



Inflation Targeting and Behavioural Economics: Introduction

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Abstract: This contribution can be understood as a theoretical introductory chapter which focuses on an increasingly widespread monetary regime – inflation targeting within a relatively new economic field – Behavioural economics. Mainstream economics have a tendency to ignore the relatively extensive and deep knowledge of humanities sciences dealing with human behaviour and decision-making processes. Why not improve the standing economical models and the current paradigm with this knowledge? The target of this paper is to outline the possibilities of using behavioural economics to improve inflation targeting.

Keywords: Behavioural economics, inflation targeting, central bank behaviour

1 Basics of Behavioural economics

Indeed the teachings of behavioural economics are not entirely new. Its roots reach into the era of neoclassical economics, where references to a less well known work by Adam Smith – *The theory of moral sentiments* or Jeremy Bentham's philosophy of utilitarianism can be found.

In modern economics behavioural economics are a relatively new interdisciplinary school of economical ideas, which try to better understand and explain economical processes behind which there are always humans ergo human behaviour. Behavioural economists believe that even beliefs, emotion and heuristics should be a relevant part of any economical study. The boom of this school can be dated to the beginning of the 90's when a well know book the *Prospect Theory* written by two psychologists Daniel Kahneman and Amos Tversky was published. This book deals with mechanisms of human decision-making. Behavioural economics does not set as its goal to try to radically change the current economical paradigm but rather tries to broaden it, for example by reformulating certain premises [1]. Through the optics of behavioural

economics a human being is not always perceived as a purely rational entity, therefore one of the most important contributions of behavioural economics is considered to be a more realistic psychological approach to human behaviour and decision-making. This is achieved by integrating findings from other disciplines such as psychology, sociology or anthropology.

Supporters of behavioural economics are confident that the utilisation of this knowledge improves the economical science as a whole, because it allows for a deeper theoretical insight, better prognosis of analyzed phenomena thus enabling better solutions to current problems [2]. Furthermore they are convinced that even irrational human behaviour is systematic and as such can be assessed, therefore it should be incorporated into economic models and policies [3] [4]. That is also the reason why, for example FED, began employing behavioural economists in departments for economics research.

To put it short behavioural economics can be perceived as a synthesis of findings from economics and psychology, which in the past was not considered to a real scientific discipline and was on the outskirts of interest during the neoclassical revolution. At the start of its boom economists recognized certain patterns in human behaviour which further served as premises for deeper theoretical development of economics. At present some economists are starting to reverse this approach, where the goal of their research is to prove the existence of a certain feature in human psychology. Human behaviour is then perceived as the outcome of evolution.

The methods of research used in behavioural economics do not differ much from commonly used methods in economics. At the beginning backers of behavioural economics relied on experimentally gained data. Later they broadened their methodological foundation by a number of other methods and at present more and more findings are based on factual data. Among traditional scopes of interest of behavioural economics are – loss aversion, decision-making under risk, time discounting and the so-called social benefits (as opposed to the concept of maximizing benefits) [2].

2 Inflation targeting

In the 90's of the 20th century a new regime for monetary policies arose, this was inflation targeting. The first bank to implement this was the central bank of New Zealand in 1990. Afterwards many other countries followed, both developed (Canada, Great Britain, Switzerland) as well as developing ones (i.e. Philippines, Ghana). The theoretical foundation was laid by the new keynesian economics in the form of the so-called new consensus, which describes the model of inflation targeting as a monetary policy based upon influencing interest rates where the goal is price stability or more precisely maintaining a low rate of inflation. Of utmost interest is therefore the process of price formation which is done by gradual accommodation to new conditions on the market [5].

An obvious benefit of inflation targeting is the approximation of the central bank's behaviour and decision-making towards the public. This is provided both by announcing the value of the inflation target as well as publishing regular news concerning the development of inflation. This is also viewed as a commitment to fulfil the inflation target and as such helps form the inflation expectations. Thanks to the relatively high volume of communication the monetary policy should be transparent to the public, ergo it should be easily assessed and the steps taken shouldn't be surprising for the markets.

As this monetary policy is focused on price stability it brings various economical benefits. Low inflation eliminates the negative aspects of wealth redistribution and in the long term promotes economical growth.

Another positive aspect of inflation targeting is the absence of an intermediate criterion. This allows the central bank to identify and evaluate more transmission mechanisms and hence lower the risk of making a flawed decision.

Direct inflation targeting represents a transmission mechanism without any intermediate criterion. The final target is a predetermined rate of inflation which the central bank attempts to reach via operational management of its interest rate.

