Measures of inflation used in inflation projections- experiences of the selected European countries

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Abstract

The article describes the study of central paths projections of CPI inflation and core inflation in central banks of Sweden and Norway. The analysis refers to the possibility of using CPI inflation and core inflation projections as a main tool (intermediate goal) for the implementation of inflation forecast targeting strategy. The study includes a reference of the central path of the CPI inflation projections and core inflation projections (made on assumption of endogenous rate) to the inflation target. The analysis allowed to determine that at the prognostic moment of three years the central paths of core inflation projections scored at or are very close to the target. Implications for the implementation of the inflation forecast targeting (IFT) strategy refer that projection of core inflation can be a typical operational tool anchoring inflation expectations and can be used also as a an intermediate goal of monetary policy because it possesses an ability to achieve the inflation target at the end of the forecasting horizon. **The central paths of core inflation projections converge with the inflation target as the time horizon became longer but still remained medium term. Such a result is not given for all the CPI projections.**

JEL: E58, E52, E59

Keywords : core inflation, inflation projection, inflation targeting regime, inflation forecast targeting

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Introduction

The financial crisis in the years 2007-2009 showed gaps in conducting monetary policy by central banks. Some of the scientists sought the fault in the assumptions of the inflation targeting strategy, others less or more inept its implementation and even called the situation with exaggeration, as the collapse of used paradigm[1]. The author of the paper suggests coming back to the inflation forecasts paradigm and analyses the inflation projections as a one of the main tool of implementing this regime and anchoring the inflation expectations.

Inflation targeting strategy is currently used to conduct monetary policy in 27 countries[2]. Some of them have already implemented this strategy for more than twenty years. The countries selected by the author pursued the inflation targeting strategy (IT) for more than ten years (Norway-2001, Sweden-1995). The full version of inflation targeting strategy is defined by meeting five elements:

1. public announcement of quantitative medium-term inflation target,

2. institutional commitment to price stability as a treatment for main objective of monetary policy,

3. addiction decision on monetary policy tools from a wide range of information relating to a number of variables, not just the behavior of the exchange rate or monetary aggregates,

4. greater transparency of the strategy through communication with the public and the markets in the objectives, targets and decisions of the monetary authorities,

5. increased accountability of the central banks towards the realization of the objectives of democratic institutions [Mishkin 2009].

The last three of the mentioned elements are directly or indirectly related to the central bank's inflation projections. In the strategy of inflation forecast targeting the final goal is published as an inflation target and the intermediate goal is the inflation projection. Hence, properly executed and announced inflation projection has many fundamental functions for the implementation of the strategy. Inflation projections:

1. are intermediate targets of monetary policy,

2. are instruments of democratic control of the central bank by the public,

3. are the basis for the creation of transparent monetary policy of the central banks,

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[1] See Borio (2011).
[2] Countries which are nowadays implementing inflation targeting strategy: Armenia, Australia, Brasil, Chile, Sweden, Czech Republic, Phillipiness, Ghana, Guatemala, Indonesia, Iceland, Israel, Canada, South Corea, Colombia, Mexico, Norway, New Zealand, Peru, Poland, South Africa, Romania, Serbia, Thailand, Turkey, Hungary, Great Britain.

4. are one of the key elements of the information policy of the central banks,

5. affect the formation of inflation expectations,

6. are indirectly responsible for the proper implementation of the inflation targeting strategy,

7. are a bridge between the monetary authorities and the public.

IT strategy requires from central banks the implementation of transparent monetary policy which will appropriately influence the creation of inflation expectations of economic actors. An integral part of the central bank's inflation targeting strategy is announcing the future inflation to the public. It is reflected in the publication of inflation projections whose most popular form are fan charts. IT strategy and its implementation have been discussed many times on the theoretical and empirical basis, and are now being verified in the face of central banking crisis. However direct links between this strategy and the inflation projections have not been widely discussed so far. Countries applying IT strategy have chosen, as the main objective of their monetary policy, inflation target, as specified in a quantitative manner, point and, in the majority, with a symmetrical tolerance range for deviations. Inflation targeting is carried out through an intermediate goal, which is the projection of inflation (inflation forecast targeting, IFT)[3]. Therefore, it is appropriate to verify already published inflation projections from the viewpoint of their function as intermediate goal.

Inflation projections in central banks differ from each other in the main assumptions concerned instrument-rate, time horizon and the measure of inflation in the inflation projections. Firstly, inflation projections in central banks implementing inflation targeting strategy can be made on assumption of constant instrument rate during the entire forecast horizon (called CIR), by assumption of instrument rate path given by market expectations of future instrument rates (called ME) and endogenous instrument rate[4]. The CIR assumptions implies the use of the rule of the thumb. This means, that if the inflation forecast is in the chosen horizon above the inflation target, central bank should raise up the repo rate. If the inflation forecast is in the chosen horizon lower than the inflation target, central bank should reduce the repo rate. If the inflation forecast is equal the inflation target, the repo rate should remain unchanged [Svensson 1997]. The inflation projections made on the assumption of endogenous rate are connected with optimal instrument rate plan[5]. This assumption implies that at the end of the forecast horizon, the inflation forecast should be equal or very close to

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[3] See: Svennson (1997).
[4] See: Svensson (2005).
[5] See Svennson (2006).

the inflation target. Such an approach was reflected in *Criteria for an appropriate future interest path* written in *Inflation Report with Monetary Policy Assessment published* in Norges Bank (NB) in 2005. "If monetary policy is to anchor inflation expectations around the target, the interest rate must be set so that inflation moves towards the target. Inflation should be stabilized near the target within a reasonable time horizon, normally 1-3 years. For the same reason, inflation should also be moving towards the target well before the end of the three year period" [*Inflation Report* …. 2005, p. 8].

Secondly, the horizon of inflation projections is medium term. Inflation projections based on CIR assumption have in practice usually two years horizon. Forecast horizon for inflation projections made on the assumption of endogenous repo rate is longer (usually three years).

Thirdly, inflation projections are made on the basis of CPI measure of inflation and underlying measure of inflation. Setting the inflation target in CPI index implies that the main inflation projection is also CPI and other core inflation projections are treated as an additional projections. Currently, out of the twenty seven countries implementing IT, ten publish the projections of CPI inflation and the projections of core inflation in parallel. The measures of the inflation projections in the countries implementing IT strategy are shown in Table 1.

The aim of this study is to analyse the possibility of using the core inflation projections as an intermediate target of monetary policy instead of CPI inflation projections. The author believes that a properly chosen measure of core inflation in the inflation projection has also a large impact on the achievement of the inflation projection function as an intermediate target. The financial crisis in 2007-2009 helped to revise that opinion.

