics, own calculations)*
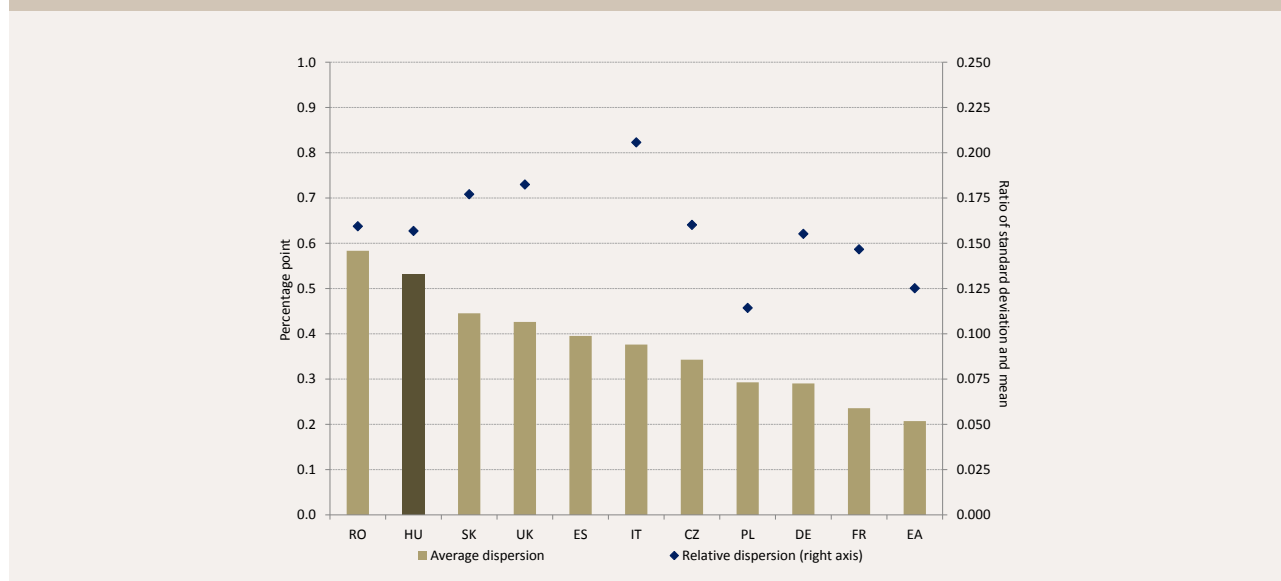
As regards the dispersion of professional forecasters' expectations concerning the evolution of domestic inflation trends over time, we can establish that the differences between professional forecasters' projections have increased since the crisis (Figure 5). This may be indicative of the increased uncertainty following the crisis. The increased uncertainty observed during the years of the crisis may be partly attributed to the fact that, besides high indebtedness, certain forecasters may have attached a higher probability to the inflationary effects of possible VAT or indirect tax increases.

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[5] According to Gerlach et al. (2011), long-term inflation expectations remained relatively stable even during the crisis (USA, EA). At the same time, uncertainty and dispersion is slightly greater than before the crisis, which raises the question as to how anchored expectations really are.

Figure 5

Dispersion of one-year ahead professional forecasters' expectations in Hungary

(Source: Consensus Economics)
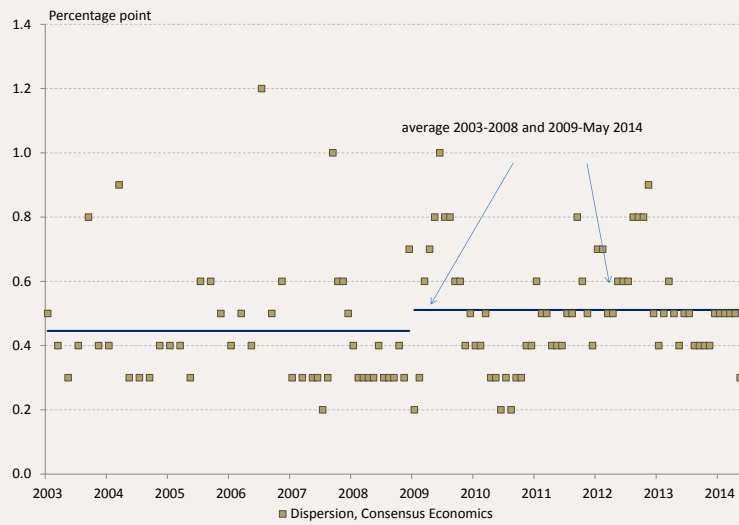
2.2 Comparing professional forecasters' and central bank's forecasts

Among economic agents, professional forecasters can be considered the best informed group. At the same time, they rely on a similar dataset in developing their expectations as the central banks; therefore, it is not clear whether professionals' forecasts carry additional information compared to central bank forecasts. This assumption is supported by the fact that one-year ahead professional and central bank forecasts co-move closely in case of Hungarian inflation as well (Figure 6).

Figure 6

One-year ahead inflation expectations of professional forecasters vs. central bank's forecasts in Hungary

(Data series on the charts indicate average inflation expectations at the date of the survey for the year to follow; actual inflation data are indicated with a shift. Source: Consensus Economics and MNB)
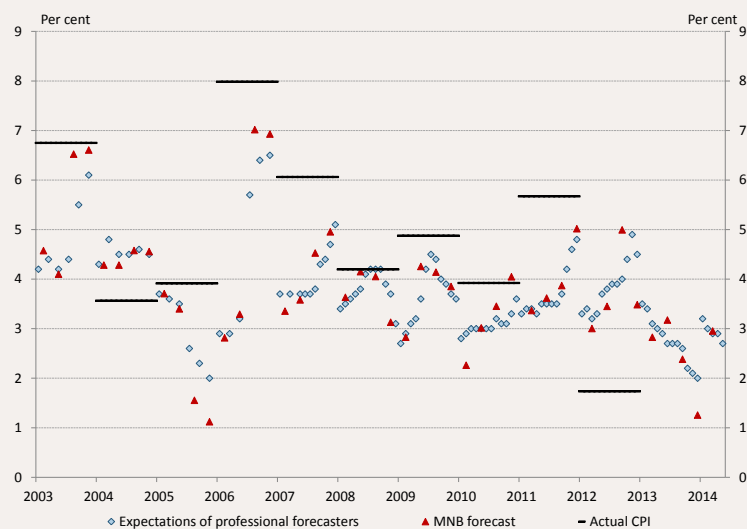
Box 2: Central bank vs. professional forecasters' expectations

A parallel examination of central bank and professionals' forecasts may reveal whether the central bank or analysts can prepare better projections of inflation trends. Differences in forecasting ability can be attributed firstly to differences in the methods applied; secondly, to the efficiency of the processing of information available both to the central bank and professional forecasters, and thirdly, to the potential information advantage of central banks. The most detailed analyses of the international empirical literature were aimed at the comparison of staff forecasts of Fed with the corresponding private forecasts in the United States (El-Shagi et al. [2012]). The authors found that at the beginning of the 1980s in the United States, the macroeconomic forecasts prepared by the Fed's staff were much more accurate than those of private forecasters, owing primarily to additional information (for example, about the banking sector). Looking at a longer time horizon, however, it is evident that this gap in forecast performance narrowed gradually, mainly thanks to the Fed's improved transparency.

