The Process of Inflation Expectations' Formation*

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Abstract

The aim of the investigation is to classify and systematize groups of economic agents with different types of inflation expectations in information economy. Particularly it's found out that it is not feasible to exclude the possibility of current signals perception by economic agents.

The analysis has also shown that there is an uncertainty in economy when authorities redeem monetary policy promises, but their action wouldn't influence on average inflation expectations of economic agents.

The investigation results testify the flat existence of agents in economy which are characterizing with rational, quasi-adaptive (including adaptive) and also arbitral inflation expectations.

Keywords: information economy, information signal, information perception, agent belief in information, inflation expectations, quasi-adaptive expectations, arbitral expectations.

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Abbreviations:

W	a variety of information signals.
w	an element of a variety of information signals that is an information signal.
x	economic agents.
q	a number of signals.
s_q	a parameter that reflects the content of *q*-signal.
I_t^s	supplied information signals at moment *t* directly or indirectly characterizing economic environment.
I_t^a	the highest available volume of information at moment *t*.
I_t^m	a piece of the all available information I_t^a perceived by an economic agent at moment *t* that defines his level of information perception.
$I^{\max}$	maximum number of information signals perceived by economic agent at moment *t*.
θ	coefficient reflecting the relative number of information signals adjusted for information asymmetry, monetary transparency and bounded rationality.
Δ_t^i	the level of information asymmetry at the moment t (non-adjusted for monetary transparency),
$\Delta_{m\,t}^i$	the level of information asymmetry at the moment t (adjusted for monetary transparency)
δ_t^m	the level of monetary transparency at the moment t.
$\vec{s}_t^{\,of,N}$	a linear combination of vectors of information emanating by monetary authorities.
$\vec{s}_t^{\,cb}$	a vector is defined according to [5] that reflects central bank information signals.
$\vec{s}_t^{\,\varepsilon}$	a vector that expressly or by implication reflects information on external shocks of inflation.
q_t^{of}	the number of information signals that overtly or covertly characterizes future rate of inflation emanating from monetary authorities (that is to say characterize inflation target value).
$q_{s_t^\varepsilon}^{\varepsilon}$	the number of information signals that characterizes external shocks (that independent from monetary authorities actions) affecting inflation rate.
$\pi_{of\,T}^{e}$	inflation forecast published by authorities in current term T.
π_T^e	average inflation expectations of agents in current term T.
$\pi_t^{e\,a\partial}$	adaptive inflation expectations.
$\pi_t^{e\,qaa}$	quasi-adaptive inflation expectations.
$\pi_t^{e\,rat}$	rational inflation expectations.
$\pi_t^{e\,arb}$	arbitral inflation expectations.
π_{hi}	hyperinflation.
α	the coefficient characterizing the agent belief sensitiveness in authority actions.
p	level of information perceptivity of agent x, $p \in [0;1]$.
s	level of belief in perceived information signals of agent *x*, $s \in [0;1]$.
y_x	income of agent x.
$y_{\max}$	maximum agent's income.
$B(y_x)$	distribution function of agent incomes that reflects a share of economic agents with income lower than the defined one.
$b(y_x)$	density function of agent incomes in $b(y_x)$.
G	distribution function of information perception.
$\{\chi_t\}$	variety of deviations $\{ \chi_t \}$ from actual inflation to its official forecast.
$\lambda_{t,T}$	coefficient characterizing changes in the significance of events took place in a period *t* to set level of belief in current period *T*.

$\{\eta_t\}$	variety of deviations to which variety of deviations $\{\chi_t\}$ is descended taking into consideration modifiability of information time relevance for every *t*.
$\{\gamma_t\}$	variety of deviations from actual inflation to its official forecast providing perception of maximum number of information signals.
$\{\phi_t\}$	variety of deviations to which variety of deviations $\{\gamma_t\}$ is descended providing perception of maximum number of information signals and taking into consideration modifiability of information time relevance for every *t* .
H_e	belief distribution function of agent *x* with level of information perception equals *p*.
F_H^G	density function of agent inflation expectations depended on signal perception and confidence in this information.
κ_i	a share of agents with *i*-type of inflation expectations.

No intelligence system can predict
what government will do
if it doesn't know itself.

John Kenneth Galbraith

Introduction

Before starting the analysis of the process of inflation expectations formation we'd like to notice the impossibility of exception of the modern economy key features influence on agent forecasts. The expectations channel undoubtedly is a very important part of a transmission mechanism for the conduct of monetary policy. The evolution of central bank activities and the appearance of new theoretical and practical papers prove the significance of inflation expectations role.

There are a lot of definitions for modern economy: knowledge economy, information economy or the new economy[1].

In 1962 Fritz Machlup published the paper [31] on measurement of US knowledge production and distribution. This article enhanced a wide range of researches dedicated to investigations of principles, norms and measurements of knowledge that resulted in appearance of a new area of economy –knowledge economy. Ouwersloot, Nijkamp and Rietveld (1990) [35] assumed that information and knowledge are linked by means that "information is the meaning assigned to data by known conventions and knowledge is the integration of processed information.

John Galbraith (1967) [20] indicated the enhanced role of knowledge in the middle of the 20th century. From his point of view, locus of power has shifted from managers to technocrats i.e. to group of highly-trained experts who, collectively, have a monopoly of scarce skills and crucial knowledge and thus increasingly make the best decisions. Thus, Galbraith regarded the time-varying role of information as a basis for fundamental economic changes.

Before 1980 "economics of information" was mainly understood as "economics of search" sourced from Stigler's papers [39]. He had modified competitive pricing theory by representing price as a random variable with a given cumulative distribution curve. Thus he had amplified the pricing theory by integrating the search activity as a necessity for price data acquisition.

The use of game theory in pricing researches became the next important stage in development of information economy. This way of problem solving is based on analysis of origin, duration and termination of contractual relations. Agent incentives to negotiate are

[1] The debates on the definition of the current economy status as an information or a new one were held, for example, on a symposium sponsored by the Federal Reserve Bank of Kansas in Wyoming (2001) [18] with the participation of M. Woodford, J. Taylor, K. Murphy, A. Greenspan, M. King and many others.

defined by various information they possess. The problem of this information asymmetry is solved by analysis of conduct of the contracting parties with the evaluating object enjoying the information structure. Thereby, problems of information economy based on interrelations of contracting parties can be solved by means of using Nash's non-cooperative games [28].

Contemporary economy sometimes is also called “new economy”. The term “new economy” according to Baily [2] may incompletely reflect current activity as it is too broad and implies more often and deep changes that actually take place. Nevertheless, the term “information economy”, from his point of view, appears to be too narrow as it doesn’t fully reflect all the changes that are inherent in current economy, e.g., increased globalization, a more intense pressure of competition, rapid development.