The paper consists of the six parts. In the first one there are presented conditions and the methodology of the conducted research. The next four parts includes the stages of the analysis. In the sixth part the author presented the conclusions and implications for countries using inflation forecast targeting. The end of the paper content the author comments on the conducted research.

Table 1. The measures of the inflation projections in the countries implementing IT strategy in 2013

Country	Measure of inflation target	Measure of main inflation projection	Measure of additional inflation projections
Armenia	CPI	CPI	-
Australia	CPI	CPI	-
Brasil	IPCA	*IPCA*- Broad Consumer Price Index.	-
Chile	CPI	CPI	*CPIEFE*-CPI excluding food goods and energy prices, leaving 72.3% of the total CPI basket.
Sweden	CPI	CPI	*CPIF*- CPI with a fixed mortgage rate
Czech Republic	CPI	CPI	*Monetary policy relevant inflation*- Headline inflation adjusted for first-round effects of changes to indirect taxes.
Philippines	CPI	CPI	-
-Ghana	CPI	CPI	-
Guatemala	CPI	CPI	-
Indonesia	CPI	CPI	-
Iceland	CPI	CPI	*CPI excluding tax effects*
Israel	CPI	CPI	
Canada	CPI	CPI	*Core inflation*-CPI excluding the effect of the HST and changes in other indirect taxes.
South Korea	CPI	CPI	-
Colombia	CPI	CPI	*CPI excluding food*
Mexico	CPI	CPI	*Core inflation*
Norway	CPI	CPI	CPIATE- CPI adjusted for tax changes and excluding energy products
New Zealand	CPI	CPI	-
Peru	CPI	CPI	-
Poland	CPI	CPI	-
South Africa	CPI	CPI	-
Romania	CPI	CPI	-
Serbia	CPI	CPI	-
Thailand	Core inflation	CPI	*Core inflation*
Turkey	CPI	CPI	*CPI excluding unprocessed food, tobacco and alcoholic beverages.*
Hungary	CPI	CPI	-
Great Britain	CPI	CPI	-

Source: central banks web pages.

1. Methodology and chosen research assumptions

The aim of this study is to analyze the central paths of CPI inflation projections and central paths of core inflation projections made on the assumption of endogenous rate in central banks of Sweden and Norway. All of the central paths of inflation projections are shown in the Annex. The main subject of the research in the paper is values of central paths of CPI and core inflation projections. The analysis tracks the central paths of inflation projections in Sweden is based on data from the years 2007 to 2013 and in Norway from the years 2006 to 2013. The years of the research have been chosen due to available data. The aim of the study will be achieved in the framework of the main hypothesis. **The central paths of core inflation projections made on the assumptions of endogenous rate in the central banks of Sweden and Norway in the implementation of inflation forecast targeting converge with the inflation target as the time horizon and can play a role of intermediate target. Such a result is not given for all the CPI projections.**

The choice of central banks in the research was dependent on the used monetary policy strategy- inflation targeting, the parallel publication of the CPI and core inflation projections in the form of fan charts. The central banks of the chosen countries:

1. have applied for at least 10 years the inflation targeting strategy,
2. they have inflation target specified in a quantitative point with a symmetrical tolerance range for deviations,
3. implement monetary policy under inflation forecast targeting,
4. publish in parallel the CPI and core inflation projections (made on the assumption of endogenous rate) in the form of fan charts,
5. make public the value of the central path of projection inflation (together with areas of uncertainty),
6. do not belong to the euro area.

In addition, the selected central banks have relatively the greatest experience from the point of view implementing inflation target, and thus are pioneers in the field of modeling and forecasting inflation. The main information about selected central banks is presented in Table 2.

Table 2. Main information about selected central banks

Central banks	Norges Bank	Sveriges Riksbank
Inflation target	2,5% +/-1%	2%
Type of inflation target	Quantitative, point with symmetrical deviations.	
Date of introduction of inflation target	2001	1995

Source: central banks web pages.

In 1993 in Sweden was set the inflation target 2% +/-1%. measured by the CPI. In parallel to the projection of CPI inflation there were published also forecasts of the core inflation UND1, UND1X, CPIX and CPIF indexes. The first nucleus of the report of Sveriges Riksbank (SR) inflation report has been published in October- *Inflation and Inflation Expectations in Sweden*. The competent *Inflation Report* was presented in 1996 and since than it had been presented four times a year (at March, June, September and December) until December 2006. Since 2007 SR have published *Monetary Policy Report* three times a year. Since 2009 the publication of the relevant report have been hold in February, July and October. CPI inflation projection appeared for the first time in December 1997 and it was constructed for a horizon of two years and assuming a constant rate over forecast horizon. This assumption includes all inflation projections constructed till March 2005. From June 2005 to the end of 2006 projections were made assuming the rate coincident with market