In practice inflation targeting is the decision-making of the central bank about the height of its interest rate (repo rate) on the basis of comparing the outcomes of inflation prognosis and the inflation target. Generally the central bank's reaction function can be formally expressed as:

$$mr_t - mr_E = f_l [P_t(p_{t+1}) - p_{t+1}^T], \quad (1)$$

where mr_t nominal interest rate of central bank

mr_E equilibrium monetary policy nominal interest rate (as the sum of the equilibrium real interest rate and model-consistent inflation expectations)

$P_t(p_{t+1})$. inflation prognosis as a function of exogenous variables

p_{t+1}^T inflation target at time t+1

Simplified we could say that if the forecasted inflation is above the inflation target, the central bank raises the repo rate above the equilibrium and vice versa while at the same time it has to note the gradual impact of the change into the economy and inflation [6].

From what was said it is clear that the monetary policy under the inflation targeting regime is forward looking which is given by the delay in the economy which exists between the measure taken and the time it has an actual impact on the economy. According to some economists this delay may span across one to two years. Therefore inflation prognosis plays a key role in inflation targeting [5]. However it is important to keep in mind that even though the prediction apparatus is always evolving it is still only an estimation of the future with a high number of various uncertainties. The central bankers are well aware of this when they decide on the interest rates based upon the

inflation prognosis. On top of that their decision-making is also subject to subjectivism – from the perspective of Behavioural economy - and therefore their decisions need not be in accordance with the outcomes of the prognosis.

Inflation targeting should primarily ensure a stable and low inflation rate thus a more stable economic cycle, further strengthen the credibility of the central bank and anchor inflation expectations. The results of various studies prove that this regime indeed does help in lowering inflation in the long term as well as dampens the reactions to inflation shocks and also promotes the independence and efficiency of the central bank. These effects are most obvious in emerging countries which have adopted inflation targeting [7] [8].

An interesting problem arose in countries that are targeting inflation and planning to enter the eurozone, such as Poland, Hungary or the Czech republic. These countries have to face the so-called impossible trinity, which represents the difficulty in fulfilling the maastricht criteria concerning price and exchange rate stability (ERM II system) while at the same time maintaining a high mobility of capital [9]. The most efficient tool of monetary policy to maintain a stable exchange rate are interest rates those however pose as an operative criterion in reaching the inflation target. This is in violation of the Tinbergen rule, according to which to reach an n amount of independent goals there must exist n independent tools. Therefore if the central bank is utilizing interest rates (in free market operations) to maintain a stable exchange rate as well as to reach the inflation target, it is probable that not even one of these goal will be met.

3 Inflation target

By publishing the inflation target the central bank commits itself to reaching this goal while at the same time influences the expectations of economical subjects and by doing so helps to attain said goal. The target inflation is usually set above zero to prevent the risk of a possible deflation.

There are basically three possible ways to set the target inflation. First of these is setting a point inflation target with a given tolerance zone (i.e. $2\% \pm 1$ p.p.). A target set in such a manner sends an unequivocal message to the public thus strongly influencing their expectations. Another possible way is to set an interval for the target inflation (i.e. 1% to 3%), this is easier for the bank to achieve and maintain but does not send such a strong impulse to the public. The bank then fulfils its target as long as the inflation is anywhere between 1% and 3%. The last commonly used form of setting a target inflation is by declaring a (usually) narrowing corridor.

Much more complicated than the form of setting the target is the setting of the actual value. An inflation target that is set too low may result in a recession. According to the European central bank the optimal value to ensure price stability is slightly under but close to 2% [10]. Another argument, from the perspective of Behavioural economics, why not to target inflation to 0% is (not only) the wage rigidity. Since if the inflation is

0% and the economy is therefore in a recession the employers would be driven to lower wages, which would be met with disapproval by the labour unions as well as employees and in the end would lead to growth of unemployment. On the other hand if the inflation is sufficiently high it is enough for the employers to maintain the current nominal wages and therefore only the real wages diminish [3].

Both Hungary and the Czech Republic are European countries that have yet to change their currency to Euro, which has given them the benefit of their own monetary policies, which are based on inflation targeting in both countries. Specifically Hungary has been targeting inflation since June 2001 and the Czech Republic has been doing so since 1998. The success of the central banks to reach their inflation targets can be seen in chart 1.