The last peculiarity of the contemporary economy is used to be a basic feature of the current economy in this research.

One of the main tasks of monetary authorities is to provide the financial stability, which primarily concerns price stability warranties. Long-term price maintenance appears to be a prerequisite for both improvement of economic health and economic growth as a whole. Thus, for example, Charles Goodhart [22] has defined two core purposes of central banks: the responsibility to achieve price stability and acting as a lender of last resort, hereby maintaining the financial stability and confidence in authorities in the conduct of monetary policy that is directly effected on the behavior of economic agents (see also [3]).

A great number of researches dedicating to analysis of economic agent inflation expectations have been published recently. It is possible to conventionally identify main research trends, i.e. articles dedicating to inflation expectation synthesis problem (e.g. see Lines and Westerhoff (2009) [27]). These works are based on the consideration of simultaneous existence of agents in economy that are characterized by different types of expectations. Some other works are based on examination of agent expectations managing. In this case modeling agent expectations are endogenous variables that are depended particularly on monetary transparency. At the same time the current economy structure is also in sphere of interest of many researchers, as it provides a possibility to refine indicators linkages.

For instance these research guidelines are in the ECB and Bank of Canada spheres of interest. In this way the Bank of Canada's staff studies to what extent the price variance from the monetary target affects the agent beliefs to monetary authorities [9].

Besides, the research subject is alluded in the papers of Carboni and Ellison (2009) [8], Doepke, Dovern, Fritsche and Slacalec (2008) [17], Demertzis and Viegi (2008) [15], Andolfatto, Hendry, Moran (2007) [1], Castelnuovo, Nicoletti-Altimari and Rodriguez-

Palenzuela (2003) [10], Blinder, Ehrmann, Fratzscher, De Haan and Jansen (2008) [5], and also others.

The study by Van Raaij (1989) [41] appears to be of peculiar interest in the context of the research. This paper is based on the analysis of the differences regarded to psychological and economic motives of agent expectations formation. The statement about the importance of psychological motive is contingent of the way of inflation perception.

Thus, for example, Demertzis and Viegi (2008) [15] assumed that agents expectations resulted not only from their own opinion, but also by other economic agent decisions. Demertzis and Hallett (2008) [13] had also tested the economy with agents characterized by bounded rationality with and without information asymmetry of central bank actions. Lines and Westerhoff (2009) [27] presented dynamic macroeconomic model in which they described the inflation rate in terms of economic agent aggregated expectations. The authors assumed that economy is characterizing with two types of agent expectations: rational and extrapolative ones. Blinder, Ehrmann, Fratzscher, De Haan and Jansen (2008) [5] have hold out the prospect for the importance of central bank transparency in the framework of economic agent expectations irrationality and presence of information asymmetry.

This paper is based on analysis of agent cognitive psychology. The aim of the work is to classify and systematize groups of economic agents with different types of inflation expectations in information economy and to analyze an uncertainty in economy when authorities redeem monetary policy promises, but their action wouldn't influence on average inflation expectations of economic agents.

The plan for the rest paper is following. There is a general description of the model that characterizes the process of inflation expectations formation including the definition of information as a source of agent expectations formation in the first part of the article. The research of information signals reception by economic agents, their beliefs in this information, the estimation of aggregated value of agent inflation expectations on its basis and monetary authority activities effect on agent inflation forecasts including estimation of the risk of such effect absence are included in the second part of the work.

Model.

The model of inflation expectations formation is based on the assumption that any agent in economy possesses inflation expectations. Herewith we note that it is impossible to consider a single representative agent in the research in the consequence of socioeconomic conditions. Both individuals and institutions are regarded as economic agents in this paper.

Economic agents maximize the objective function

$$f\left(\pi - \pi^{e}\right) \rightarrow \max, \quad (1)$$

which values are directly proportional to inflation expectations accuracy, i.e.

$$f'\left(\left|\pi - \pi^{e}\right|\right) < 0 . \tag{2}$$

To create inflation expectations economic agent should use information signals which we treat as resources. According to the new institutional economic theory information acquisition and analysis are associated with costs. It's noted that information is considered in the research not in a capacity of a normal good as for example it's fixed in the work of Ouwersloot, Nijkamp and Rietveld (1990) [35], but in a capacity of a good that conditionally exhibits properties of various types of goods[2] similar to a merit good [32, 33].

To investigate the information perception we should define the term "information signal" firstly. It reflects some data that can be useful in compiling agent inflation forecasts.

Information signals are collected cumulatively and at period *t* there can be infinite, but countable number of information signals in the economy whereby it's possible to assign a peculiar number $q \; |q \in N$ to each signal. Denote a variety of information signals by *W*, and each of its elements by *w*. In this case information signal can be understood either both an abstract and an intensional notion, i.e. we can consider the variety of information signals as a homogeneous one or in terms of information content as a source of its heterogeneity. The whole set of information signals W_t includes all the information signals $W_t = \bigcup_i w_i$, $i \in N$ collected by period of time *t*. In addition we should single out information signals in the way that two signals shouldn't have any intensional recurrences, i.e. $w_i \bigcup w_j = \varnothing$ under $\forall i, j \in N \middle| i \neq j$. It is also necessary to separate information substance wherever it is possible. For example, we should consider unique signals for official forecast and monetary target instead of the single signal both for official forecast and inflation target.

As a result we can identify a perceived part of information variety *W* by agent *x* that is a combination of two constituent parts *q* and $\mathrm{s_q}$. Where *q* is a number of signals, and $\mathrm{s_q}$ is a parameter that reflects the content of *q* - signal. In addition $\mathrm{s_q}$ reflects vector $\vec{s}_t$ that is a linear combination of vectors* $\vec{s}_t^{\,of,N}, \vec{s}_t^{\,\varepsilon}$, $N \in R$, where $\vec{s}_t^{\,of,N}$ is a linear combination of monetary authorities information vectors. Particularly $\vec{s}_t^{\,cb}$ is a vector that reflects central bank information signals, it is defined by Blinder, Ehrmann, Fratzscher, de Haan, and Jansen [5], $\vec{s}_t^{\,\varepsilon}$ is a vector that expressly or by implication reflects information on external shocks of inflation.

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[2] For example, Ricardo analyzed the value of goods based on the example of diamonds and water which was possessed with different values due to the scarcity degree.

* With unitary sum of coefficients.

Thus we can say that inflation expectations are formed on the basis of information signals perceived by economic agent. Sources of information signals include the whole range of existing communication means.