expectations of future instrument rates. Since March 2007 inflation projections have been made on the assumption of endogenous rate and SR have started publication of repo rate projections in the form of fan charts. Data on the central path of the inflation projection are given for projections since September 1999 on a monthly basis. The horizon of the inflation projection has gradually lengthening. From September 1999 to June 2005 varied between 26 and 28 months, and since September 2005 in the range of 37 to 40 months. Some difficulties in analyzing data may suffer as a change that occurred in early 2005 in the method of determining statistical components of the CPI index. The main inflation projection in SR is CPI projection. Additionally, in reports till first *Monetary Policy Report* in 2008 there were also CPIX inflation projections. In years 2008-2009 SR didn't publish core inflation projections. In years 2010-2013 SR was presenting two parallel inflation projections: CPI projections and CPIF projections. Table 5 in Annex presents a brief overview of the inflation projection published by the SR in the years 1999-2013.
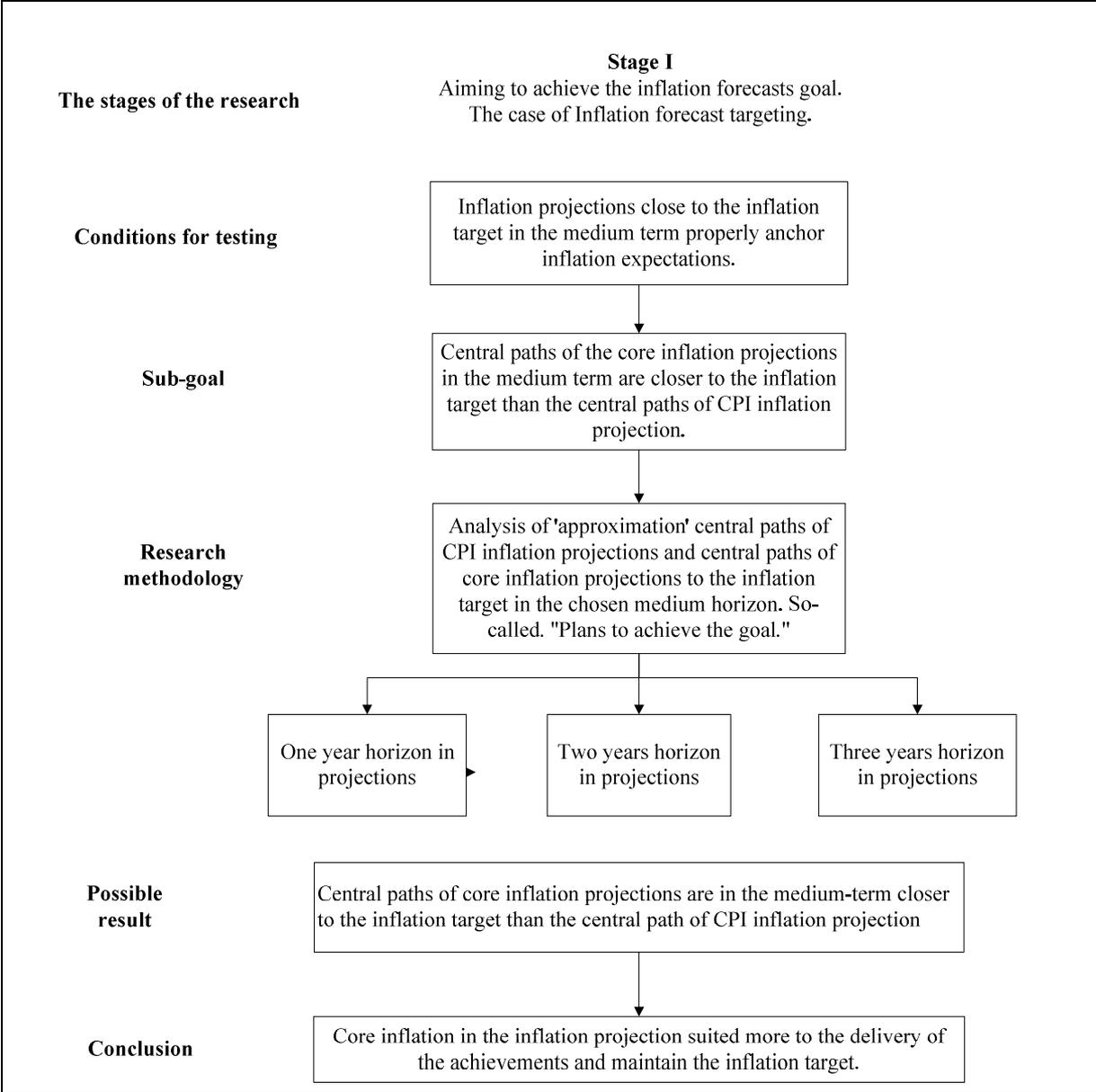
Since 2001 Norges Bank (NB) have been implementing the inflation targeting strategy with point inflation target of 2.5% measured by the CPI Index. As a part of the strategy, NB publishes projections for CPI inflation and core inflation (CPI-ATE and CPIX). Till 2006 NB had published three *Reports of inflation* per year. From 2007 to 2012 published three *Monetary Policy Reports* per year (seemed to be in March, June and November). In 2013 NB has started publishing four times per year *Monetary Policy Report with the Financial Stability Assessment* (atMarch, June, September and December). Till 2005 inflation projections have been constructed on the basis of CIR and ME. Since 2006 inflation projections have been made on the assumption of endogenous rate. During the period 2001-2013 the horizon of the inflation projections performed gradually from two years to three years. The values of each of the inflation projections central paths are given on a quarterly basis. Table 6 in Annex presents a brief overview of the inflation projection published by the NB in the years 2001-2013.

Detailed information about inflation projections necessary to perform the test and verification of the main hypothesis are presented in Table 3. The study from the viewpoint of the main objective are presented in Scheme 1.

Table 3. Detailed information about inflation projections necessary to perform the test and verification of the main hypothesis

		Norges Bank IR 2006-2013			Sveriges Riksbank IR 2007-2013	
	CPI Projections	Core inflation projections		CPI Projections	Core inflation projections	
		CPI-ATE	CPIXE		CPIX	CPIF
Years	2006-2013	2006-2008; 2013	2008-2013	2007-2013	2007, 2008 first report	2010-2013
Measure description	Consumer Price Index	CPI adjusted for tax changes and excluding energy products	CPI adjusted for tax changes and excluding temporary changes in energy prices.	Consumer Price Index	CPI excluded from mortgage interest expenditure and effects of indirect taxes and subsidies	CPI with a fixed mortgage rate
Number of projections per year	4	4	4	3	3	3
Main assumpion	Endogenous interest rate	Endogenous interest rate	Endogenous interest rate	Endogenous interest rate	Endogenous interest rate	Endogenous interest rate
Horizon	3 years	3 years	3 years	3 years	3 years	3 years

Source: Own.

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The stages of the research	**Stage I** Aiming to achieve the inflation forecasts goal. The case of Inflation forecast targeting.
Conditions for testing	Inflation projections close to the inflation target in the medium term properly anchor inflation expectations.
Sub-goal	Central paths of the core inflation projections in the medium term are closer to the inflation target than the central paths of CPI inflation projection.
Research methodology	Analysis of 'approximation' central paths of CPI inflation projections and central paths of core inflation projections to the inflation target in the chosen medium horizon. So-called. "Plans to achieve the goal."
	One year horizon in projections / Two years horizon in projections / Three years horizon in projections
Possible result	Central paths of core inflation projections are in the medium-term closer to the inflation target than the central path of CPI inflation projection
Conclusion	Core inflation in the inflation projection suited more to the delivery of the achievements and maintain the inflation target.

Scheme 1. Plan of the research

2. First phase of the study

At the beginning of the first phase of the study the central paths of the CPI and core inflation projections were isolated due to the forecast horizon. The projections were divided into three sets for the individual values of 12 , 24 and 36 months. Inflation targeting forecasts require that in the medium term the value of the central paths of the inflation projections are convergent with the inflation target.

Graphs 1 and 2 show the sequence of all the tracks at the chosen moment - one year of the forecasts horizon in Sweden and Norway .

The analysis allowed us to notice regularity.

1. In Sweden the projections for core inflation (CPIX , CPIF) at the moment of the first year's forecast horizon achieve similar, but slightly lower values than the projections of the CPI. These differences are not significant. Values are mainly in the range of deviations from the target.