Using a few simple regressions we also examined the efficiency of central bank and analysts' forecasts pertaining to domestic inflation trends between 2002 Q3 and 2012 Q4.

$$\pi_{t+1} = \alpha + \beta_1 \pi_{t+1|t}^{e,Reuters} + u_{t+1} \tag{1}$$

$$\pi_{t+1} = \alpha + \beta_2 \pi_{t+1|t}^{e,MNB} + u_{t+1} \tag{2}$$

where π_{t+1} denotes expected inflation one year from now, α is the intercept, $\pi_{t+1|t}^{e,Reuters}$ is inflation expected by Reuters for the following year in the t period, $\pi_{t+1|t}^{e,MNB}$ is inflation expected by the MNB for the following year in the period t, and u_{t+1} is the error term.

Regressions (1) and (2) are aimed at testing bias. The forecasts would be unbiased if the α intercept was 0 and the forecast coefficient (β_1) was 1. Based on the results (Table 3, regression (1) and (2)) both central bank and analyst forecasts are biased, significantly underestimating the inflation to be realised one year from now. In addition to the bias, the explanatory power of regressions is also low (low adjusted R^2), which suggests that Hungarian inflation is hard to forecast with frequently materialising, unforeseen shocks.

With the help of the following equation we examined whether the Reuters analyses carry any additional information content in addition to MNB forecast.

$$\pi_{t+1} = \alpha + \beta_3 \pi_{t+1|t}^{e,Reuters} + \beta_4 \pi_{t+1|t}^{e,MNB} + u_{t+1} \tag{3}$$

All else being equal, the β_3 coefficient shows the level of the Reuters expectation's information content in respect of actual inflation. According to the result, the MNB forecast predicts inflation somewhat more efficiently than the projections of professional forecasters; analyst forecasts have no additional information content. [6]

Finally, the last regression examines the extent to which changes in the central bank forecast alter the forecasts of professional forecasters.

$$\pi_{t+1|publ_a}^{e,Reuters} - \pi_{t+1}^{e,MNB} = \alpha + \beta_5 (\pi_{t+1|publ_b}^{e,Reuters} - \pi_{t+1}^{e,MNB}) + u_{t+1} \tag{4}$$

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[6] Bias and low forecasting power are not typical in any of the countries analysed in the empirical literature. Estimating similar regressions, in respect of the United States and the euro area El-Shagi et al. (2012) found that annual central bank staff forecasts and private forecasts are unbiased and the adjusted R^2 is above 50 per cent.

$\pi_{t+1|publ_b}^{e,Reuters}$ on the right-hand side of the equation is the inflation expected by Reuters for the following year as at the month of the publication of the Inflation Report (IR), while $\pi_{t+1|publ_a}^{e,Reuters}$ is the inflation expected by Reuters for the following year as at the month following the month of the publication of the Inflation Report. β_5 indicates the multiplicative change in the difference between the MNB forecast and analysts' forecasts after the publication, in comparison to the difference before the publication of the Inflation Report. In case of $\beta_5 < 1$ the projection of market analysts approaches the MNB forecast. Based on the result, the central bank forecast has a considerable impact on analyst expectations, and the difference between the central bank forecast and the projection of professional forecasters declines by a third after the publication of the Inflation Report.

Table 3
Coefficients of the regressions quantifying the relationship between professional forecasters and central bank forecast

Regressions		(1)	(2)	(3)	(4)
Dependent variable		Annual average inflation	Annual average inflation	Annual average inflation	Difference between central bank and analysts' inflation forecasts after the publication of the IR
Explanatory variables	Constant	2.97 [0.94]	3.22 [0.73]	3.70 [1.03]	0.07 [0.07]
	Annual average inflation forecast, Reuters	0.54 [0.23]		−0.52 [0.60]	
	Annual average inflation forecast, MNB		0.48 [0.16]	0.87 [0.44]	
	Difference between central bank and analysts' inflation forecasts before the publication of the IR				0.63 [0.14]
Adjusted R^2		0.12	0.17	0.16	0.24

Newey-West standard errors are shown in brackets.

3 Households' inflation expectations

The heterogeneity of households hinders the interpretation of the surveys regarding the inflation expectations of households. Many households have limited or at times, distorted information about macroeconomic developments, and their replies to the questionnaire provide dispersed and extremely noisy information about their expectations. At the same time, these surveys may capture information that is inaccessible to the central bank's forecasting system (e.g. when expectations diverge from the path warranted by macroeconomic developments). The inflation expectations of households are often distorted; at the same time, their change can still provide useful information regarding short-term inflationary pressures (Ranchhod [2003]).

Household expectations may exert their influence through wage negotiations and consumption-savings decisions. In case of higher inflation expectations, households strive to achieve higher nominal wages, which may eventually raise prices. Higher inflation expectations may bring consumption forward, amplifying inflationary pressures in the economy. In addition, in case of higher inflation expectations consumers tend to tolerate price increases more easily, which, in itself, makes the raising of prices easier.

Both quantitative and qualitative surveys are used to gauge the inflation expectations of households.[7] In the context of the quantitative survey aimed at Hungarian households' inflation perceptions and expectations, 1,000–1,200 persons are polled. (The survey was initially conducted by Medián and at present by Tárki, commissioned by the MNB)[8]. The results of the survey have been available since 2002. Qualitative surveys have been conducted since 1993 in Hungary on behalf of the European Commission, polling 1,000 consumers on a monthly basis. Since all EU Member States conduct this survey on behalf of the European Commission, Hungarian results can be easily compared to those of other countries.

3.1 Results of quantitative surveys

The interpretation of quantitative surveys is made difficult by the fact that the mean value of the responses may differ persistently and significantly from actual inflation (Box 3 provides a brief summary of the results of empirical studies). Households' inflation perceptions and expectations are significantly higher than the central bank's inflation target, and have high volatility, which indicate that expectations are not anchored. The level and volatility of longer-term expectations is similar to those of short-term expectations. This means that the central bank's inflation target does not coordinate households' expectations even over a longer time horizon (Figure 7).

Box 3: Characteristics of household inflation expectations / international results

A large part of the empirical literature analysing households' inflation expectations focuses on the rationality of expectations. In this sense, rationality means whether the expectations of households are good predictors of actual inflation. As expected, most empirical studies — for example, Forsells and Kenny (2002) and Dias et al. (2008) in case of the euro area; and Mitchell and Weale (2007) in case of the United Kingdom — found that the inflation expectations of households are not rational. That notwithstanding, they carry meaningful information about the future inflation developments. Ang et al. (2006) found that the inflation expectations of US households performed better than numerous alternative forecasts.

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[7] For the purposes of this study, one-year ahead expectation is equivalent to inflation expected for the next 12 months, while 5-years ahead expectations are equivalent to annual inflation expected five years from now.

[8] The following question is asked in respect of inflation expected one year from now: How do you expect consumer prices will develop in the next 12 months? Will they decrease, increase or remain the same? In your opinion, by what percentage will prices increase / decrease? In respect of long-term expectations, the survey uses the following question: What annual rate of inflation do you expect five years from now?