The concepts of agent expectations of macroeconomic indicators were researched by economists over several decades. The concepts of rationality and adaptivity of economic agents are reckoned among the constitutive theories on inflation expectations formation. According to this statement we suppose that agents in economy are presented both with rational and with adaptive inflation expectations. By the way it is in line with Lucas' interpretation as long as he asserted that adaptive expectations theory was an isolated instance of rational expectations theory [29, 30]. Such dichotomy can be explained by the differences in agent education levels. Actually the more agents are educated the less costs on information signals acquisition and processing they incur. C. p. the more individual is educated the more information signals of current period he perceives to maximize objective function. But firstly the problem is that the statistics on the economic agent levels of education is published annually at the best. And secondly the attempts to define the educational level of legal entities that are included in the variety of economic agents a priori set to fail. This limits the feasibility of such a way to determine the inflation forecasts. To avoid this we suggest using statistics on agent incomes that is frequently published. Such assumption is based on the statement that in order to achieve high level of income in conditions of current economy (i.e. in information or in knowledge economy) both individual and institutional unit should be well-qualified for data acquisition and analysis. Moreover the greater the agent income, the greater the risk he bears in case of wrong inflation forecast, i.e. in this case he has much more incentives to perceive an additional unit of information. Thereby agents with higher income demand relatively more accuracy of own inflation forecasts to maximize objective function under which c.p. they perceive relatively more signals. According to this (as mentioned above) there is a possibility to single out discrete groups of economic agents that are characterizing with differential aptitudes of available data acquisition and analysis. Thereupon despite neo-classical theories we don't find it judicious to regard variety of economic agents as homogenous one with the same features. And we reckon that it is reasonable to find out economic agents with different levels of available information perception that corresponds with agent-based models inherently based on the papers of Burrell (1951) [7], and Kahneman and Tversky (1979) [23]. Macroeconomic approach of these models was taught upon for example by both Axel Leijonhufvud (2006) [26] and Leigh Tesfatsion (2005) [40].

Facing the uncertainty economic agents behave in correspondence to their inherent characteristics (according to own preferences basing on both individual peculiarities[3] and circumstances shaped up in the way of particular economy characteristics).

We reckon that it's impossible to rule out an agent ability to obtain current term signals in information economy. We also suppose that it's reasonable to use general government as an original source of actual or future inflation information. It's essential to note that in general government has wider access to special-purpose sources of information the bulk of inflation fluctuations are integrated in forecasts published by the authorities.

As it was mention above economic agents maximize their objective function which values are directly proportional to inflation expectations accuracy, which by-turn is under the pressure of monetary authorities fulfillment of macroeconomic indicators targets[4], i.e. it is influenced the degree to which authorities are following ex-ante policy. Accordingly we should define the term "belief". In capacity of an individual belief in authorities it is regarded subjective probability of how well actual inflation coincides with the value forecasted by authorities.

Thus, we can formally assign the criterion of belief in monetary authorities

$$\left|\pi^{e}_{of\ T} - \pi^{e}_{T}\right| \to o \text{, where} \tag{3}$$

$\pi^{e}_{of\ T}$ - officially published by authorities inflation forecast in current term *T*,

π^{e}_{T} - average agent inflation expectations in current term *T*.

Thus we can suppose that positive dependence between adherence degree of authorities to declared targets and agent belief is presented. It's essential to note that level of agent confidence will be also directly dependable on both coordination inflation forecasts published by authorities and macroeconomic conjuncture.

Under differences in receptivity level agents obtain various data volume to set own level of belief in authorities. The higher level of agent receptivity the more information they obtain to set level of belief in authorities.

To define average inflation expectations d.b.e. on the basis of data perceptivity and belief in this information we can single out four main types of inflation expectations (notice that every agent in economy run just to one type of expectations).

It's not assumed in adaptive expectation theory to acquire current term signals by agents. But as it was mentioned above it's impossible to rule out it in information economy. Due to what we consider these agents are characterizing with *quasi-adaptive expectations*[5]:

[3] For example, particularly, under the influence of the incentives that Keynes defined as "animal spirits".

[4] Kohn and Sack (2004) [24] stated for instance that economic agents can feel confidence in central bank's press releases in case of its conscientious attitude to published forecasts.

[5] In other words we define that if agents are characterizing with quasi-adaptive inflation expectations that is to say perceiving some current term signals but do not trust this information for whatever reasons then they are actually

$$\lim_{p\to 0}\pi_t^e = \pi_t^{e\,qaa}.$$

1. Economic agents with low levels of both data perceptivity and authority belief characterize with *adaptive expectations*:

$$\lim_{\substack{p\to 0\\ s\to 0}}\pi_t^{e\,qaa} = \pi_t^{e\,ad}, \text{ where}$$

p– level of data perceptivity of agent *x*, $p \in [0;1]$,

s– level of belief in perceived information signals of agent *x*, $s \in [0;1]$ (for more details see below), i.e.

$$\lim_{\substack{p\to 0\\ s\to 0}}\pi_t^{e\,qaa} = \pi_{t-1}^e + \beta(\pi_{t-1} - \pi_{t-1}^e). \quad (4)$$

2. Expectations of agents with low level of signals perceptivity and high level of belief in this information tend to official inflation forecast published by authorities.

$$\lim_{\substack{p\to 0\\ s\to 1}}\pi_t^{e\,qaa} = \pi_{of\,t}^e. \quad (5)$$

Notice that agents with high level of information perceptivity, i.e. receiving and analyzing more data on economic conjuncture are characterizing with more sensitive confidence in authorities actions as compared with agents with quasi-adaptive expectations. As mention above define that forecasts of these agents are made under *rational expectations*[6] theory.

$$\lim_{p\to 1}\pi_t^e = \pi_t^{e\,rat}, \text{ т.е.}$$

$$\lim_{p\to 1}\pi_t^{e\,rat} = E[\pi_t | I_{t-1}].$$

3. Particularly mention that agent expectations with high levels of signals perceptivity and belief in monetary authorities' actions are also based on inflation targets, i.e.

$$\lim_{\substack{p\to 1\\ s\to 1}}\pi_t^{e\,rat} = \pi_{of\,t}^e. \quad (6)$$

Denote also that rational agents with high level of belief in monetary authority actions create their expectations on the basis of all available current term information, particularly emanated from inflation target, monetary transparency level, seasonality and other bearing factors.

4. Expectations of agents with high level of signals perceptivity and low level of belief in monetary authority activities per se are also made under *rational expectations* theory. But

characterizing with classical adaptive expectations. Thus, expectations are specified according to adaptive expectations theory are a special case of quasi-adaptive expectations defined in the present work.