2. In Norway the projections for core inflation (CPI-ATE , CPIX) at the moment of the first year's forecast horizon achieve similar values than the projections of the CPI. These differences are not significant. Values are mainly in the range of deviations from the target.
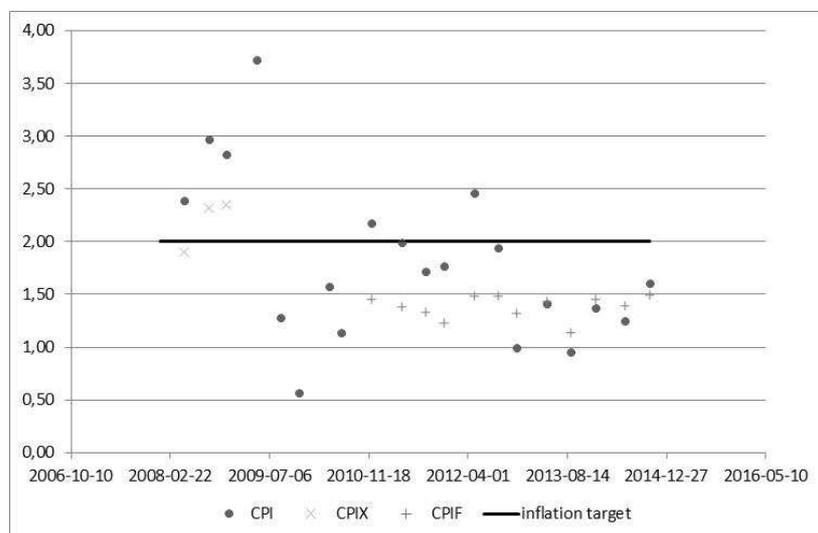
Graph 1. The values of the central paths of CPI inflation projection and selected measures of core inflation at the moment of the first year of the forecast horizon in SR

Source: Own calculations.
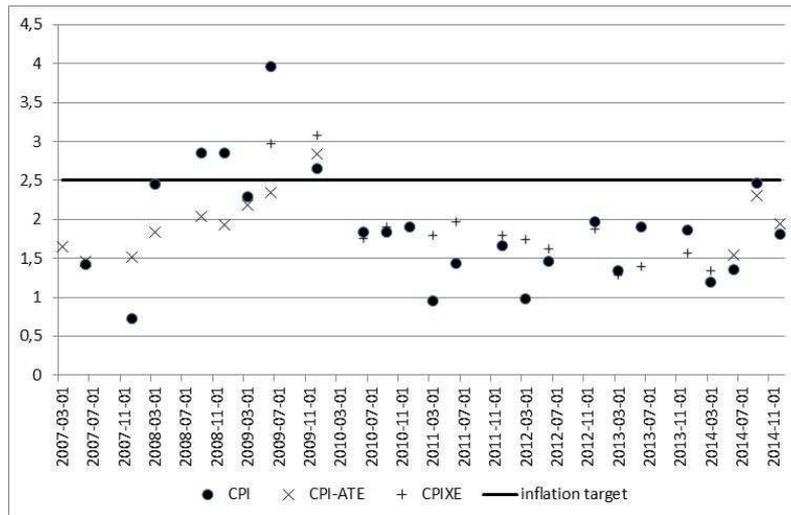
Graph 2. The values of the central paths of CPI inflation projection and selected measures of core inflation at the moment of the first year of the forecast horizon in NB
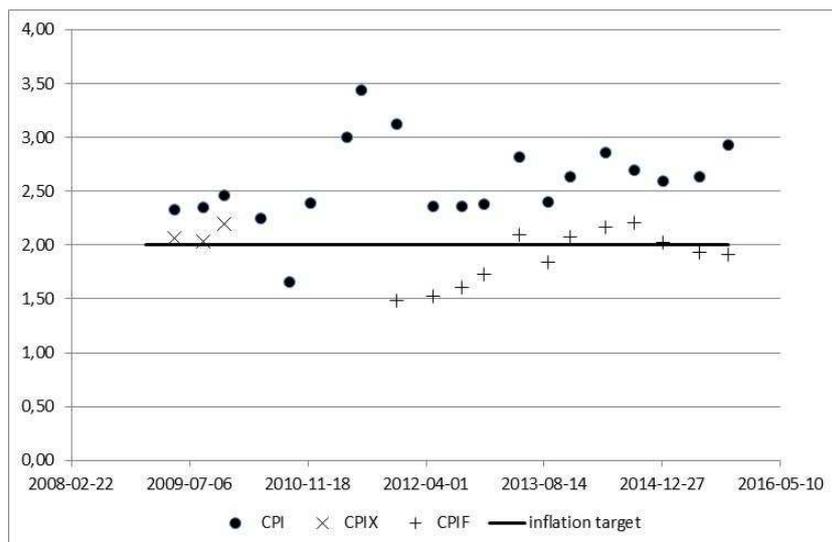
Source: Own calculations

3. Second phase of the study

At the second stage the projections were divided into individual values of 24 months. Inflation targeting forecasts require that in the medium term the value of the central paths of the inflation projections are convergent with the inflation target.

Graphs 3 and 4 show the sequence of all the tracks at the chosen moment - two year of the forecasts horizon in Sweden and Norway .
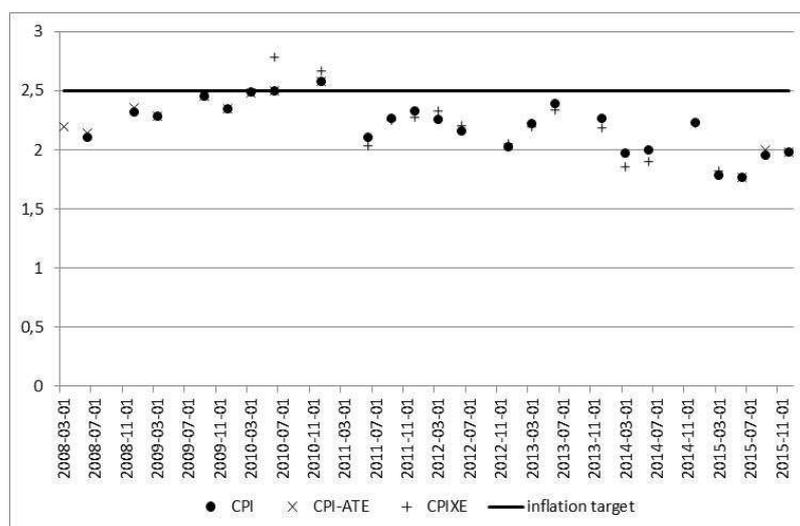
The analysis allowed us to notice regularity.