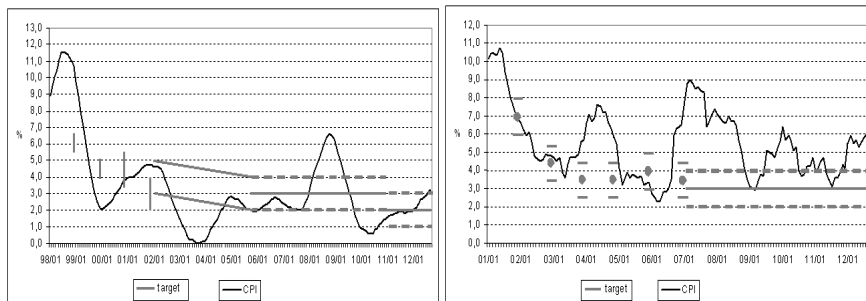


Chart 1
Inflation development in the Czech Rep. and Hungary in comparison with the target inflation in the years 1998 to 2012

Resource: Czech National Bank, Magyar Nemzeti Bank

Both countries had a high initial rate of inflation (shown as CPI). In the first years of inflation targeting this rate was being successfully lowered and mainly Hungary was nearing the target inflation. The subsequent development was to a great degree influenced by supply shocks and the recent financial crisis. During the last year the Czech National Bank was able to keep inflation near the inflation target [11] [12].

4 Forming of inflation expectations

The most commonly used division of inflation expectations is adaptive, which forms based on previous experience and rational, which are formed based on all available information [13] without systematic errors in the creation of said expectations. There are many studies that test the hypothesis of rational inflation expectations, the results vary. For example one study conducted for the Eurozone in 2002 [14] is in favour of the hypothesis and concludes that expectations tend to rationality given time. On the other hand another study from 2008 denies the hypothesis [15].

Influencing inflation expectations gives the central bank the possibility to reach or at least approximate the inflation target without having to use any of the commonly used instruments, such as repo operations. This depends on the extent to which the central bank is able to influence the expectations. In this relation economical literature speaks of the so-called self-fulfilling property of expectations. That is when an economical subject is expecting a certain level of inflation (for now we will not take into account how that expectation was formed), the subject will raise their prices and thus transform their expectations into reality, which in turn serves to strengthen their expectations. Therefore the expected rate of inflation can be – to a certain extent – viewed as a measure of success or more precisely a measure of credibility of the monetary policy, in other words the closer the inflation expectations are to the inflation target the more credible is the monetary policy.

Behavioural economics analyze the formation of inflation expectations on the basis of psychological factors, where economical agents assess the future development from a personal point of view utilizing a simple “rule of thumb” method, which should simplify the process of information processing. Literature uses the term *subjective probability heuristics*. An example of such heuristics would be an economical subject deciding if and with what probability will the future inflation be the same, lower or higher than that of a previous period, while his decision-making may be based purely on guessing, intuition or past experience.

Authors Gnan, Langthaler and Valderrama give several possible explanations as to how economical subjects form their inflation expectations from the perspective of Behavioural economics [16].

First of these is called *availability heuristic* where the probability of a certain event is dependent on the capacity to imagine it. If a certain event (or a similar one) has happened in the past, it is therefore more readily imaginable and thus has a higher probability attributed.

Simulative heuristic is described similarly. The probability of an event is derived from the possibility to conceive the events impact.

Another type is the *associativeness model* in which present actions conjure an association with a past action that had the same or similar accompanying features. The danger lies in the capacity of insubstantial or even irrelevant information influencing the expectations in such a manner that the same development as in the past is expected even though this has no basis in reality.

Saliency heuristic assumes that economical subjects only transmit such information into their expectations of future inflation that are blatantly obvious therefore only in periods of high or volatile inflation.

If an agent applies *representativeness heuristic* then he changes his future expectations on the basis of only a select part of newly gathered information. The consequence of this is a certain rigidity in their expectations in spite of the fact that the present economical development calls for a reassessment.

In the case of *confirmation bias* new information is being misinterpreted either because of ingrained preconceptions concerning the development of inflation or because of an effort to assimilate these new information to past events in order to enforce one's own opinion. With this type of behaviour the credibility of the central bank is especially crucial since once it is lost it is very hard to regain.

Another form of decision-making is *anchoring and adjustment* where assessments of future inflation are influenced by a certain default value. This is basically what the central banks try to achieve when they try to anchor the inflation expectations by announcing the target inflation in a clear manner and the commit to fulfil it. If said bank manages to do so, then not even short-term fluctuations would change the inflation expectations by much.

The last phenomenon is *overconfidence* in one's own knowledge and abilities to assess the future development of inflation amongst professionals and laymen alike.