[6] Agents with high level of information perceptivity are also characterizing with both extra facilities to acquire data and greater abilities in its analysis. That is to say they need minimum time to process information and to integrate signals into expectations. In other words rational agents acquire more current term information signals and thereby they have an advantage in future inflation assessment.

the wider spread between actual inflation and its official target the stronger possibility of agents decision on monetary authorities will go back in declared conduct of monetary policy. I.e. per se it means that on agent minds actual inflation is under pressure of some external WRT monetary authority factors. Thus share of agents characterizing with rational expectations on inflation reckons that monetary authorities can't assure that actual inflation attains its target. And it has been just in consequence of existence of economic agents with quasi-adaptive (including adaptive) expectations that expects worse inflation value. In this case rational agents consciously orient in their own forecasts to these agents expectations[7]. Identify such agents forecasts as *arbitral* ones on the analogy of OTC and stock trading strategy:

$$\lim_{\substack{p\to 1\\ s\to 0}} \pi_t^{e\,rat} = \pi_t^{e\,arb}, \text{ and at that,}$$

$$\begin{cases} \lim\limits_{\substack{p\to 1\\ s\to 0}} \pi_t^{e\,arb} = \pi_t^{e\,qaa}, if\,(\lim\limits_{s\to 0} \pi_t^{e\,rat} < \int\limits_0^1 \pi_t^{e\,qaa}(s)ds), \\ else \\ \lim\limits_{\substack{p\to 1\\ s\to 0}} \pi_t^{e\,arb} = E(\pi_T | I_{T-1}) \end{cases} . \quad (7)$$

1. The process of inflation expectations formation.

In accordance with the concept of bounded rationality, developed by Simon in 1972 [38] (that is to be more exact in comparison with the rational expectation hypothesis, as it considers the limitations of available information and limitations of human intelligence), economics agents are singled out by the level of information perception in the research. Note that because of agent bounded rationality[8] it is not possible to achieve the maximal theoretic level of information perception. Following this we bound the lowest level of information perception to the point that can be attributed to an agent who perceives just public signals of current term. The maximum of tolerance range we bound to the point that can be attributed to an agent perceives the greatest volume of information (note that this agent is not completely rational). This statement is made in accordance with the up-to-date concept of information economy and availability of online sources of information. Thus such agents are considered pro tanto with the unity and zero levels of information perception.

[7] Notice that economic agents with arbitral inflation expectations follow deliberate strategy in prediction. It particularly can be explained by that we consider these agents as individuals defined in accordance with Neumann-Morgenstern Theory as agents with risk aversion. According to this if inflation expectations of arbitral agents are higher than average forecasts of agents with quasi-adaptive expectations they don't resort to arbitrage and we classify them as rational ones.

[8] This assertion doesn't contradict the concept of quasi-adaptive expectations presented in this paper, as due to limited nature of human intelligence every economic agent is boundedly rational (possessing both rational and quasi-adaptive expectations).

In a similar way we define the level of agents belief in monetary authority actions - those agents completely distrust perceived information will be identified as possessing zero level of belief and those with absolute trust towards perceived information are identified as possessing the unity level of belief.

This simplification allows us to define the inflation expectations type of any agent in economy through using linear combinations:

$$\pi_t^e(p,s)\,. \tag{8}$$

Hereinafter to define average inflation expectations of economic agents firstly we should determine agent unit distributions on information perception and its confidence.

What if analysis of agent inflation expectations on the basis of information perception and its belief is presented in the first part of the work. But the aim of the article is to describe in process of inflation expectations formation. Thus we found the necessity to characterize these notions and formalize them.

A. Agent perception of information signals.

Before analysis of agent information perception it's essential to evaluate the number of information signals those are incoming to an agent in economy. Assume that I_t^s[9] is supplied information signals at moment *t* those are directly or indirectly characterizing economic environment, in addition these signals reflect both previous period events (up to and including period *(t-1)*) and current changes (took place at moment *t*).

$$I_t^s = q_t^{of} + q_{s_t^\varepsilon}^\varepsilon \text{, where} \tag{9}$$

q_t^{of} is the number of information signals that overtly or covertly characterizes future rate of inflation emanating from monetary authorities (that is to say characterize inflation target value).

$q_{s_t^\varepsilon}^\varepsilon$ is the number of information signals that characterizes external shocks (that independent from monetary authorities actions) affecting inflation rate.

However every agent in economy at moment *t* can perceive just some nuggets of information I_t^s in a consequence of information asymmetry and I_t^a reflects its highest available volume:

$$I_t^a = f(I_t^s, \Delta_{m\,t}^i) = f(q_t^{of}, q_{s_t^\varepsilon}^\varepsilon, \Delta_{m\,t}^i) \text{, where} \tag{10}$$

[9] It's necessary to note that each country is characterized both with its own information volume ($I_t^{s\,j}, j \in N$ where *j* is a country, *author: s - supply*) and with its own indexes reflecting information asymmetry ($\Delta_t^{i\,j}$) and monetary transparency ($\delta_t^{m\,j}$) characterizing this particular country. And as already mentioned above, according to dialectical principle for Hegel (the transition from quantity to quality) we may affirm that agent's information perception increases as its total volume increases meeting its asymmetry decrease.

Δ^i_{mt} is the level of information asymmetry at the moment t.

Take notice that monetary transparency facilitates the decrease of volatility of agent inflation expectations, i.e. tend to expectations convergence to official inflation forecast, thus tend to decrease in degree of agent nervousness, and to greater financial stability. In other words, the more perfect monetary transparency leads to the less information asymmetry between authorities and economic agents:

$$\Delta^i_{mt} = f(\Delta^i_t, \delta^m_t) \text{, where}$$

Δ^i_t is the level of information asymmetry at the moment t (non-adjusted for monetary transparency),

δ^m_t is the level of monetary transparency at the moment t.

It's essential to note that we use in the model precisely monetary transparency as a whole instead of central bank transparency specified in many researches[10]. The index of monetary transparency reflects not only explicit policy models, regularity of policy decisions announcements, open monetary transmission mechanism and other factors integrated in central bank transparency index [21] but moreover it also reveals for example quantity and quality of information sources, its essence and many other determinants.

At the same time it should be noted that also none of up-to date published monetary transparency assessments can be used as only correct one to reduce asymmetry without applying additional adjustments for example by reason of the lack of information of evaluation technique (for example see Oxford Analytica Country Report) [43].