1. In Sweden the projections of core inflation (CPIX , CPIF) at the moment of the second year's forecast horizon are still similar trends, but achieve much lower values than the projections of the CPI. These differences are also not very significant. Values are mainly in the range of deviations from the target.

2. In Norway the projections for core inflation (CPI-ATE , CPIX) at the moment of the second year's forecast horizon achieve similar values than the projections of the CPI. These differences are not significant. Values are mainly in the range of deviations from the target.

Graph 3. The values of the central paths of CPI inflation projection and selected measures of core inflation at the moment of the second year of the forecast horizon in SR
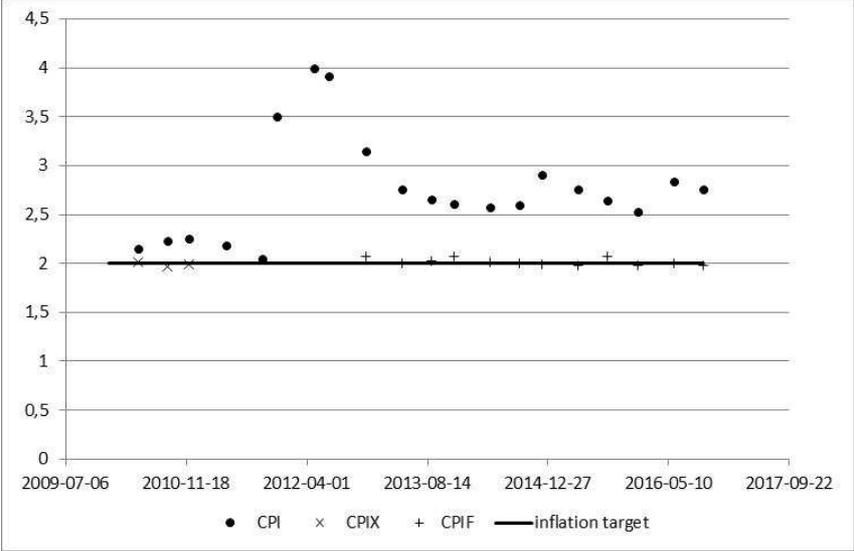
Source: Own calculations

Graph 4. The values of the central paths of CPI inflation projection and selected measures of core inflation at the moment of the second year of the forecast horizon in NB

Source: Own calculations

4. Third phase of the study

At the third stage the projections were divided into individual values of 36 months. Inflation targeting forecasts require that in the medium term the value of the central paths of the inflation projections are convergent with the inflation target.

Graph 5 shows the sequence of all the tracks at the chosen moment - third year of the forecasts horizon in Sweden. The analysis allowed us to notice regularity.

1. The projections for core inflation CPIX at the moment of the third year's prognostic horizon have similar trends, but are closer to the target than the projections of the CPI. These differences are not very significant.

2. The projections of core inflation CPIF at the moment of the third year's prognostic horizon CPIF are convergent with inflation target, while the CPI projections are not. These differences are very significant.

Graph 5. The values of the central paths of CPI inflation projection and selected measures of core inflation at the moment of the third year of the forecast horizon in SR

Source: Own calculations

Graph 6 shows the sequence of all the tracks at the chosen moment - third year of the forecasts horizon in Norway . The analysis allowed us to notice regularity. Relatively there is no difference between the values of central paths of inflation CPI and core inflation projections in the moment of the third year forecast horizon in Norway.
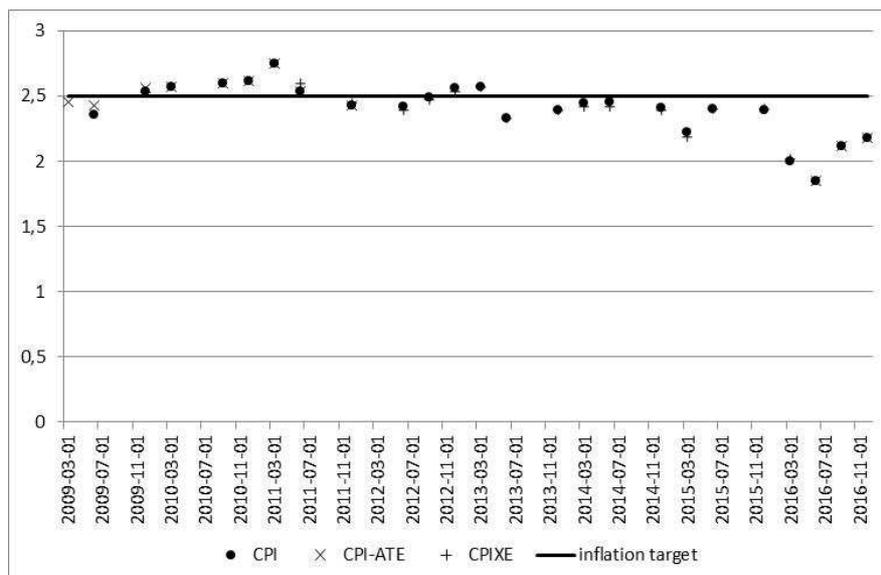
Graph 6. The values of the central paths of CPI inflation projection and selected measures of core inflation at the moment of the third year of the forecast horizon in NB

Source: Own calculations

5. Summary of the research

Central paths of CPI inflation projections and core inflation projections in the selected countries at the moments of the first and second year's forecasts horizon differ significantly from each other and are relatively not convergent to the inflation targets. These differences are relatively larger in Sweden than in Norway.

Central paths of core inflation projections in the selected countries at the moment of the third year's forecasts horizon are convergent to the inflation targets. In Norway central paths of CPI and core inflations projections at the moment of the third year's forecasts horizon have similar values and both are convergent to the inflation target. In Sweden the projections for core inflation CPIX at the moment of the third year's prognostic horizon have similar trends, but are closer to the target than the projections of the CPI. These differences are not very significant. The projections of core inflation CPIF at the moment of the third year's prognostic horizon CPIF are convergent with inflation target, while the CPI projections are not and differ significantly. The average deviation of the central path projections from the inflation target in the selected moment of the forecast horizon is shown in Table 4. The average deviation of the central path projections from the inflation target in the third moment of the forecast horizon in Sweden and Norway are relatively lower than for CPI.

