INFLATION EXPECTATIONS VERSUS UNCERTAINTIES AND TIME HORIZONS: THE CASE OF ALBANIA

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ABSTRACT

Inflation expectations represent one of the monetary policy transmission mechanism channels to be continuously explored, especially in the Inflation Targeting regime. This article tries to re-evaluate the accuracy and the features of quantitative inflation expectations in Albania, until the end of 2018. The study concludes that the accuracy of inflation expectations have been improved over time. The rationality tests, in general, re-confirm the presence of a weak rational component in inflation expectations. Also, as long as medium-term inflation expectations are higher than short-term ones, they might be considered more in line with the Bank of Albania (BoA) medium-term inflation target, suggesting a satisfactory degree of public confidence in the monetary policy decision-making.

Keywords: Inflation expectations, Accuracy, Rationality.

JEL-Classification: E52, E31, C83, C52.

1. INTRODUCTION

Central banks, especially those under Inflation Targeting (IT) monetary policy regimes, emphasize the importance of inflation expectations, in order to maintain price stability and 'well-anchored' inflation rates to the medium-term objective. Understanding the evolution of inflation expectations is a key issue of the implementation and success of an IT regime, already adopted by many emerging economies during the 2000s.

Because of the forward-looking feature of the monetary policy decision-making process in general, and particularly in the case of the IT, inflation expectations represent a very important tool in this framework. If this channel works well, the monetary policy becomes more rational. Under an IT regime, inflation expectations signal more or less the degree of confidence in the central bank and the credibility of the public in the inflation target [1]. If expectations result close to the target over the medium term, they indicate that the public strongly

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believes that the central bank will do the best to steer inflation to the target, despite short-term deviations. Under these circumstances, the rate of changes in prices and wages would tend to be in line with the inflation target by resulting more immune to temporary inflation fluctuations. This allows central banks to largely ignore short-term price fluctuations and adopt a medium to long-term approach, in order to maintain price stability. Otherwise, if inflation expectations were not consistent with the inflation target, maintaining price stability would be a difficult task. In this case, expectations for a higher inflation rate would likely be reflected in higher wages and prices, affecting consumption and domestic demand, and increasing inflationary pressures. Exploring the evolution of inflation expectations is also an important information for modelling and forecasting purposes.

This article will focus exclusively on the quantitative approaches of inflation expectations, measured through the direct method according different agents and time horizons in the case of Albania[2]. The second section briefly summarizes the main concerns in assessing inflation expectations giving examples from different countries under an IT regime. A short explanation of the database is presented in the third section. In the fourth one, the results of accuracy indicators and rationality tests are summarised and analysed. The last section presents the main conclusions of the re-evaluations.

2. ASSESSING INFLATION EXPECTATIONS – A CHALLENGING TASK

In the IT framework, besides other channels of the monetary policy transmission mechanism, expectations remain a challenging one for two important reasons: *firstly*, because inflation expectations cannot be measured directly; *secondly*, testing the feature of inflation expectation - if they represent a rational, adaptive, or mixed behaviour - is really crucial for the monetary policy in an IT regime.

The reason for raising the first concern is because inflation expectations are an unobservable variable. As a consequence, alternative methods - direct and indirect ones - are usually implemented for their assessment. Central banks use mostly the survey-based method. Different economic agents are interviewed periodically, regarding future inflation over short, medium and long-term horizons. The questions are formulated for getting qualitative or quantitative answers.

A range of indirect methods, mostly probabilistic approaches, based on normal and uniform distributions, are implemented to quantify ***the answers from the qualitative questions*** [2]. In addition, the balanced-based method is used, as a possible alternative for assessing inflation expectations [2]. The qualitative questions regarding expected inflation are usually found in business and consumer confidence surveys. We get the percentages of answers according to each option (three or five options). Applying a set of statistical formulas and

[2] *For more details on the approaches and measurement methods applied in BoA, see [2].*

transformations suggested from different distributions on these percentages, combining them with past/current published inflation rate, we achieve the assessments for expected inflation rates.

Assessing the inflation expectations on ***survey-based quantitative answers, relates to the direct method***, because the users get the expected inflation rates for different agents and time horizons. This quantitative and direct information might be collected from both confidence surveys and professional and financial agents' surveys.