An economic agent perceives at moment t just a piece I^m_t [11] of the all available information I^a_t that defines its level of information perception. Suppose that a number of apprehended information signals depend on an agent income. And since as a rule levels of information perception p_t and p_{t-j} [12] are strongly correlated with relatively small j, thus in tote high income agents are characterized with high degree of information perception. Thereby

$$p = f(y_x; I^m_t) \in [0;1] \text{, where} \tag{11}$$

y_x – income of agent x, p - level of information perception of agent x.

[10] See for example [14, 16, 21, 36].

[11] The isolation of perceived signals I^m_t by agents from the all available information I^a_t is explained by limitations of human intelligence, i.e. from the standpoint of philosophy by the problem of ideal objects. So far as ideal objects in combination with material ones provide the sophistication of perpetual universe.

[12] This statement reflects an assumption that economic agent in the short run can't change own level of information perception.

The volume of acquired information is measured by use of signals, i.e. announcements or statistical data on economic environment that are expressly or by implication affects the future value of inflation.

Some agents acquire and analyze just previous periods information distrusting any fresh information (those are adaptive ones). Other ones orient to the most available signals disseminated by monetary authorities. The higher level of agent signal perception is the greater regards are paid to the latest information (that is the rational behavior). Assume also that it's possible to determine this number of information signals that additional one wouldn't substantially improve personal inflation forecast. Thereby it's possible to limit infinite number of information signals till

$$I^{\max}\big|p = 1 . \tag{12}$$

An economic agent acquires and analyzes information and on the basis of this analysis makes a decision. Herewith the income distribution is used as a distribution of economic agents according to their capability to perceive information. At once income increase per unit is much more significant for an economic agent that owns just one unit of income that for an agent owns one thousand income units. Thus assume that level shift in agent information perception depends on percentage income change. For the purposes of further analysis it's necessary to formalize distribution function of agent incomes $B(y_x)$[13] that reflects a share of economic agents with income lower than the defined one.

Designate density function of agent incomes in $b(y_x)$ and constrain maximum income up to y_{max} that in fact corresponds to every agent with income $y \geq y_{\max}$. This function is continuous and thus integrand. According to mentioned above information perception and processing is associated with data acquisition costs and other problems of information asymmetry. Pursuant to this we use the parameter that reflects information asymmetry adjusted for monetary transparency at that $\Delta_t^i \in [0;1]$, $\delta_t^m \in [0;1]$.

Thus two parameters affect the level of agent information perception:

1. Relative value of income reduced to semielasticity:

$$\tilde{y}_x = \ln\left(\frac{y_x}{y_{\max}}\right); \tag{13}$$

2. Coefficient reflecting relative number of information signals adjusted for information asymmetry, monetary transparency and bounded rationality:

[13] It's feasible to use statistical data on income distributions of both households and legal entities for model verification.

$$\theta = \frac{I^{a}}{I^{\max}}, \text{ i.e.}$$

$$\theta = \frac{I^{\delta^{m} \times (1-\Delta^{i})}}{I^{\max}}. \qquad (14)$$

Level of information perceptions depends on processing information as well as on monetary transparency and asymmetry per information unit:

$$p = \frac{1}{1 - \tilde{y}_x^{\ \theta}}. \qquad (15)$$

The density function of $\tilde{y}_x$ can be expressed in terms of density function of agent incomes $b(y_x)$. According to (13)

$$y_x = y_{\max} \times e^{\tilde{y}_x}, \qquad (16)$$

$$dy_x = y_{\max} \times e^{\tilde{y}_x} \times d\,\tilde{y}_x,$$

thus inverting order of integration we obtain:

$$\int b(y)dy = \int b(y_{\max} \times e^{\tilde{y}_x}) \times y_{\max} \times \tilde{y}_x \, d\,\tilde{y}_x. \qquad (17)$$

Designate distribution function of relative incomes in logarithmic scale ($\tilde{y}_x$) in $\tilde{b}(\tilde{y}_x)$. Then distribution function of information perception will be defined on the basis of the density function of relative incomes $\tilde{b}(\tilde{y}_x)$.

So far as $\tilde{y}_x = \left(1 - \frac{1}{p}\right)^{\frac{1}{\theta}}$.

Let $\Theta = \frac{1}{\theta}$, whence

$$d\,\tilde{y}_x = \Theta \times (p-1)^{\Theta-1} \times p^{-\Theta-1} dp.$$

Inverting order of integration in (17) we obtain:

$$\int \tilde{b}(\tilde{y}_x) d\,\tilde{y}_x = \int \tilde{b}((1-\frac{1}{p})^{\Theta}) \times \Theta \times (p-1)^{\Theta-1} \times p^{-\Theta-1} dp. \qquad (18)$$

Designate distribution function of information perception in *G*:

$$G = \int_0^p \Theta \times \tilde{b}((1-\frac{1}{v})^{\Theta}) \times (1-v)^{\Theta-1} \times v^{-\Theta-1} dv \qquad (19)$$

The function *G* is equally distributed among each level of belief *s*.

B. Belief in perceived information.

Notice that belief level of agents with various levels of information perception is different. Those agents who perceive information relatively deeply are able to acquire and analyze extra signals, but level of belief found on the basis of this information varies.

Belief level of the agent with level of information perception equals *p* is defined as

$$s_{|p} = (1-\mathrm{p}) \times s_{|p=0} + p \times s_{|p=1}, \text{ where} \quad (20)$$

$s_{|p=0}$ - belief level of the agent with the level of information perception equals zero,

$s_{|p=1}$ - belief level of the agent with the level of information perception equals unit.

According to this examine the process of belief formation in authority actions for agents with zero and unit levels of information perception.

As mentioned above economic agents rely on the previous period spreads between actual inflation and its official target to set own belief in perceived information. However agents with zero level of information perception consider public authorities as common source of information. Thus for every period *t* it's possible to determine divergence:

$$\chi_t = \pi_t^* - \pi_{of\ t}^e. \quad (21)$$

For agents with weak information perception carried forward compact divergence χ treats that they willing to trust to authorities (see (3)). But economic agents assign events of various periods with a different relevance at least for two reasons. Firstly economic agents tend to give higher priority to recent events and less priority to past ones. Secondly if some government comes to power again then events of those periods would be considered with higher importance than others. Thus for example if the US Democratic Party comes to power with breaks in the management period then economic agents probably will give higher priority to these periods' events. Thereby to recognize modifiability of information time relevance we should introduce coefficient $\lambda_{t,T}$ characterizing changes in the significance of events occurred in a period *t* to set level of belief in current period *T*.