5 The credibility and transparency of the central bank

Since inflation targeting is strongly connected with the requirement of a transparent monetary policy, central banks usually publish results of predictions, inflation news, commentary on current and possible future development on top of mere changes of interest rates. On the other hand we can notice the standard of rather cautious statements of central bankers regarding the possible future development of interest rates to retain a certain room for manoeuvring and for fine-tuning their assessments [17]. Another requirement for the monetary policy is its credibility, the fulfilment of which helps anchor inflation expectations hence central bankers should not change their statements too often.

Therefore targeting inflation is not just reaching the inflation target by regulating interest rates, in fact this process is strongly influenced by other aspects such as communication of the central bank with the general public. Authors Kuttner and Posen ask the question, how can inflation targeting be interpreted. First of all they state three basic possibilities of behaviour of a central bank targeting inflation. These are discretionary, conservative and behaviour based on the optimal rule of monetary policy as a compromise between the previous two [18].

In accordance we can distinguish between two basic types of behaviour of the central bank, which are discretion and rules. If the central bank acts in a discretionary manner, economical subjects may be taken by surprise, which in turn influences their expectations and this has an impact on the overall efficiency of the economy. Discretionary behaviour is connected with relatively stable short-term rates during supply shocks, but inflation expectations manifest a higher volatility which in turn leads to significant changes in long-term interest rates.

If the central bank makes its decisions based on a set of simple rules, enforcing its credibility and transparency, thus forming the desired inflation expectations, especially if said rules are easily comprehensible. On the other hand such central banks have a higher tendency to manipulate short-term interest rates in order to fulfil the inflation target.

A compromise between the two aforementioned types of behaviour is the so-called optimal rule of monetary policy, its application is common under inflation targeting regime. This leaves a certain room for manoeuvring for the central bank which is needed when making decisions about an uncertain future. In the case of the optimal rule the central bank commits itself to fulfilling the target in the form of an average rate of inflation, this allows the central bank to react to short-term shocks and the impact into long-term interest rates is dampened.

The authors further analyze other options of the central bank's behaviour as a transition between two of the three aforementioned types.

First of these is *trust building*, a transition from discretionary or conservative behaviour to the optimal rule (this is how the authors describe the Bank of England and the Bank of Canada). The central bank is more open with its information regarding their prognosis while accepting responsibility for fulfilling the inflation target, thus gaining flexibility in their reactions to inflation shocks. In this case a one-time inflation shock should not weaken the credibility of the bank (something that is unattainable for a conservative bank).

Strict contracting represents the same transition as *trust building* with the exception that the central bank is strictly responsible for fulfilling the inflation target, failing to do so the bank should suffer some clearly stated consequences. In the case of an inflation shock both aforementioned transitions should lead to a lower inflation momentum and a more stable long and short-term interest rate.

The transition between discretionary and conservative behaviour is called *chatty conservatism* (this is typical for the Bank of New Zealand) which still strongly heeds meeting the inflation target. The central bank is more open with its information but this only affects its behaviour to a certain degree, it is still primarily governed by a set of rules. Such a bank tends to alter the short-term interest rates more often, while the long-term rates exhibit a higher volatility than that in the case of a transition to the optimal rule.

Inflation-only targeting as a deviation from discretionary behaviour is considered as an extreme form of central bank behaviour and is rarely practiced and focuses solely on meeting the inflation target to the detriment of transparency and flexibility of the bank's reactions to inflation shocks.

The transition from conservative to discretionary behaviour is viewed as the worst possible option. Dubbed as *cheap talk of the week* it describes a bank that is incapable of guaranteeing a stable and low rate of inflation, yet the bank keeps reassuring the public that it can do so. This situation brings up two problems that derogate the

credibility of the bank. First of all it is the fear of a surprising measure taken by the central bank in accordance with its previous discretionary behaviour, secondly scepticism of the public towards the informational openness of the bank in spite of the bank publishing various inflation news and prognosis.

Conclusion

Behavioural economics offer more insight into the decision-making of central banks and open up new possibilities for research on the field of inflation targeting as a regime of monetary policy, whose success is deeply intertwined with the central bank's ability to communicate with the public and perform so with credibility. A sort of ideal approach of central bankers is considered to be the optimal rule, which should not lead to surprises for economical subjects while leaving room for manoeuvring for the central bank.

Success of the monetary policy can be also judged according to how well the central bank is able to influence inflation expectations. That is why it is useful for central bankers to know how inflation expectations are formed into which Behavioural economics provide some deeper insight.

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