By addressing the second concern - two main components come into the formation of inflation expectation: the adaptive; and the rational one. It is very important to emphasize that inflation expectations obtained through surveys may reflect various situations. The surveys method allows us to obtain information about agents' expectations on inflation, but it does not necessarily mean that the formation of their expectations is economically correct [3]. According to Basdevant (2003) [4], it might happen that inflation expectations reflect current and recent past inflation situation. Thus, they are mostly affected by inflation rates at the moment the survey is carried out. The latter suggests that in the formation of inflation expectations, the component which adapts the expected values in view of the current and recent past ones is playing the most important role. In this case, literature defines inflation expectations as "adaptive". Empirical studies have shown that the data obtained from surveys may reflect much more current and past values of inflation rather than predict future inflation rates [5], [1], [2]. However, even when obtained inflation expectations are strongly correlated to its current and past values, this does not exclude the possibility that they might have a forward-looking component to some extent, which is widely known as the "rational" part of the inflation expectations. In the case of New Zealand, one of the pioneers of the IT regime, the findings of Basdevant (2003) [4] highlight that inflation expectations are the result of the combination between forward-looking behaviour and past developments of inflation. In addition, he concludes that the way economic agents form their inflation expectations might change over time. Is this the case of Albania? Have the agents used all the available information at the moment they formed their expectations including information related to current and future decisions of monetary policy?

Three main benefits, all interrelated, are associated with an IT regime. *First*, inflation targeting successfully lowers inflation and makes it less volatile [6]. *Second*, it reduces the real costs of disinflation [7]. *Third*, it anchors long-term inflation expectations at, or very close to, the inflation target [8]. Empirical literature has found stronger evidence of such benefits for emerging economies than for advanced economies. Focusing on the third benefit, the evidence from different central banks emphasizes that the medium and long-term expectations may remain well-anchored, even if inflationary pressures signal higher inflation for the future periods, such as in 2008 periods of higher inflationary pressures from commodity prices. Another case, the opposite one, consists of the lower inflationary pressures during and after 2012 to nowadays. The slowdown trend of global demand during and after the crises affected the commodity and

oil prices in international markets, leading inflation and inflation expectations to minimum rates.

Based on the consensus forecast results for various countries, Martínez (2008) [9] concludes: "…it became clear that there is no guarantee that expectations will remain anchored even under an inflation - targeting regime". The majority of cases (the darker cells in the last column, Table 1) demonstrate that inflation expectations for 2009 measured in October 2008, remained significantly above the target, due to inflation increases from commodity prices' shocks. A large number of emerging economies faced this situation.

Table 1. Inflation target and inflations expectations

Countries	Inflation target (%)	Inflation expectations (%) for 2009 (survey Oct. 2008)
Advances Economies		
Australia	2-3	3.2
Canada	2	2.1
New Zealand	1-3	3.3
Norway	2.5	2.8
Sweden	2(+/-1)	2.5
Switzerland	<2	1.4
UK	2	2.9
Emerging Economies		
Brazil	4.5(+/-2)	4.7
Chile	3(+/-1)	4.5
Colombia	3.5-4.5	4.9
Czech Rep.	3(+/-1)	3.1
Hungary	3(+/-1)	3.9
Korea	2.5-3.5	3.6
Peru	2(+/-1)	4.1
Philippines	5-6	7.1
Poland	2.5(+/-1)	3.5
South Africa	3-6	7.1
Turkey	4	8.5
	Inflation target (%)	Inflation expectations for 2009 & 2010* (surveys conducted over 2008 & 2009, respectively)
Albania*	3% (+/-1) or 2-4%	2.43% (financial agents) – for 2009
Albania*	3% (+/-1) or 2-4%	2.73% (financial agents) – for 2010

Source: Martínez (2008)– data from Consensus Forecast (Oct' 2008). Additional information by the author

*Note: *) Author's calculations derived from Financial Agents Survey of BoA - a professional survey, as well as based on [9].*

In the Albanian case (last 2 rows, Table 1), financial agents' inflation expectations formed during the period 2008-2009 for inflation rates over next 4 quarters of 2009 and 2010 experienced an upward trend, also. The latter has reflected the higher inflationary pressures mainly due to imported inflation at the moment of collecting assessments from financial agents. Even so, inflation expectations remained significantly lower than the target for 2009, but approaching BoA's target in 2010.

3. SURVEYS AND INFLATION EXPECTATIONS DATABASE

This study will analyse quantitative approaches only regarding accuracy and rationality features in the case of Albania, for perceived inflation, 1 year and 2 years ahead horizon. The quantitative data are obtained from questions in: a) business confidences surveys; b) consumer confidences surveys; - both carried out quarterly - c) financial agents' (FA) survey "Survey of Professional Forecasters", carried out monthly. The above-mention surveys are organised and published by the BoA[3].