To simplify analysis suppose that $\lambda_{t,T}$ does not depend neither on *t* nor *T, i.e.* $\lambda_{t,t+1} = \lambda$. In this case λ reflects to what extent event relevance loses up to and including period *t* transferring to period *(t+1)*[14]. Agents with low level of signal perceptivity are charactering with fewer opportunities to acquire and analyze information. Thus it's difficult for them to keep in mind long periods of time data. Therefore it's logically to suppose that information forgetfulness coefficient should vary for agents with different levels of information perception, i.e. $\lambda = \lambda(p)$.

[14] The use of this coefficient for example can explain the results of Romer & Romer investigation (2000) [36]. They statistically substantiated that forecasts published by Fed staff were refined as compared with inflation expectations of economic agents over a period of several decades.

Assume $\lambda(0) = \lambda_0$ then variety of deviations $\{\chi_t\}$ descends to variety of deviations $\left\{\chi_t * \frac{\lambda^{T-t}}{\sum_{t=1}^{T} \lambda^{T-t}}\right\}$ that takes into consideration modifiability of information time relevance. Denote that

$$\eta_t = \chi_t * \frac{\lambda^{T-t}}{\sum_{t=1}^{T-1} \lambda^{T-t}} \text{ for every } t. \tag{22}$$

Thereby variety of deviations $\{\chi_t\}$ descends to variety of deviations $\{\eta_t\}$ that takes into consideration modifiability of information time relevance for every *t*.

In this case the belief level of agents with unity level of information perception is evaluated on the basis of variety $\{\eta_t\}$. The spread between actual inflation and its official target is affected by various factors. Therefore current term spread can be considered as a random variable with unknown distribution law. At that the law definition is conceptually impossible under additive and multiplicative influence of various factors (which can vary according to discussing country) on divergences. In general case it seems fair to suppose that deviations are distributed as finite number of linear combinations of generalized hyperbolic distributions, where linear factors are $\beta_1, \beta_2, ..., \beta_n \left| \sum_{i=1}^{n} \beta_i = 1 \right.$, i.e. a linear combination of distribution should also be a distribution function. We can determine deviation mean value on the basis of data on spreads between actual inflation and its official target:

$$m_0\big|_{\mathrm{p}=0} = E\eta_T = \frac{\sum_{t=1}^{T-1} \eta_t}{t-1}, \tag{23}$$

and unbiased estimated variance of deviations:

$$\sigma_0^{\,2}\big|_{\mathrm{p}=0} = V\eta_T = \frac{t}{t-1} \times \left(\frac{\sum_{t=1}^{T-1} \eta_t^2}{t-1} - \left(\frac{\sum_{t=1}^{T-1} \eta_t}{t-1} \right)^2 \right). \tag{24}$$

We suppose that agents don't recognize distribution function of differences between actual inflation rate and its target in this case. That follows at least from two reasons. Firstly in this instance the confidence is evaluated on the basis of coincidence of actual inflation and its official forecast including the coordination of authority actions and excluding influence of possibility of statistically significant characterization of spread behavior. Secondly fitting of generalized hyperbolic distributions is rather complex process that requires special software and consequently agents even with relatively low costs of information acquisition and analysis have some problems with the distribution parameters' estimations. Nevertheless economic agents align their forecasts on the basis of own impressions on authority adherence to declared targets and price level forecasts. The subjective expectation of deviations by every agent is affected by various endogenous (in a consequence of individual peculiarities) and exogenous factors. The last ones include average deviation (the mean, see (23)) and degree of fluctuations instability (the variance, see (24)). Endogenous peculiarities under random selection of agents are chance factors. Thereby considering a particular agent assume that expected deviation is a normally distributed random variable with mean m_0 and variance $\sigma_0{}^2$.

$$\eta^e \sim \frac{1}{\sqrt{2\pi}\sigma_0} \times e^{(-\frac{(\eta-m_0)^2}{2\sigma_0{}^2})}. \qquad (25)$$

As far as an economic system in toto consists of large numbers of agents, thus the distribution function of this random variable reflects the distribution of expected deviations. As it was mentioned above the bigger difference between actual inflation and its forecast is found the lower level of belief in monetary authority actions is achieved. Consequently distribution function of expected deviations is used as basis to definition of belief distribution function.

Thereby estimate subjective probabilities of deviation to fall within the determined interval [*a*;*b*] as:

$$p(a < \eta_T < b) = \int_a^b \frac{1}{\sqrt{2\pi}\sigma} \times e^{(-\frac{(\eta-m)^2}{2\sigma^2})} d\eta. \qquad (26)$$

If $p=0$ and both a and b are closed to к m_0 and in addition if the deviation probability to fall within the determined interval is high then economic agents will trust authorities.

Define belief function proceeding from the distribution function. It is defined on the basis of probability distribution $p(a < \eta_T < b)$.

It's essential to note that under hyperinflation in spite of the fulfillment of macroeconomic indicators targets agent will have zero level of belief. I.e. in other words weakened belief in authority actions in the conduct of monetary policy correlates with the intersection of the hyperinflation threshold. Hence to every critical η_{hi} such that at $\forall \eta > \eta_{hi}$ level of belief in authority actions equals zero: $\eta_{hi} = \frac{\pi_{hi}}{\alpha}$, where α is the coefficient characterizing the agent belief sensitiveness in authority actions[15].

Thereby belief function is set on the basis of density function that is defined in interval $\left[0; \frac{\pi_{hi}}{\alpha}\right]$ and is expressed as:

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[15]The coefficient α also reflects agent nervousness, velocity of money and currency issue.

$$\begin{cases} F = \int\limits_0^{\eta} \frac{1}{\sqrt{2\pi}\sigma_0} \times e^{(-\frac{(\nu - m_0)^2}{2\sigma_0{}^2})} d\nu + \int\limits_0^{\eta} \frac{1}{\sqrt{2\pi}\sigma_0} \times e^{(-\frac{(\nu + m_0)^2}{2\sigma_0{}^2})} d\nu, & \text{at } \eta \in \left[0; \frac{\pi_{hi}}{\alpha}\right) \\ F = \int\limits_{\eta}^{+\infty} \frac{1}{\sqrt{2\pi}\sigma_0} \times e^{(-\frac{(\nu - m_0)^2}{2\sigma_0{}^2})} d\nu + \int\limits_{\eta}^{+\infty} \frac{1}{\sqrt{2\pi}\sigma_0} \times e^{(-\frac{(\nu + m_0)^2}{2\sigma_0{}^2})} d\nu, & \text{at } \eta \in \left[\frac{\pi_{hi}}{\alpha}; +\infty\right) \end{cases} \quad (27)$$