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Table 4. The average deviation of the projection of headline inflation and core inflation from the target at the prognostic moment of 1, 2, 3 years in Sweden and Norway

	Norges Bank			Sveriges Riksbank	
Average deviations of central path projections (from the IR 2010-2013) over the inflation target					
Horizon (year)	CPI	CPI-ATE	CPIXE	CPI	CPIF
1	0,9318076	-	0,8602987	0,4956	0,4956
2	0,4211095	-	0,4120209	0,6073	0,1839
3	0,2203903	0,1608185	0,1608185	0,7331	0,0264

Source: Own calculations

6. Conclusions and implications for countries using inflation forecast targeting

The analysis did not allow for confirmation that a properly selected core inflation rate is a better indicator of inflation in the inflation projections than the CPI. It cannot be stated explicitly that the central paths in the projections of core inflation are characterized by smaller deviations from the inflation target. However, one can say that **in Sweden and Norway central paths of the projections of core inflation at the prognostic moment of the third year of forecasts horizon were convergent with inflation target.** This relation can be also confirmed by CPI inflation projections in Norway but cannot be for CPI inflation projections in Sweden. This result should be exposed**. The central paths of core inflation projections converge with the inflation target as the time horizon became longer but still remained medium term.**

Implications for the implementation of the IT strategy therefore go in one direction. Central Bank pursuing IT should decide on a parallel publication of the CPI inflation projection and the correct choice of core inflation. **The projection of core inflation can be a typical operational tool anchoring inflation expectations and can be used as a an intermediate goal of monetary policy because it possesses an ability to achieve the inflation target at the end of the forecasting horizon.**

6. Comments

Difficulties in the analysis of the inflation projections are due to the fact that the IT strategy has evolved in the implementation of the guidelines in practice. The first theoretical works were based on the contemporary paradigm of treating the inflation projection as an intermediate target . In fact, it turned out that the inflation projection can have a wide range of different features and central banks should decide which of them would be emphasised. According to the author a compromise between the properties of the prognostic function and the targeting of the forecast is very difficult to achieve. In contrast, the area on the characteristics of the inflation projection, as a specific operational tool within the IT strategy

is often biased on the side track . The study compares projected CPI inflation and core inflation in Sweden and Norway just from the point of view of rooting projection as a tool for shaping inflation expectations. The range of this subject has been very much narrowed . In addition, it has been presented from the point of view of how inflation projection " should " shape up. The next step in the analysis will be revision of these aspects based on a study of actual correlation between the projection and the inflation expectations of economic actors. Such a bilateral look could help to better adapt the projection to destination set in the late nineties of the last century. These analysis represent only a part of the whole spectrum of the possible research to perform. These features were selected by the author in a subjective manner using the principle of deduction, starting from the function of the projection , which is the formation of inflation expectations.

The analysis was deliberately limited by the author to the selected features of projections, while not taking into account additional information regarding the published inflation projection.. Research was based only on the results of the central projection pathways, bypassing the study areas of uncertainty, which, on further analysis, may also play a very important role. The author did not take into account the economic situation and occurrence of the crisis. On the one hand, this assumption could affect the outcome, on the other hand, however, it turned out to be even more interesting, because it allowed for a comparison of the formation of the central projection pathways in more extreme conditions. The obvious limitation is to base conclusions on a study conducted on only two countries applying IT. The article is a contribution and indicates directions for further research on the proper adjustment of the inflation projection as an operational tool of IT strategy .

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UND1X changes its name to CPIX, PRESS RELEASE (2007), Sveriges Riksbank

Annex

## Table 5. Brief overview of the inflation projection published by the SR in the years 1999-2013

IR Date	Projection horizon [quarter]	Main assumption (repo rate)	Number of projections per year	Headline inflation	Core inflation	
					UND1X/CPIX	CPIF
1999:03:00	9	CIR	4	CPI	UND1X/CPIX	
1999:04:00						
2000:01:00						
2000:02:00						
2000:03:00						
2000:04:00						
2001:01:00						
2001:02:00						
2001:03:00						
2001:04:00						
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2004:01:00						
2004:02:00						
2004:03:00						
2004:04:00						
2005:01:00						
2005:02:00						
2005:03:00	13	ME				
2005:04:00						
2006:01:00						
2006:02:00						
2006:03:00						
2007:01:00	14	Endogenous rate.				
2007:02:00	13					
2007:03:00	14		3			
2008:01:00						
2008:02:00						
2008:03:00						
2009:01:00						
2009:02:00						
2009:03:00						
2010:01:00						CPIF
2010:02:00						
2010:03:00						
2011:01:00						
2011:02:00						
2011:03:00						
2012:01:00						
2012:02:00						
2012:03:00						
2013:01:00						
2013:02:00						
2013:03:00						

Source: central banks web pages.

Table 6. Brief overview of the inflation projection published by the NB in the years 2001-2013

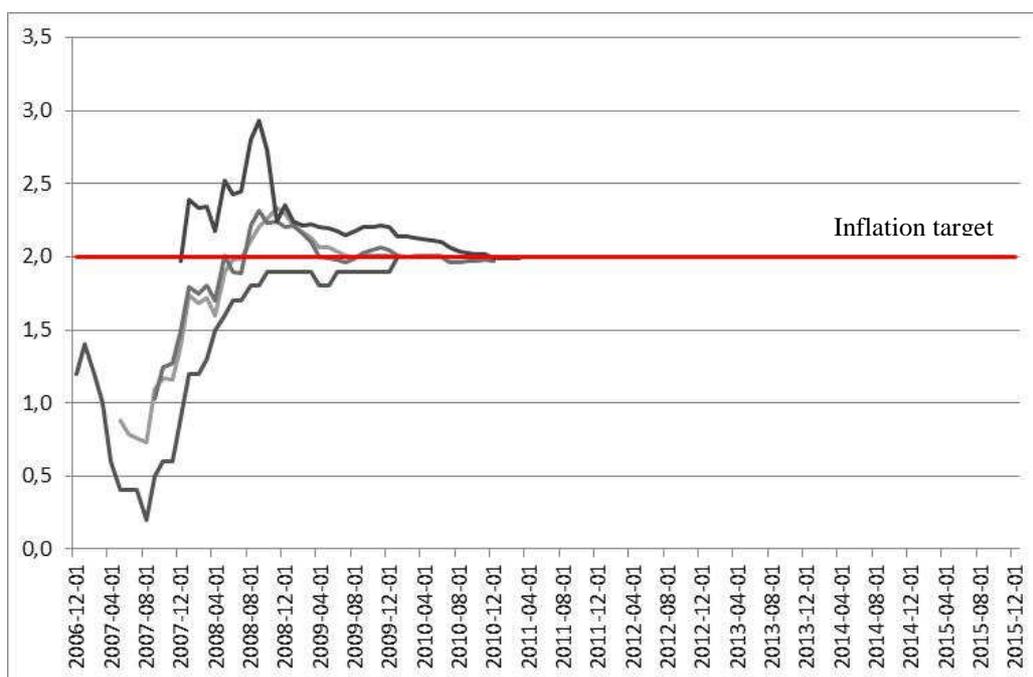| IR	Inflation projections					
	Projection horizon [quarter]	Number of projections per year	Main assumption (repo rate)	Headline inflation	Core inflation	
					CPIXE	CPI-ATE
2001:01:00	8		CIR		CPIXE	
2001:02:00						
2001:03:00	no data		no data	no data	no data	no data
2002:01:00			CIR			CPI-ATE
2002:02:00			ME			
2002:03:00						
2003:01:00			CIR and ME			
2003:02:00						
2003:03:00			no data	no data	no data	no data
2004:01:00	8		ME			
2004:02:00						
2004:03:00						
2005:01:00						
2005:02:00						
2005:03:00						
2006:01:00						
2006:02:00	15					
2006:03:00	13					
2007:01:00	16	3				
2007:02:00	14					
2007:03:00	13					
2008:01:00	16					
2008:02:00	15					
2008:03:00	13					CPI-ATE
2009:01:00	15		Endogenous	CPI		
2009:02:00	14					
2009:03:00	13					
2010:01:00	16					
2010:02:00	15				CPIXE	
2010:03:00	13					
2011:01:00	16					
2011:02:00	15					
2011:03:00	13					
2012:01:00	16					
2012:02:00	15					
2012:03:00	13					
2013:01:00	16	4				
2013:02:00	15					
2013:03:00	14					
2013:04:00	13					