Another branch of the empirical literature dedicated to households' inflation expectations focuses on factors that influence the inflation expectations of households (for example, Brachinger [2008], Lein and Maag [2008], Ueda [2009]). The studies address, among other things, the effects exerted by actual inflation, food and commodity prices on expectations. The findings show that the expectations of households are shaped primarily by inflation observed in the past. Moreover, in shaping their expectations, households usually do not attach the same weights to products as statistical offices. They typically overweight higher, transparent price changes and the products they buy most frequently. As regards the impact of commodity prices, oil price shocks raise the level of expected inflation, but this effect is transitory only (Mehra and Herrington [2008]). The estimates of Leduc et al. (2007) suggest that monetary and fiscal policy shocks are factored in consumers' expectations; however, this did not lead to permanent, significant increases in inflation expectations prior to the 1980s. From the 1980s, as anti-inflationary monetary policy became more aggressive, inflation expectations fell persistently in response to monetary policy shocks. The expectations of households may be also influenced by media news items. Lamla and Lein (2008) found that a higher intensity of reports in the written and electronic media is likely to induce an update of households' expectations and brings them closer to the expectations of professional forecasters. At the same time, media tends to transmit exaggerated or incomplete information, which may distort the accuracy of expectations. As a result, the inflation expectations of households may persistently and significantly diverge from actually observed inflation.

Figure 7

Inflation perceptions and expectations of households

(The time series of expectations indicate inflation expected one year from the time of the survey. Source: own calculations and CSO)
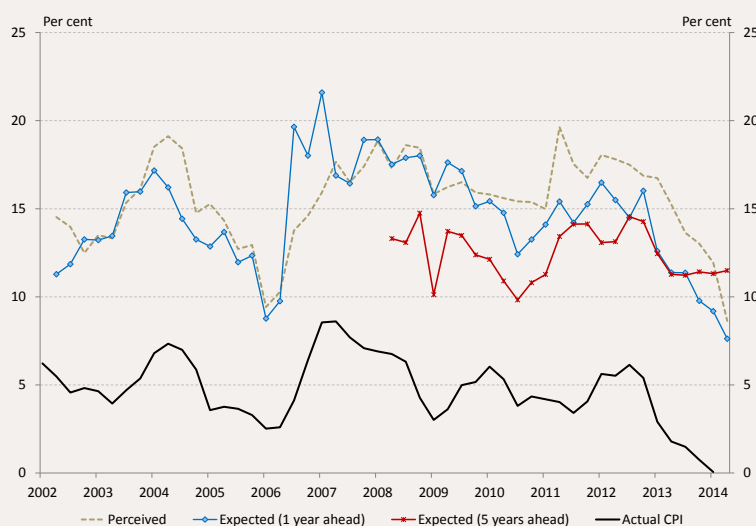
The interpretation of households' quantitative inflation expectations is made difficult by the lack of publicly available surveys in numerous countries. The European Commission has been conducting surveys in respect of households' quantitative inflation expectations; however, for the time being, this information is not publicly available, and only a handful of summary tables and time series have been published so far. Based on the available information, the gap between households' inflation expectations and actual inflation trends is by no means a Hungarian phenomenon; nevertheless, between 2003 and 2010, the largest divergence was observed in Hungary (Table 4).

In comparing Hungarian figures to data collected in European countries it is important to stress that household perceptions and expectations fell sharply in Europe during the crisis (Figure 8), while they remained largely the same in Hungary. At the same time, headline inflation remained also stable, which can be attributed to the considerable impact of fiscal adjustment.

3.2   Results of qualitative surveys

The European Commission conducts a monthly survey in respect of households' qualitative inflation perceptions and expectations. The survey is based on an internationally harmonised methodology, allowing for an international comparison of the data pertaining to European countries.

Table 4
Results of quantitative inflation surveys

	Inflation perception	Inflation expectation	Actual inflation	Difference (Perceived-actual inflation)
Austria	10.6	6.5	1.9	8.7
Belgium	8.6	4.0	2.1	6.5
Germany	8.0	5.5	1.7	6.3
Greece	18.5	14.4	3.1	15.4
Spain	16.8	11.4	2.7	14.1
Finland	3.6	2.9	1.5	2.1
France	7.7	3.6	1.8	5.9
Ireland	8.8	7.4	1.6	7.2
Italy	18.3	5.2	2.1	16.2
Luxembourg	7.9	4.8	2.8	5.1
Portugal	7.1	6.1	1.9	5.2
Slovenia	11.5	8.0	3.1	8.4
Cyprus	16.1	12.9	2.2	13.9
Malta	9.1	9.2	2.4	6.7
Slovakia	10.2	10.4	3.3	6.9
Euro area	**11.9**	**6.4**	**2.0**	**9.9**
Hungary	**15.5**	**15.2**	**5.4**	**10.1**

Average values between May 2003 and June 2010. Source: Ferrucci et al. (2010)

Figure 8
Households' inflation expectations and perceptions in the euro area (%)

(Source: Ferrucci et al. (2010), p. 25)
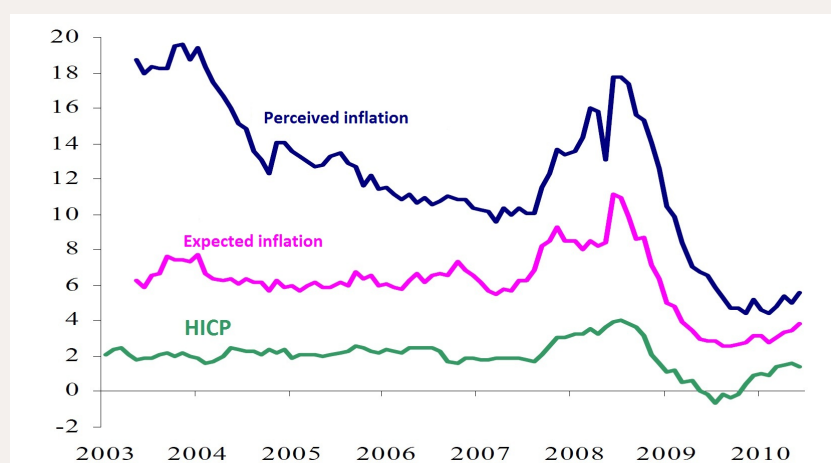
Quantified inflation expectations can be derived from the qualitative data by using the Carlson–Parkin method. The method assumes that both perceived and expected inflation have a continuous probability distribution, which defines the manner in which the distribution parameters (expected value, standard deviation) can be determined. The expected value of the distribution is considered to be the perceived or expected inflation. In order to quantify perceived inflation, we need to determine the price increase that households consider to be a moderate rate of increase. For that, we need to introduce an assumption regarding the interaction between perceived and actual inflation. Accordingly, below we assume that, over a longer time

horizon, perceived and actual inflation are the same on average. When responding to the question about their expectations, households use the thus determined perceived inflation as a point of reference (for more details about the Hungarian results, see Gábriel [2010]).