The confidence surveys are conducted in collaboration with INSTAT (since May 2016, at monthly frequency based on the Project for Harmonisation of Confidence Surveys, supported by the European Commission). Quantitative questions on inflation expectations appear at monthly and quarterly questionnaires. In this study, the quarterly ones are considered only, because they are formulated at the same way for consumers and businesses of all sectors participating in the survey (industry, construction, services, and trade). This question at quarterly questionnaires for both groups, regarding annual inflation expectations is as follows [10]:

How do you think will the inflation change after a year? It will...
1. Increase 0-2%
2. Increase 2-4%
3. Increase above 4%
4. Decrease

After eliminating the outliers, the formulas of weighted/simple mean have been applied in order to calculate the expected inflation rates, according businesses and consumers. The inflation expectations series are updated till 2018:Q4, but starting at different moments of time: for businesses in 2009:Q1 and for consumers in 2005:Q1.

Besides the confidence surveys, BoA collects inflation expectations from FA, monthly. Then monthly data are transformed into quarterly ones applying a simple mean. In this survey, there are questions about annual inflation expectations at different time horizons and based on two different formulations of questions as following [10]:

1st: Based on your opinion how much do you expect to be:
1. Annual inflation rate currently (perception for the current month) ____% (perception)
2. Annual inflation rate 1 year after ____% (at a short term horizon)
3. Annual inflation rate 2 years after ____% (at a medium term horizon)
4. Annual inflation rate 3 years after4 ____% (at a medium to long term horizon)

[3] *Detailed information at the link: https://www.bankofalbania.org/Monetary_Policy/Surveys_11282/Inflation_expectations/*
[4] *3-years horizon will not be discussed in this article because of too few observations.*

2nd: How do you assess the probability for annual inflation rates?

Annual Inflation	After 1 year	After 2 years	After 3 years
< 0 % (-1 - 0%)			
0 – 1%			
1 – 2%			
2 – 3%			
3 – 4%			
> 4% (4 - 5%)			
Total (%)	100	100	100

Note: The total according columns must be 100%.

Both questions intend to calculate the expected inflation rates. In addition, the second one signals the probability distribution of inflation intervals, indicating if there is significant shift over or below the target value (3%)[5]. The time series data for FA's survey start in 2007:Q4 for perceived and 1 year ahead inflation expectations, and in 2010:Q1 for a 2 years horizon. Data for FAs are also updated till 2018:Q4.

In principle, the actual annual inflation rates at quarterly bases are compared to the time series generated from surveys. The difference between actual inflation (A_t) and expected inflation (EXPt-4/t-8) obtained from surveys at t-4/t-8 quarters before, is called forecast error (FE)[6].

4. ACCURACY AND RATIONALITY OF DIRECT INFLATION EXPECTATIONS: RESULTS AND ANALYSES

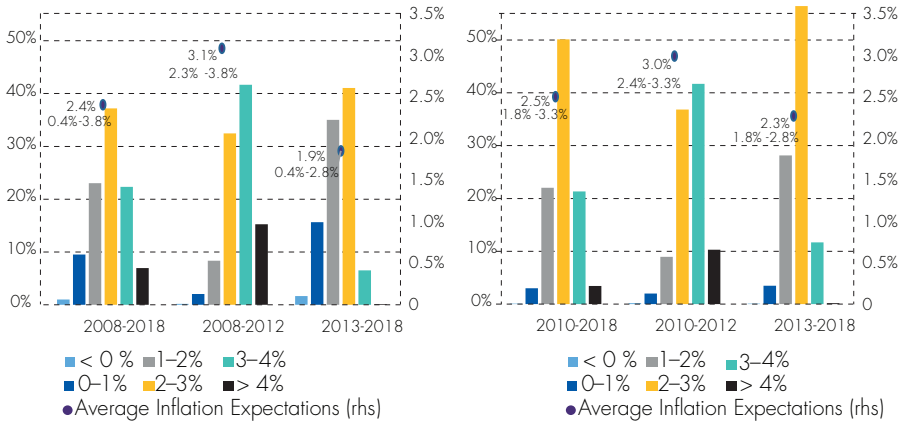
Numerous analyses can be carried out through surveys data. Figure 1presents the probability distribution according to inflation intervals in the 2nd alternative of the question for FAs over 1 year and 2 years horizons, respectively. We can conclude that the expectations for a 2 years horizon are better-anchored versus the target (3%) than those of one year horizon, over the whole sample and 2 sub-periods. But, we cannot conclude on: (i) which are the most accurate ones with respect to the actual inflation rates? ; (ii) are 2 years horizon expectations more rational than short-term ones? ; (iii) is there any substantial difference between the previous results on accuracy indicators and rationality tests and those that take into account even the additional information from the last three years (2015:Q2 – 2018:Q4)?