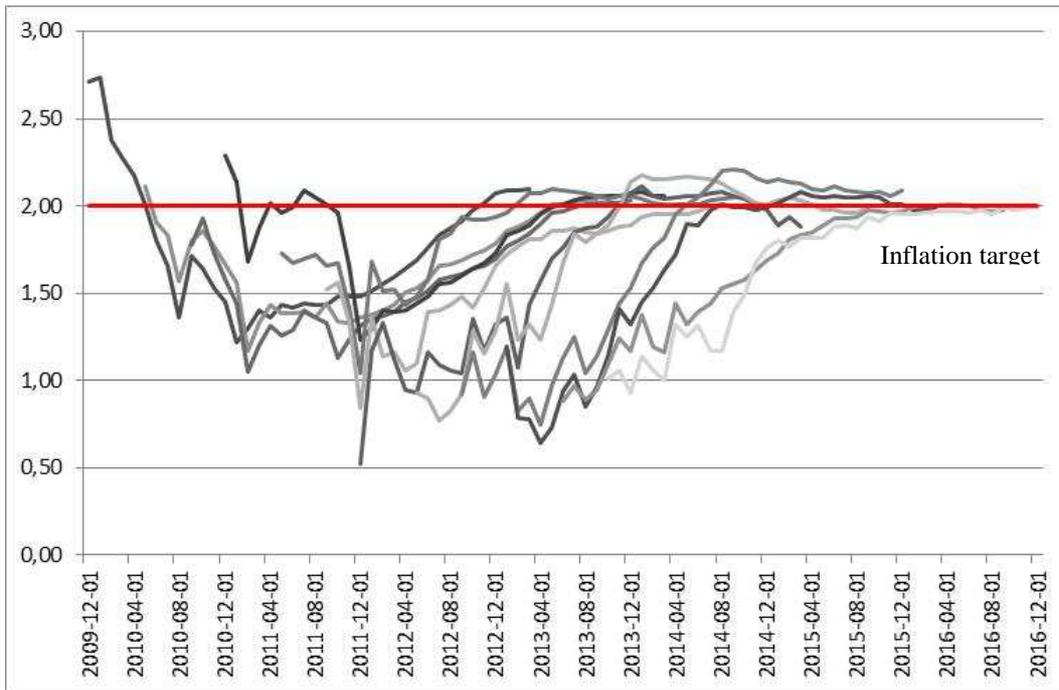Source: central banks web pages.
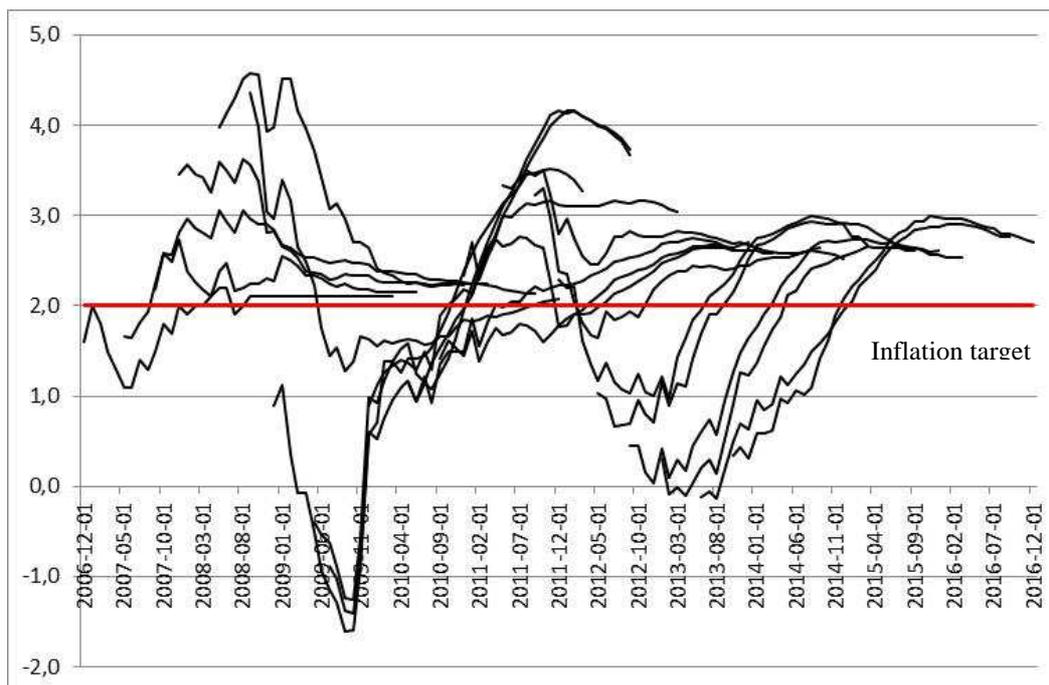
Graph 7. Central paths of CPI inflation projections in SR
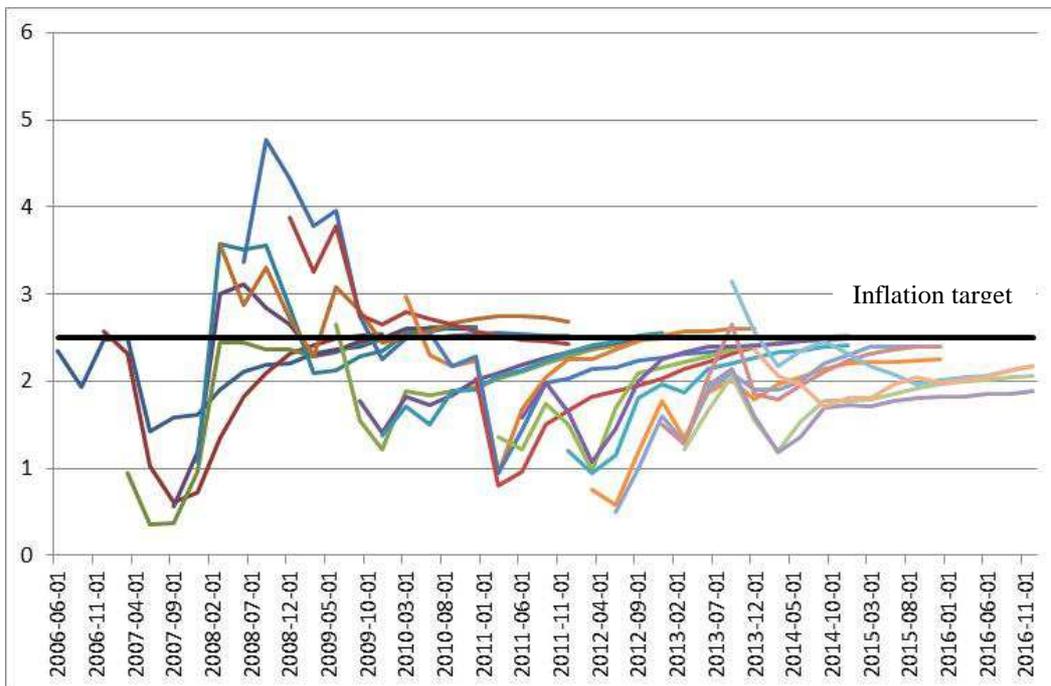
Source: Own calculations