During the quantification exercise we can apply various assumptions. If we assume that moderate inflation is actual inflation's moving average of different lengths (3, 4 and 5 years), this will change the level, but not the dynamics of the time series (Figure 9). It will have no impact on the correlations presented later. According to the quantified expectation time series (under the original assumptions), Hungarian inflation expectations are high in regional comparison (Figure 10).[9]

Figure 9

Range of inflation expectations under different assumptions
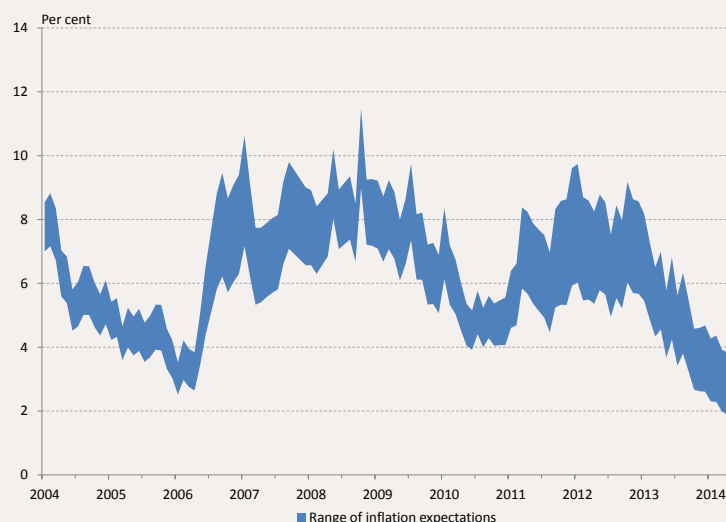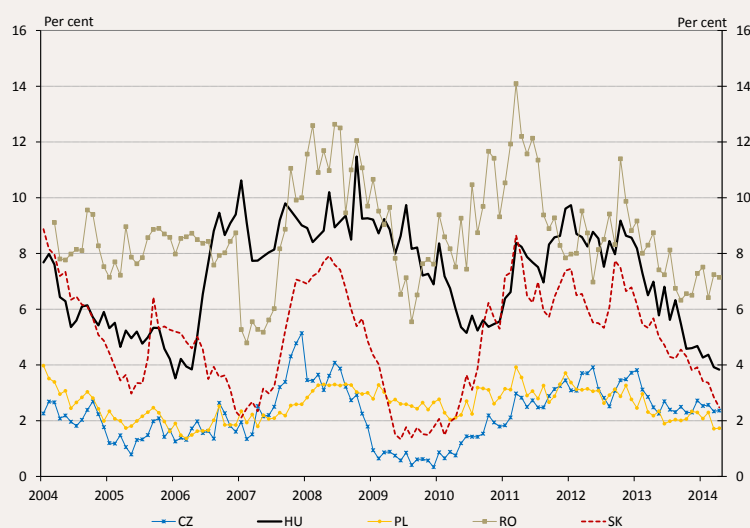
(Source: own calculation)

Figure 10

Development of one-year inflation expectations in the region

*(Source: MNB calculation based on data from the European Commission)*

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[9] When assessing the level of expectations it should be considered that the assumption applied for the quantification will also influence the value of the obtained time series.

It should be noted that, although the dynamics of the quantitative expectation time series of Hungarian households and the time series quantified from the qualitative survey co-move closely, the average level of the two time series is different (Figure 11). This is basically because of the assumption used for the quantification of expectations; namely, that perceived inflation, on average, is identical with actual inflation. Compared to quantitative surveys, in case of Hungary this is a relatively optimistic assumption which, in itself, induces a downward bias in the results derived from the qualitative survey in respect of the inflation expectation.

Figure 11

Households' inflation expectations vs. actual inflation

(Source: MNB calculation based on data from the European Commission, and MNB)
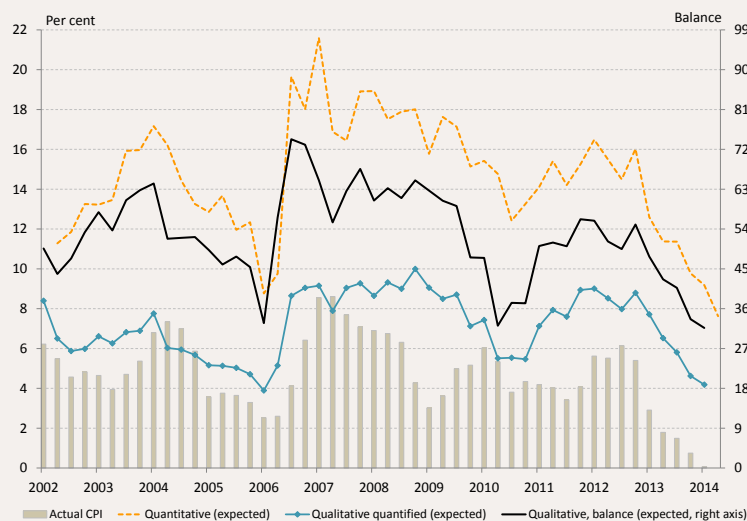
Based on simple correlations, perceived and expected inflation largely co-move with the consumer price index (Table 5). Based on inflation components, some CPI items play a more important role in shaping perceptions and expectations as, presumably, households monitor changes in these items more closely. Of the inflation components, perceptions and expectations correlate to the largest degree with administered prices and food prices. There is a close co-movement between the inflation expectation time series and perceived inflation. This indicates that households' expectations rise persistently in line with the increase in inflation.

Table 5

Correlation with the inflation perception and inflation expectation time series

	CPI	Core inflation	Non core inflation	Administered prices	Foods	Inflation perception	Inflation expectation
Inflation perception	0.57	0.68	0.15	0.13	0.59	1	0.88
Inflation expectation	0.62	0.65	0.27	0.31	0.68	0.88	1
CPI	1	0.85	0.72	0.69	0.71	0.57	0.62
Calculated between 2001 and 2013 Q3							

On the basis of simple correlations alone it is not possible to determine the causal relationship between inflation and inflation expectations. In order to answer this question, the literature typically applies structural vector autoregressive (SVAR) models. We applied the methodology used by Gábriel (2010), and extended it to several countries [10] between 1993 Q2 and 2012 Q3. In estimating the model we applied two lags.

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[10] Hungary, Czech Republic, Poland, Slovakia, Romania, Slovenia, Spain, Portugal, United Kingdom, Sweden, Germany, Latvia, Lithuania and Estonia

Relying on the SVAR model we can capture the linear relationship between several endogenous variables and estimate the impact of various shocks. As endogenous variables, we used the quarterly change of actual inflation, the quantified inflation expectation based on the European Commission survey, and changes in retail sales. The role of the latter variable is to capture economic activity. The exogenous variable used in the model is a dummy variable capturing VAT changes. Relying on the model we can quantify the impact of demand, supply and expectation shocks. Below we focus on the expectation shock and the impact that exerts on inflation.

Although the inflation expectations of households differ from actual inflation, expectations are self-fulfilling and as such, they may have an important role in the evolution of wage-setting and pricing decisions. The objective of the expectation shock is precisely to quantify such changes in inflation expectations. In identifying the shock we assume that the expectation shock has an immediate impact on inflation expectations, while it influences the rest of the variables with one period lag.