In order to answer to the above questions, the results of accuracy statistics and rationality tests are provided and compared.

[5] *Before January 2015, the target was defined as 3% with a tolerance band of +/-1 pp, or 3% (+/-1pp) = 2%-4%.*

[6] *Example: the published annual inflation rate of 2010:Q1 must be differenced with annual expected inflation collected in 2009:Q1, in the case of the one year (4 quarters) horizon (FE_4); in the case of the 2 years (8 quarters) horizon, the published annual inflation rate of 2011:Q1 must serves as a reference for (FE_8).*

Figure 1 Probability distribution of inflation expectation for 1 year horizon (lh) & 2 years horizon (rh); Average inflation expectations according different periods of time



Source: BoA, and author's calculations.

4.1 ACCURACY INDICATORS: MAIN RESULTS

The results regarding the accuracy indicators for the annual inflation expectations obtained from the quantitative approaches only, according Businesses, Consumers and FA, are presented in Table 2. Before discussing the main results, it is important to highlight that a larger sample size theoretically would influence them.

Table 2. Results of Accuracy Indicators for quantitative inflation expectations*

	Up to 2015:Q1 Previous study's period [2]			Up to 2018:Q4 New results		
Agents	ME	RMSE	TIC	ME	RMSE	TIC
1. Businesses - 4 quarters/1 Year	0.22	0.91	0.76	0.23	0.83	0.73
2. Consumers - 4 quarters/1Year	0.51	1.25	0.63	0.39	0.99	0.87
3. Financial Agents (FA)						
- 4 quarters/ 1 Year	-0.54	1.16	0.87	-0.51	1.02	0.85
- 8 quarters/ 2 Years	-1.26	1.37	0.96	-1.06	1.18	1.02

Source: Author's calculations.
*Note: * Mean Error (ME); Root Mean Square Error (RMSE); Theil Inequality Coefficient (TIC)[7].*

Businesses and consumers tend to underestimate the annual inflation rates for four quarters ahead. The last results show that the size of underestimation is decreasing for consumers, but remains almost the same for businesses. FAs have expected higher inflation rates after 4 and 8 quarters compared to the published inflation. The negative values of ME indicate that inflation has been over-estimated by FAs, in average terms. RMSE for all agents has decreased over time, signalling higher accuracy of inflation expectations for short and medium-term horizons. Businesses remain the most accurate forecasters over the short-term horizon.

Inflation expectations of consumers have improved till 2018:Q4, in terms of ME and RMSE.

[7] *Formulas and explanations in [2], pages 23-24.*

Inflation expectations of FAs demonstrate improvements in terms of ME, RMSE and TIC over the short-term horizon.

Over the medium term, the ME and RMSE indicators have been reduced, meanwhile the TIC is slightly deteriorated. The TCI results indicate that monitoring inflation expectation through the surveys approach is helpful as long as they continue to generate better results than a naïve one. However, the result should be taken with caution because of the small size effect generated by limited number of observations for medium-term inflation expectations series.

4.2. RATIONALITY TESTS: MAIN RESULTS

The accuracy analysis sheds light and helps to accomplish the rationality tests already addressed for the Albanian case in a previous paper [2]. As it is already mentioned, the tests' procedures will focus on the quantitative expectations only, according to various agents and time horizons. We would be able to identify possible changes in the behaviours of their rational and adaptive components over time. The empirical work on rationality tests is based on a rich literature [11] previously used for Albania up to 2015:Q1 [2].

Test results for the updated quantitative approach of inflation expectations up to 2018:Q4, are presented in the Table 3.