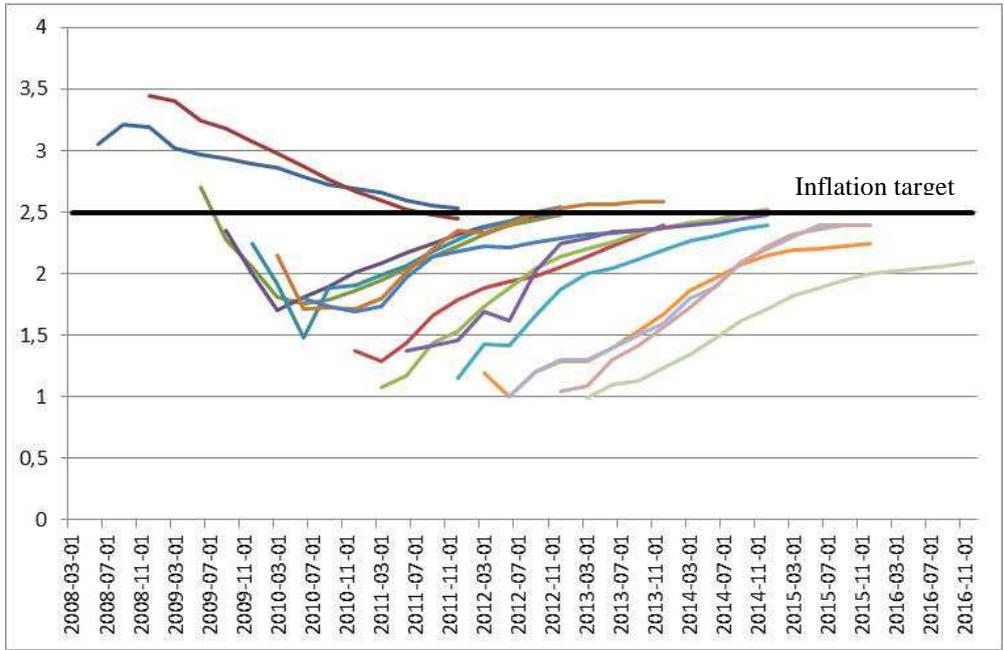**Graph 8. Central paths of CPIX inflation projections in SR**

Source: Own calculations

Graph 9. Central paths of CPIF inflation projections in SR
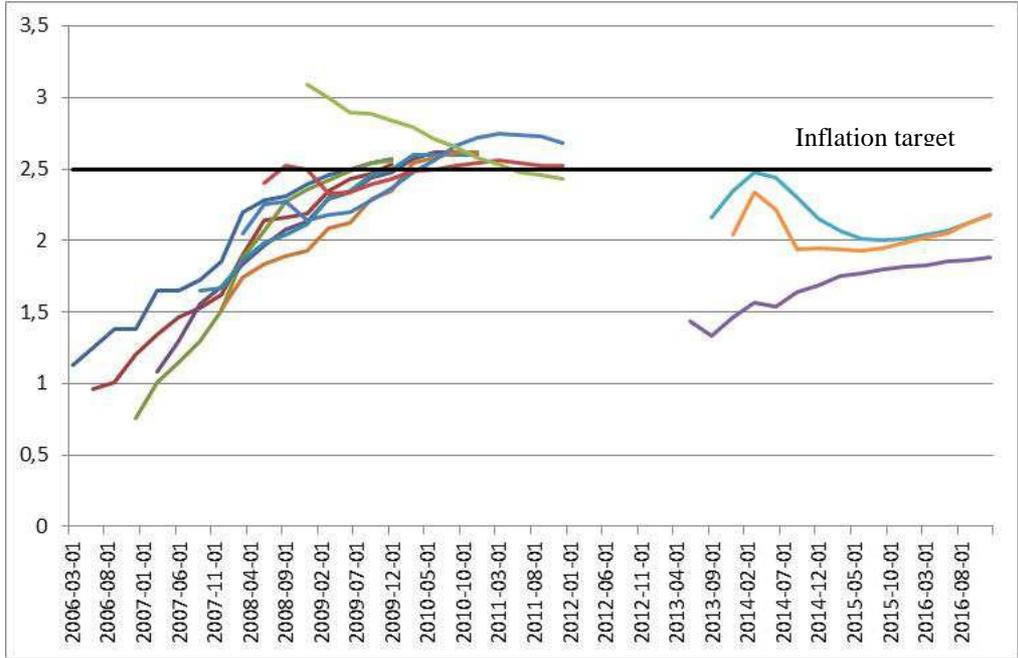
Source: Own calculations

Graph 10. Central paths of CPI inflation projections in NB

Source: Own calculations

Graph 11. Central paths of CPIXE inflation projections in NB

Source: Own calculations

Graph 12. Central paths of CPI-ATE inflation projections in NB

Source: Own calculations