Based on the results it can be stated that household expectations track the changes in inflation; in other words, to a large degree, they are retrospective in nature. At the same time, in all countries inflation expectations sustain certain shocks that cannot be explained by past changes in inflation. The magnitude of these shocks is presumably related to the extent to which monetary policy can coordinate expectations. We normalised the received results. According to the results, these shocks are large and persistent in Hungary in comparison to other European countries (Figure 12). This may be explained by the fact that Hungary sustained numerous shocks (indirect tax and regulated price increases) during the period used in the estimation and as a result, expectations remained stuck at high levels.

The applied methodology also enables us to examine the evolution of inflation following the shocks to the expectations. In case of Hungary these shocks raised inflation significantly in a European comparison. The results indicated that the inflation expectations of Hungarian households are not adequately anchored, which may have contributed to volatile inflation persistently exceeding the inflation target.

Figure 12

Expectation shocks and their effect on inflation

(The chart indicates the average expectation shock and its impact on inflation. The chart contains normalised results and accordingly, they are not influenced by size effects.)
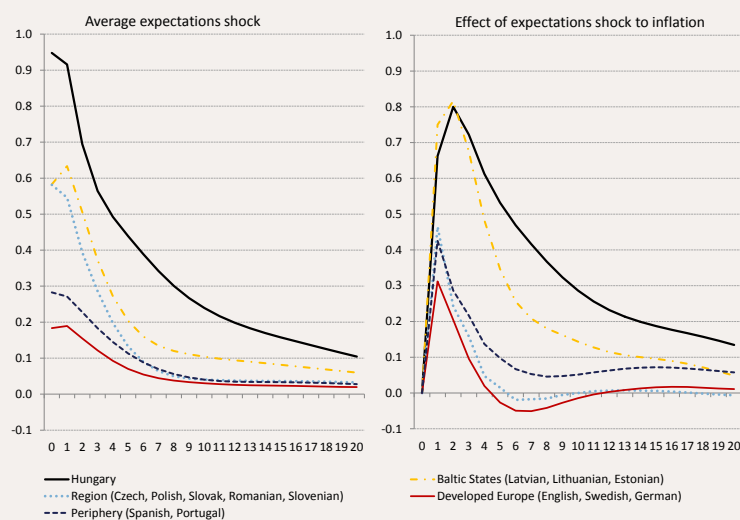

Households' inflation expectations are highly heterogeneous. The dispersion of expectations can be partly attributed to the difference between the consumption baskets of individual consumers and as a result, differences may be observed in the expectations of different individuals. At the same time, the dispersion of expectations may be also caused by households' inaccurate assessment of macroeconomic developments in general, and inflation trends in particular. Inaccurate expectations may lead to economic decisions that prove to be less than optimal in retrospect; therefore, the high dispersion of expectations is typically an unfavourable phenomenon. The dispersion of quantified expected inflation demonstrates the heterogeneity of households'

inflation expectations in international comparison. The dispersion of households' expectations is relatively high in Hungary in European comparison (Figure 13)[11]

Figure 13

Average dispersion of one-year ahead inflation expectations (2001 – April 2014)

(Source: MNB calculation based on data from the European Commission)

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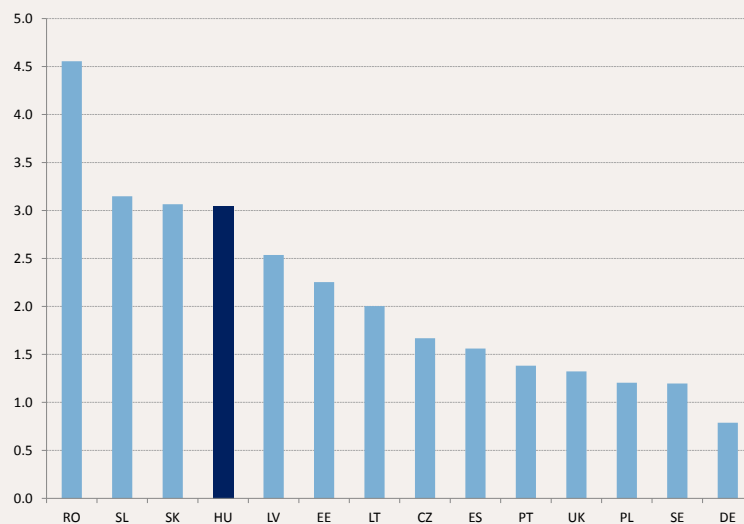
[11] The dispersion can be deduced from the assumption applied during the quantification. If we assume, for the purposes of the quantification, that moderate inflation is identical with the average actual inflation of the past 3 years, the dispersion will be somewhat less pronounced (2.2%).
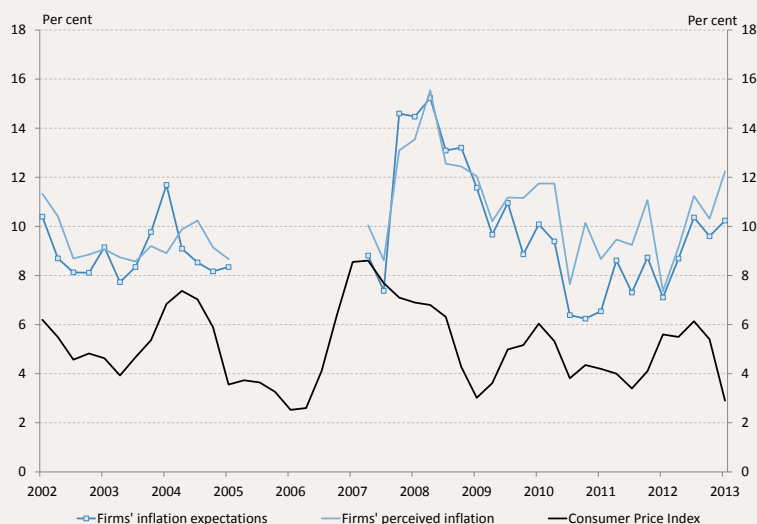
4 Corporate inflation expectations

The inflation expectations of firms may serve as an important source of information for monetary policy. The expectations of firms play a role in price-setting and wage negotiations and as such, can exert a substantive impact on the evolution of inflation.

Medium-term corporate inflation expectations can be computed from the Tárki/Medián survey.[12] The question is quantitative, directly asking about the future level of inflation expected by firms (12 months ahead). The corporate questionnaire allows us to examine, in addition to the expected level of the overall CPI, corporations' expectations about their own products and services. By doing so, we can gain an insight into expected future price pressures in individual segments. Moreover, we can also estimate inflationary pressures from the labour market from the question about expected changes in gross wages.

We have no available corporate database for other countries. While surveys polling households and professional forecasters are rather frequent worldwide, surveys focusing on the inflation expectations of firms are rare. Of CEE countries, corporate surveys are conducted only in Poland where, based on the results, there is no meaningful difference between the characteristics of corporate and professional forecasters' expectations (Lyziak, 2012).

Figure 14
Corporate inflation expectations

(As opposed to the other periods, between 2005 and 2007 the relevant question in the questionnaire pertained to the change in inflation, rather than its level. For the sake of comparability, data concerning this period were excluded from the chart. The time series of expectations indicate inflation expected one year from the time of the survey.)