*Table 3. Rationality tests**

	RATIONALITY TESTS INTERPRETATIONS**		
Rationality Tests	Test 1	Test 2	Test 3
Explanations of tests	$\pi_t - \pi^e_{t-k} = \alpha + \varepsilon_t$ It must that H0: $\alpha = 0$ (t); p-value (*** high significance). *Insignificant = rationality accepted*	$\pi_t = \alpha + \beta\pi^e_{t-k} + \varepsilon_t$ It must that H0: $\alpha = 0$, $\beta = 1$ Wald-Test; for small p-values, rationality is not accepted, i.e. when high significance is reported (***) the rationality will be highly rejected. *For p-values greater than 10% the rationality will be accepted.*	$\pi_t - \pi^e_{t-k} = \alpha + \beta(\pi_{t-1} - \pi^e_{(t-k)-1}) + \varepsilon_t$ It must that H0: $\beta = 0$; if otherwise (i.e. significant), rationality will be rejected (t); p-values (high significance, when ***) *Insignificant = rationality is accepted*
Quantitative Inflation Expectations according: Agents and Horizons			
Businesses 4 quarters/1 Year Nr. Obs. = 37	(1.40); 0.17 (insignificant) Rationality – accepted	(p=0.38; 0.36) Rationality – accepted	Highly rejected (4.0); 0.00 (***)
Consumers 4 quarters/1Year Nr. Obs. = 52	Highly rejected (2.5); 0.005 (***)	Highly rejected (p=0.01; 0.007)	Highly rejected (5.4); 0.00 (***)
Financial Agents			
Perception Nr. Obs. = 44	(-1.12); 0.2 (insignificant) Rationality – accepted	(p=0.24; 0.2) Rationality – accepted	(1.31); 0.16 (insignificant) Rationality – accepted
4 quarters/1 Year Nr. Obs. = 34	Highly rejected (-3.3); 0.012 (***)	Highly rejected (p=0.004; 0.000)	Highly rejected (3.55); 0.00 (***)
8 quarters/2 Years Nr. Obs. = 21	Highly rejected (-5.2); 0.00 (***)	Highly rejected (p=0.000; 0.000)	Rationality no-rejected (1.8); 0.065 (*)

Source: Author's estimates;
Note :) The blue coloured areas show presence of rational component.*
*** Explanations on the rationality tests in [2], pages 30-33.*

Test results evidence no significant changes compared to those from the beginning of 2015. In general, they confirm the weak presence of the rational component. The tests reject the rationality hypothesis for inflation expectations over a one-year horizon in the case of FAs. The inflation expectations of FAs are rational for a very short-term horizon, when they assess the perceived inflation (3/3 tests confirm the rationality hypothesis). Businesses are more rational than other agents when they form their inflation expectations four quarters ahead: 2/3 tests significantly accept the presence of the rational component. For longer-time horizons (8 quarters), inflation expectations of FAs are more in line with the inflation target (3%). However, the rationality feature remains suspicious: one test only, does not fully reject the rationality hypothesis.

The results should be considered with caution, for three main reasons: *firstly*, the limitations generated from small samples in the testing process; *secondly*, economic and financial literacy remain at a low level for assessing the inflation and economic outlook, despite intensified efforts for enhancing the financial education for general public during recent years; *thirdly*, the time this data belongs to. Focussing on the third reason, it is important to emphasise that a lower degree or lack of rationality in inflation expectations of agents in emerging countries is not a surprise. In addition, the rationality declines in times of crisis and high uncertainties, because it is more difficult for market agents to include and select the appropriate information when they form their expectations. Studies and empirical evidence show that even in advanced economies, inflation expectations, particularly those for short-time horizons, have resulted non-rational (Sweden, Germany, Norway, England, etc.). Meanwhile, the medium-term ones remain more in line with the target due to the high confidence of the public in the central banks and the monetary policy implementation. A similar behaviour is identified in the case of inflation expectations in Albania.

5. CONCLUSIONS

Inflation expectations represent an important factor, especially for economies that have adopted the IT regime. Furthermore, inflation expectations are assessed as a good indicator for the credibility of the central bank, reliability of inflation target and as an appropriate tool for maintaining prices stability. Inflation expectations represent also an essential ingredient in modelling and medium-term forecasting inflation. Given the above-mentioned reasons, inflation expectations represent a monetary policy transmission mechanism channel, to be continuously monitored and improved, even in the Albanian case.

As an unobservable variable, inflation expectations' data have been obtained using indirect methods. The most widely used is the survey one. This method has been applied by BoA since 2003, and firstly was focused on qualitative assessments of inflation expectations. Since 2006, BoA has gradually developed the quantitative direct measurements of inflation expectations, according different agents and horizons. This article tries to shed light on the accuracy and the nature of quantitative inflation expectations in Albania until the end of 2018.

Different accuracy indicators have been calculated and various rationality tests have been run, covering a longer period of time than in the previous studies. The results suggest that the accuracy of inflation expectations has increased over time. The accuracy results support the information obtained through inflation expectations for the future short to medium-term inflationary pressures.

Tests' results on the rationality did not signal significant changes compared to the previous estimates, which covered data until the beginning of 2015. In general, they confirm the weak presence of the rational component and the dominance of the adaptive one when the different agents form their expectations. The presence of rationality is suspicious for the medium-term inflation expectations. But, at the same time the inflation expectation rates are higher than the short-term ones. The medium-term inflation expectations are more in line with the BoA's inflation target indicating a higher confidence in the monetary policy decision making.

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