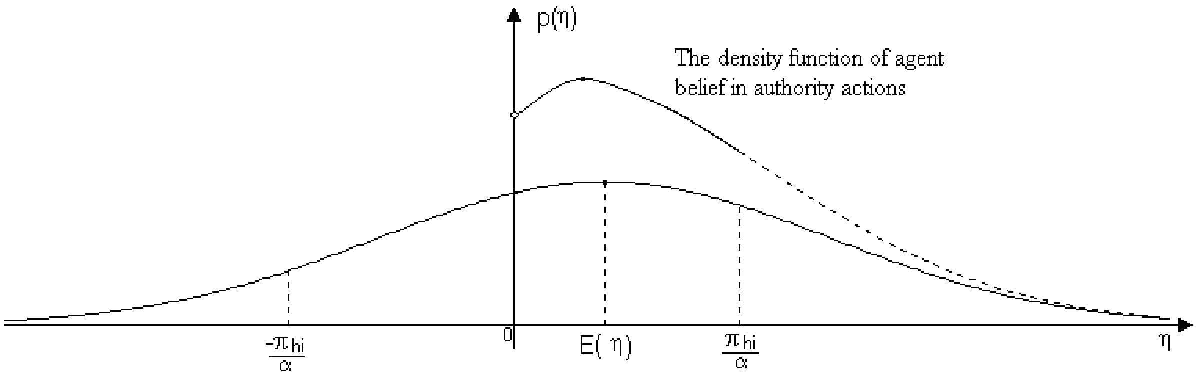

Figure 1. The distribution function of agent belief in monetary authority actions (depends on differences between actual inflation and its official forecast)

We should turn to the measure of belief $s\big|_{s\in[0;1]} = \frac{\pi_{hi} - \alpha\eta}{\pi_{hi}}$ to consider the distribution function of agent belief. In accordance to this if α is significantly greater than unit then in response to slight increase in expected spread between actual inflation and its forecast the confidence in authority activities can decrease drastically. Herewith mentioned above statement "the wider spread the weakened belief" is confirmed. Thus by inverting order of integration we obtain:

$$\begin{cases} H_0 = \int\limits_0^{s} \frac{\pi_{hi}}{\alpha\sqrt{2\pi}\sigma_0} \times e^{(-\frac{\left(\frac{\pi_{hi}}{\alpha}\right)^2 (1-\nu-\frac{m_0}{\pi_{hi}/\alpha})^2}{2\sigma_0{}^2})} d\nu + \int\limits_0^{s} \frac{\pi_{hi}}{\alpha\sqrt{2\pi}\sigma_0} \times e^{(-\frac{\left(\frac{\pi_{hi}}{\alpha}\right)^2 (1-\nu+\frac{m_0}{\pi_{hi}/\alpha})^2}{2\sigma_0{}^2})} d\nu, at\ \ s \in (0;1] \\ H_0 = 1 - H_{0|s\in(0;1]}, at\ \ s = 0 \end{cases} . \quad (28)$$

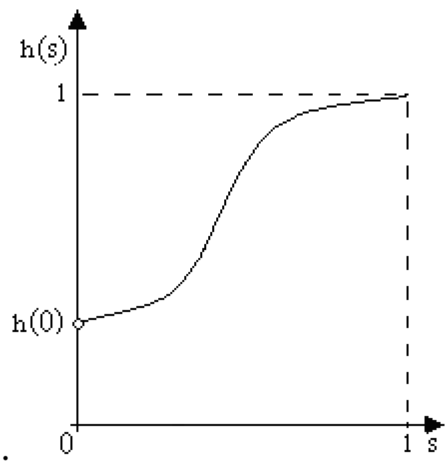

Figure 2. The distributions function of spreads between actual inflation and its official forecast.

Thereby we defined the distribution function of belief for agents with zero level of information perception.

The distribution function of belief for agents with unity level of information perception is defined in the same way with the one exception of that another approach to estimate divergences is used. These economic agents qualitatively distinguish all kinds of signals emanating by authorities. Therefore they can use different weighted coefficients to set level of belief. In other words they will rely on that source of information giving previous period signals strongly corresponding with actual rates of inflation. The sum of squared deviations from actual inflation to this kind of signal can be used as a measure of this accuracy.

We should emphasize the significance of the coordination of authority actions which is revealed at forecast coincidences. This in and of itself can’t set strong belief in authority actions, but it can produce certain multiplicative effect by means of sending out signal for agents that monetary actions are concerted.

Thereby agents with unity level of information perception set own level of belief in authority actions on the basis of deviations:

$$\gamma_t = (\pi_t^* - (\sum_{n=1}^{N}\left(\frac{q_t^{of,N}}{\sum_{n=1}^{N}\left(q_t^{of,N}\right)} \times \frac{\sum_{k=1}^{t-1}(\pi_t^{\tau} - \pi_t^*)^2}{\sum_{n=1}^{N}\left(\sum_{k=1}^{t-1}(\pi_t^{of,N} - \pi_t^*)^2\right)} \times \pi_t^{of,N} \right)) \times \times (1 + \ln(\frac{\sum_{n=1}^{N}\left(\sum_{k=1}^{t-1}(\pi_t^{of,N} - \pi_t^*)^2\right) + \frac{1}{N} \times \sum_{n=1}^{N}\sum_{k=1}^{t}(\pi_t^{of,N} - \pi_t^{of,(N-1)})^2}{\sum_{n=1}^{N}\left(\sum_{k=1}^{t-1}(\pi_t^{of,N} - \pi_t^*)^2\right)})) \quad , N \in R . \tag{29}$$

Then these deviations are adjusted by coefficient λ and variety of adjusted deviations $\{\phi_t\}$ is considered:

$$\phi_t = \gamma_t * \frac{\lambda^{T-t}}{\sum_{t=1}^{T-1}\lambda^{T-t}} . \tag{30}$$

Determine deviation mean value on basis of data on spreads between actual inflation and its forecast for agents with high level of information perception:

$$m_1\big|_{\mathrm{p=1}} = E\phi_T = \frac{\sum_{t=1}^{T-1}\phi_t}{t-1}, \tag{31}$$

and unbiased estimated variance of deviations:

$$\sigma_1^{\,2}\big|_{\mathrm{p=1}} = V\phi_T = \frac{t}{t-1} \times \left(\frac{\sum_{t=1}^{T-1}\phi_t^2}{t-1} - \left(\frac{\sum_{t=1}^{T-1}\phi_t}{t-1} \right) \right)^2 . \tag{32}$$