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[12] From 2013 Q2 the data points are not presented in the chart due to the change in the sample.

4.1 Characteristics of corporate inflation expectations

In Hungary, CPI expectations continuously exceeded the level of actual inflation in the entire corporate segment (Figure 14). This indicates in itself that the central bank's inflation target fails to coordinate corporate expectations adequately. During the crisis, expectations declined in line with disinflation before they started to increase once again from mid-2011.

The permanent difference in level between the consumer price index and expectations characterised all sectors; there was no significant difference between sectors in respect of expectations about the consumer price index. In terms of dynamics, expectations about the consumer price index and the prices of own products track the dynamics of actual inflation; however, expectations about the prices of own products are lower; consequently, the extent to which expectations about the CPI influence pricing decisions is unclear (Figure 15).
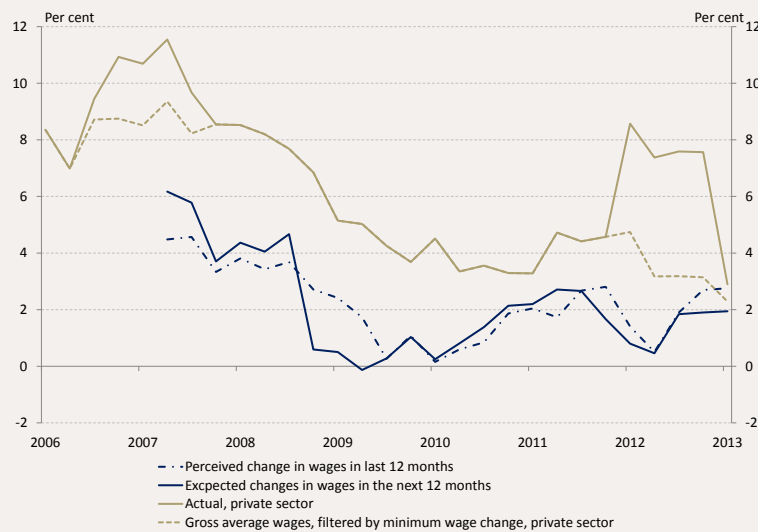
Figure 15
Inflation expectations by sector
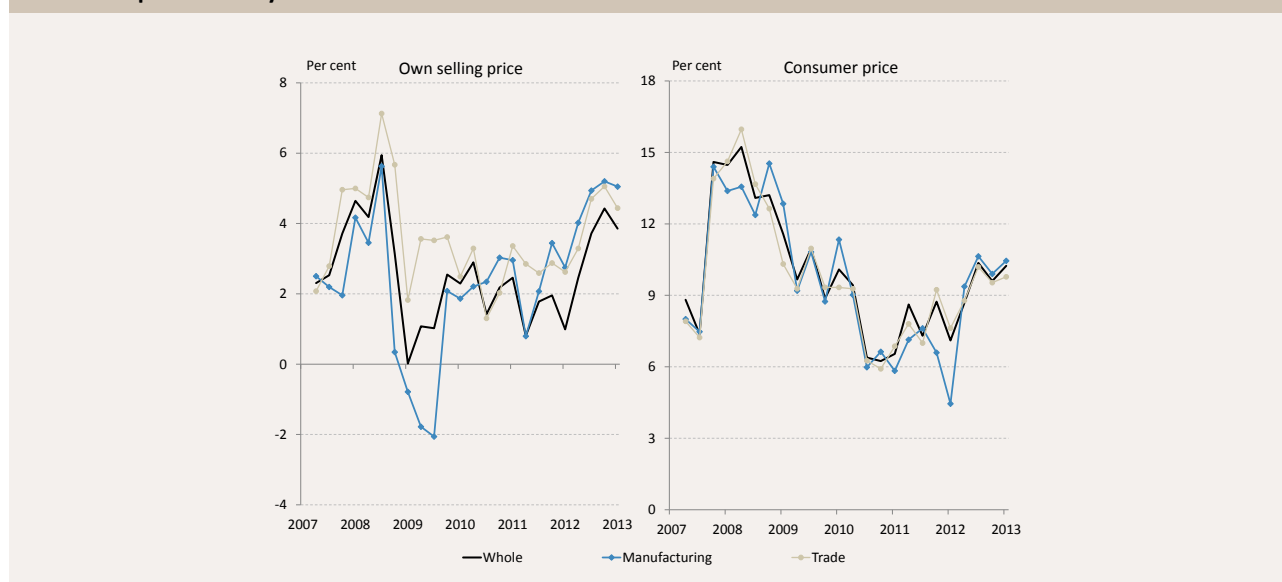
As in the case with price indices, there is a significant difference between the actual and the expected wage index in terms of its level (Figure 16), wage expectations are significantly below the subsequently registered wage changes. The minimum wage increase of early 2012 is a particularly difficult episode to interpret, as it materialised in actual data as a sharp spike, while no such peaks could be observed in expectations.

Given that there is a permanent difference between the actually observed price and wage indices and the respective expectations, we should examine whether the replies given to different questions in the corporate questionnaire are consistent with one another, and assess the extent to which the expectation time series derived from the survey carry information about future developments (Table 6). With that in mind, we estimated a number of 3-variable VAR(1) models between 2000 Q2 and 2012 Q4. We then proceeded to examine the relationship between the variables of the model by means of impulse responses derived from Cholesky decomposition. All of the models included price indices and, in addition to expectation time series, an economic activity variable, namely, changes in retail sales or — in some cases — changes in industrial production. The price and expectation time series mentioned above varied from model to model. In the first group of the models — (1)–(7) —, for the purpose of examining the consistency between expectations, we used two expectation time series during each estimation. In order to examine whether the expectation time series contained information in respect of future developments, in models (8)–(13) we included a wage and a price index in addition to the expectation time series.

Figure 16
Evolution of wage expectations

Per cent

- ·-·- Perceived change in wages in last 12 months
- —— Excpected changes in wages in the next 12 months
- —— Actual, private sector
- - - - Gross average wages, filtered by minimum wage change, private sector

The main findings are as follows:

- In setting the prices of their own products, firms consider expected changes in wages (1), the expected economic situation (6) and the expected prices of competitors (4).

- Based on models 2 and 3, expectations about the level of consumer prices influence corporate wage expectations, and the changes expected in the overall price level are reflected in the expected price index of own products. At the same time, the variables demonstrated an interrelationship in the opposite direction as well.

- During wage decisions, firms consider expected economic developments (7).

- As regards the information content of expectations, expected wage increases influence actual developments in gross average wages (11) and producer prices (12). A connection also exists in the opposite direction.

- Producer price indices are also influenced by individual corporate price expectations (expectations about the prices of own products [9] and competitors' products [10]).

- Based on the results, expectations about the consumer price level respond sharply to actual inflation; however, we found no such evidence in the opposite direction (8). Corporate expectations are retrospective.

- Expectations about consumer prices are also influenced significantly by gross wages (13).

On the whole, corporate expectations are retrospective. In case of pricing their own products, firms consider expected changes in gross wages, overall price level increases, the economic situation and [13] the expected changes in competitors' prices. Moreover, we found evidence of a significant relationship between wages and expected economic activity and the wage index. In the rest of the cases there was no significant relationship between the various expectation time series. We can establish that the pricing behaviour of firms appears consistent with a Philips curve behaviour both in case of pricing their own products and wage-setting. At the same time, there is no meaningful relationship between the expectations pertaining to the rest of the variables.

In general we can conclude that the expectations of firms tend to be retrospective in nature. In shaping their expectations, corporations consider aggregate macroeconomic indicators; however, the impact of expectations on the economic indicators under review is far less pronounced. It was only in the case of wage expectations that we found evidence of forward-looking information; namely, that they significantly influence changes in gross average wages and the producer price index.

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[13] Survey data about expectations in respect of economic activity were not available. We used the ESI economic sentiment indicator to gauge expectations about the economic situation.

Table 6
Relationship between expectations for various variables

	A	B	Impact of A on B	Impact of B on A
(1)	expectations for wage increases	expectations for the price index of own products	0.35-0.51	-
(2)	expectations for wage increases	inflation expectations	0.39	0.09
(3)	expectations for the price index of own products	inflation expectations	.30	0.44
(4)	expectations for competitors' price indices	expectations for the price index of own products	0.46-0.55	-
(5)	economic activity expectation (ESI)	inflation expectations	-	-
(6)	economic activity expectation (ESI)	expectations for the price index of own products	0.04-0.15	-
(7)	economic activity expectation (ESI)	expectations for wage increases	0.08-0.14	-
(8)	inflation	inflation expectations	0.51	-
(9)	producer price index	expectations for the price index of own products	0.24	-
(10)	producer price index	expectations for competitors' price indices	0.12-0.24	-
(11)	gross average wages	expectations for wage increases	0.56-1.57	0.17-0.27
(12)	producer price index, inflation	expectations for wage increases	0.14-0.23	-
(13)	gross average wages	inflation expectations	0.85-1.02	-

The values show one-year impact based on impulse responses computed from VAR models using Cholesky decomposition. For example, the value of 0.51 indicated in the top right corner of the table means that an average 1 percentage point increase in wage increase expectations for the period of a year will induce a 0.51 percentage point increase in the expectations about the price index of own products during the same period. The – sign indicates the lack of a significant relationship between the two variables. The bands show the ranges computed for the entire time series or derived from values computed for individual sectors (manufacturing, trade).

4.2   Short-term inflation expectations

In the monthly Business and Consumer Survey of the European Commission, questions pertaining to the price expectations of firms refer to a period shorter than the above (3 months). Short-term replies may help assess the price changes envisaged by firms for the next few months. This provides additional information for the examination of the current economic situation, and may be also helpful in determining the pass-through of different shocks hitting the economy. Price expectations in the retail trade segment closely track inflation, and the price expectations of the service sector also exhibit a strong co-movement with the prices of market services (Figure 17).

For the purposes of analysing the forecasting power, we applied the SVAR methodology used in the case of households' expectations. The review period was January 2000 – December 2012. The models included the difference between changes in retail sales, the consumer price index and — in case of the service sector — market services, and the balance indicator of the price expectations in the trade and service sectors.

We found that expectations had a significant short-term forecasting power in the case of both variables. Expectation shocks [14] raised the level of inflation significantly, and a large portion of this effect is also present in the first quarter (Figure 18).

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[14] The expectation shock translates into an immediate increase in expectations, while inflation remains unchanged during the first period.

Figure 17

Short-term (3-month) inflation expectations

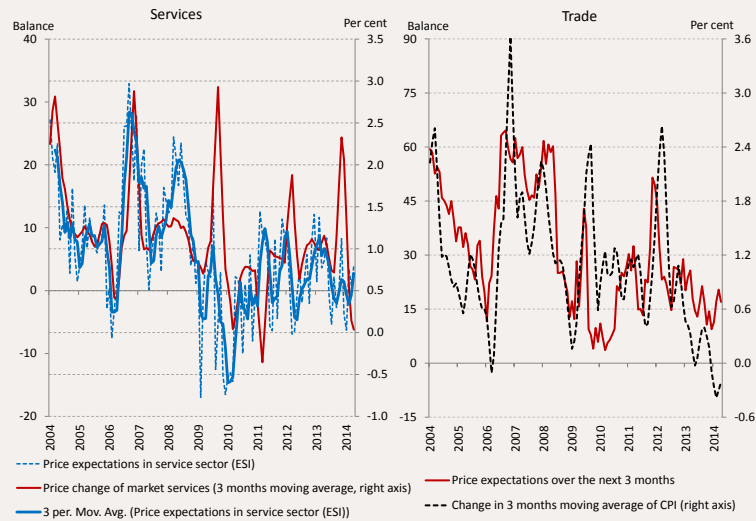*(European Commission Business and Consumer Survey, own calculation based on CSO data)*

Figure 18

Impact of expectation shocks on inflation

(During the calculation of the impulse function, we normalised the inflationary effect of the expectation shock with the immediate reaction of the expectation shock. In the case of the retail sector the chart indicates overall inflation, while in the case of the service sector the effect on the inflation of market services is shown. Expectation shock means a one-point increase in the expectation time series. The standard deviation of the balance indicator was 19.1 points for the retail sector and 10.3 points for services.)
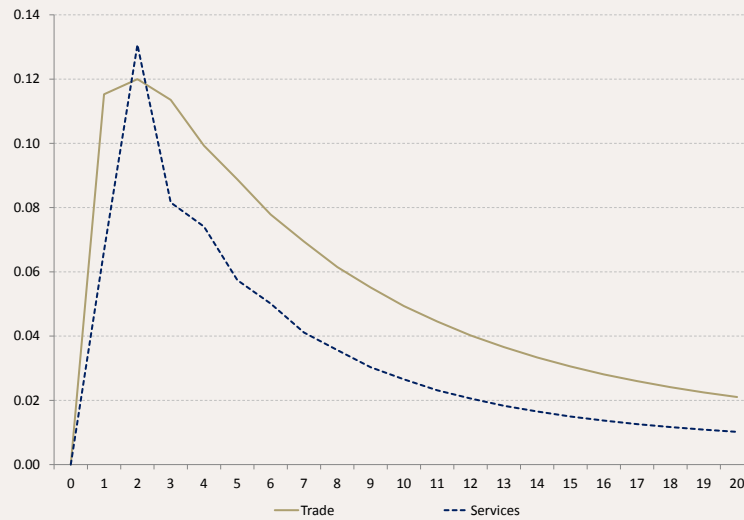
5   Conclusion

In our study we provided an overview of the main characteristics of the expectations of professional forecasters, households and firms in respect of Hungarian inflation trends. On the one hand, expectations are informative about the credibility of the central bank's inflation target; in other words, about the extent to which the inflation target can coordinate the expectations of economic agents. On the other hand, expectations may be helpful in the assessment and forecasting of macroeconomic developments.

Longer-term professional forecasters' inflation expectations remained close to the inflation target continuously, which demonstrates the credibility of the inflation target among professional forecasters. At the same time, short- and medium-term expectations are heterogeneous and volatile, which indicates that professional forecasters have widely diverging assessments about the time horizon on which the central bank intends to neutralise inflationary shocks. Professional forecasts were typically consistent with the central bank's forecast during the review period, and analyst forecasts had no meaningful additional information content compared to the central bank's forecast.

The inflation expectations of households exceed the central bank's inflation target significantly, and the difference is high even in international comparison. Household expectations demonstrate close co-variance with actual inflation and inflation perception, which indicates that household expectations are highly retrospective in nature. According to the simple correlation calculation, as regards the different components of inflation, perceptions and expectations correlate to the largest degree with administered prices and food prices.

Based on the corporate surveys, the expected evolution of own prices are influenced by expectations for economic activity, wages, competitor prices and the aggregate price index. Expectations for the consumer price index exceeded the inflation target continuously and significantly; at the same time, corporate inflation expectations are fundamentally retrospective and do not contain meaningful information about future inflation developments.

On the whole, longer-term expectations — the most important indicators of credibility — continuously remained close to the inflation target in Hungary. In contrast, short-term, one-year ahead expectations frequently and significantly exceeded the central bank's inflation target; however, this does not necessarily point to lack of credibility, due to the effect of transitional shocks reflected in short-term inflation. At the same time, these shocks have less significance in two-year ahead analyst expectations; thus two-year ahead expectations may also demonstrate the credibility of the central bank. These analyst expectations have remained close to the 3 per cent inflation target in recent periods.

From the point of view of forecasting, household and corporate expectations are retrospective, and their level has no perceivable information content. It is more important to consider the dynamics, rather than the level, of expectations. In terms of dynamics, qualitative expectations convey meaningful information among households and firms alike.

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6 Appendix: Surveys on inflation expectations

European Commission survey

The European Commission publishes its Business and Consumer Survey once a month. As part of the survey, consumers are also asked qualitative questions about their expectations in respect of prices changes. The representative sample of consumers covers 1,000 persons. Questions pertaining to inflation perceptions and expectations are the following:

How do you think consumer prices have developed over the last 12 months? They have…

- risen a lot

- risen moderately

- risen slightly

- stayed about the same

- fallen

- don't know

By comparison with the past 12 months, how do you expect that consumer prices will develop in the next 12 months? They will…

- increase more rapidly

- increase at the same rate

- increase at a slower rate

- stay about the same

- fall

- don't know

Medián/Tárki survey

HOUSEHOLD SURVEY

1. How do you think consumer prices have developed over the last 12 months? They have

    - fallen

    - increased or

    - stayed about the same?

2. In your opinion, by what percentage did prices increase / decrease …%

3. How do you expect prices will develop in the next 12 months? They will:

   • decrease

   • increase, or

   • remain about the same?

4. In your opinion, by what percentage will prices increase / decrease? …%

5. No-one can predict how prices will develop in future. I will list a number of possibilities. In each case, please indicate how likely it is to happen. In each case, please reply in a percentage form, i.e. give a number between 0 and 100, where zero indicates that the given scenario will definitely not happen, and 100 indicates that it will definitely happen. In your opinion, how likely it is that prices will increase by 25 per cent or more over the next 12 months? …%

6. In your opinion, how likely it is that prices will increase by more than 15 per cent over the next 12 months? Again, please reply in a percentage form. …%

7. In your opinion, how likely it is that prices will increase by more than 5 per cent over the next 12 months? …%

8. In your opinion, how likely it is that prices will decrease, remain the same, or increase, but by no more than 5 per cent over the next 12 months? …%

9. What annual rate of inflation do you expect — i.e. by what percentage will prices increase during a year — five years from now? …%

10. I will now ask some questions about your income. Do you have any income from labour?

    • yes

    • no

11. How did your labour income change in the past 12 months? It

    • decreased

    • increased or

    • did not change?

12. By what percentage did your income increase/decrease? …%

13. In your opinion, how will your labour income change over the next 12 months? It will:

    • decrease

    • increase, or

    • remain the same?

14. In your opinion, by what percentage will it increase / decrease? …%

CORPORATE SURVEY

1. What is your position at the company:

   • managing director

   • owner or

   • a senior officer in the area of finance?

2. I would first like to ask a few questions about your company. Your company is:

   • fully in private ownership,

   • in private majority ownership,

   • in state majority ownership or

- fully in state ownership?

3. Which sector does your company belong to?

   - manufacturing
   - construction
   - trade, repair of motor vehicles
   - accommodation, real estate
   - transport, storage and communication
   - other

4. Approximately how many people work for this company? …person

   - less than 50
   - between 50 and 100
   - between 101 and 300
   - over 300

5. How much was the company's domestic net sales revenue in 2013:

   - less than 500 million HUF or
   - more than 500 million HUF?

6. What was the total net sales revenue of the company in year?

7. Of which what percentage was from exports? …%

8. Now I would like to ask some questions about the market position of the company. In your opinion, in the past 12 months the domestic selling prices of the products or services of your company:

   - decreased
   - increased or
   - stayed about the same?

9. By around what percentage did the domestic selling prices of the products or services of your company change in the past 12 months? …%

10. In your opinion, over the next 12 months the domestic selling prices of the products or services of your company will:

    - decrease
    - increase, or
    - remain about the same?

11. In your opinion, by around what percentage will the domestic selling prices of the products or services of your company change over the next 12 months? …%

12. The next few questions are related to your competitors. In your opinion, in the past 12 months the domestic selling prices of your company's competitors:

    - decreased
    - increased or
    - stayed about the same?

13. By around what percentage did the domestic selling prices of your competitors change in the past 12 months? …%

14. In your opinion, over the next 12 months the domestic selling prices of your competitors will:

    - decrease
    - increase, or

- remain about the same?

15. In your opinion, by what percentage will the domestic selling prices of your competitor change over the next 12 months? …%

16. The next few questions are related to your company again. In the past 12 months, the domestic purchase prices of your company:

   - decreased
   - increased or
   - stayed about the same?

17. By around what percentage did the domestic purchase prices of your company change in the past 12 months? …%

18. In your opinion, over the next 12 months, the domestic purchase prices of your company will:

   - decrease
   - increase, or
   - remain about the same?

19. In your opinion, by what percentage will the purchase prices of your company change over the next 12 months? …%

20. We are now interested in wage developments at your company. In the past 12 months, average gross wages at your company:

   - decreased
   - increased or
   - stayed about the same?

21. By around what percentage did gross wages change at your company in the past 12 months? …%

22. In your opinion, over the next 12 months gross wages at your company will:

   - decrease
   - increase, or
   - remain about the same?

23. In your opinion, by what percentage will gross wages change at your company over the next 12 months? …%

24. Finally, we would like to ask some questions about consumer price developments. We are now asking you as a consumer, not as an executive. In your opinion — on average — consumer prices in the past 12 months:

   - decreased
   - increased or
   - stayed about the same?

   Clarify the concept of consumer prices at the request of the executive: A change in consumer prices means the inflation figure published by the CSO. This shows the percentage by which the prices of the products and services bought by households have changed during a 12 month-period on average.

25. In your opinion, by around what percentage did consumer prices change in the past 12 months? …%

26. In your opinion, over the next 12 months consumer prices will:

   - decrease
   - increase, or
   - will not change?

27. In your opinion, by what percentage will consumer prices increase over the next 12 months? …%