Define the distribution function of agent belief with unity level of information perception on the basis of hypotheses on normalcy of expected deviation of data distribution in the way described above:

$$\begin{cases} H_1 = \int_0^s \frac{\pi_{hi}}{\alpha\sqrt{2\pi}\sigma_1} \times e^{\left(-\frac{\left(\frac{\pi_{hi}}{\alpha}\right)^2 (1-v-\frac{m_1}{\pi_{hi}/\alpha})^2}{2\sigma_1^2}\right)} dv + \int_0^s \frac{\pi_{hi}}{\alpha\sqrt{2\pi}\sigma_1} \times e^{\left(-\frac{\left(\frac{\pi_{hi}}{\alpha}\right)^2 (1-v+\frac{m_1}{\pi_{hi}/\alpha})^2}{2\sigma_1^2}\right)} dv, \ \mathrm{s} \in (0;1] \\ H_1 = 1 - H_{1|s\in(0:1]}, \ \mathrm{s} = 0 \end{cases} \quad (33)$$

The belief distribution function of agent *x* with level of information perception equals *p* defines as linear combination of H_0 and H_1:

$$H_e = (1-p) \times H_0 + p \times H_1 . \quad (34)$$

C. Average inflation expectations.

We don't consider a single representative agent in the research. Thereby various economic agents are characterizing with divergent inflation expectations. However it's feasible to calculate the integral of agent inflation expectations in economy. Thereto it's necessary to weight inflation expectations of economic agents on their numbers. For this purpose define the density function of agent inflation expectations (F_H^G) depended on signal perception and confidence in this information. This distribution function is the combination of the belief *G(s,p)* and the information perception *H(p)* distribution functions that are defined above:

$$F_H^G = \int_0^p H \times G(v) dv \ . \quad (35)$$

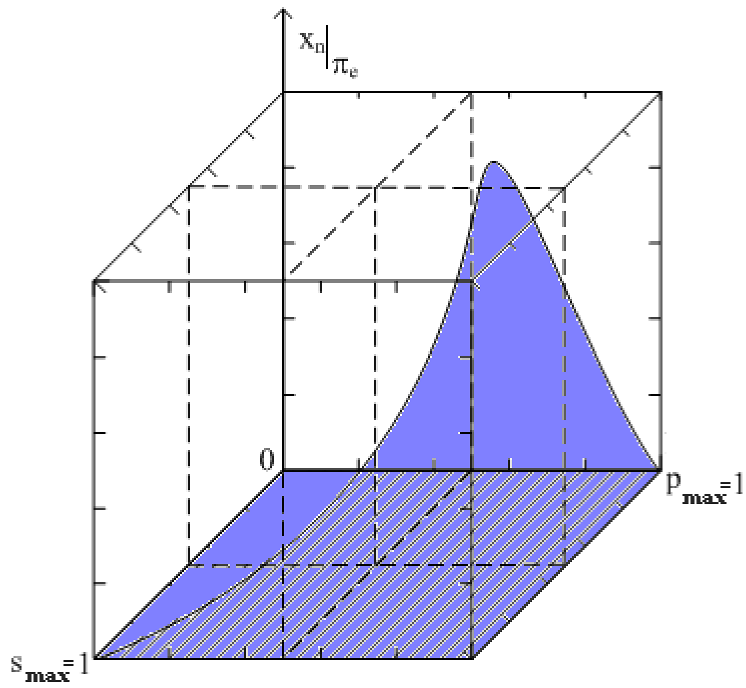

Figure 3. The graphic representation of density function of agent inflation expectations depended on signal perception and belief in this information.

This figure reflects simplified interpretation of research results. By means of which the predominant type of inflation expectations can be graphically recognized. Thus it's possible to evaluate risks are inherent in it.

Then the average inflation expectations of economic agents equal to weighted (in inflation expectations) average of described above function:

$$\pi_t^e = \int_0^1 \int_0^1 \pi^e(s,p) H_p G_s dpds \quad (36)$$

D. Risk of arbitrage.

One of the practical aspects of this concept application is the risk definition of the presence of agents with arbitral inflation expectations in economy. An uncertainty in evaluation of average inflation expectations relating to this, i.e. the potential contribution of agents with arbitral expectations in average anticipations is considered to be arbitral risk. We have seen fit to consider this case as a risky one in the consequence of an uncertainty surrounding the monetary authority actions that in conditions of their fulfillment of macroeconomic indicators targets wouldn't influence on average agent inflation expectations. It occurs when agents with quasi-adaptive expectations forecast higher inflation owing to a lack of information sourced from monetary authorities. In this case some agents characterizing with rational expectations and getting access to a volume of information sufficient to define both the share of quasi-adaptive agents and their average inflation expectations forecast the same inflation value. Thus average inflation forecasts of economic agents depend on the presence of agents with arbitral inflation expectations in economy. It's essential to note that as the average agent belief becomes ever stronger, any inflation fluctuations increase its future average rate more versus anticipated one providing lack of identification of this group of agents.

Note that average inflation expectations defined according to both (36) and that agents are characterizing with various levels of confidence in acquired information is identical to:

$$\pi^e = k_1 \pi^{qad} + k_2 \pi^{\text{rat}}, \text{ where}$$

k_j - a share of agents with the proper type of inflation expectations, $j \in [1;2], j \in N$.

Or

$$\pi^e = \kappa_1 \times \pi_{qad}^{ad} + \kappa_2 \pi_{qad}^{of} + \kappa_3 \pi_{\text{rat}}^{arb} + \kappa_4 \pi_{\text{rat}}^{\text{of}}, \text{ where} \quad (37)$$

κ_i - a share of agents with the proper type of inflation expectations, $i \in [1;4], i \in N$.

Evaluate the share of agents with arbitral inflation expectations at moment *T*. For every kind of agents with fixed defined level of information perception *p=p** it constitutes

$$\tilde{\kappa}_4 = \int_0^1 (1-s) \times H_{|p=const} ds . \quad (38)$$

This value can be determined on each level of perception. Thus it's possible to evaluate the share of agents with arbitral inflation expectations α_4 by weighting and summing up each level:

$$\kappa_4 = \int_0^1 \int_0^1 (1-s) \times p \times H_{|p=const} \times G ds dp \ . \tag{39}$$

I.e.

$$\kappa_4 = \int_0^1 \int_0^1 (1-s) \times p \times (\int_0^s \frac{\pi_{hi}}{\alpha\sqrt{2\pi}\sigma_p} \times e^{(-\frac{\left(\frac{\pi_{hi}}{\alpha}\right)^2 (1-\nu-\frac{m_p}{(\pi_{hi}/\alpha)})^2}{2\sigma_p^2})} d\nu + \int_0^s \frac{\pi_{hi}}{\sqrt{2\pi}\sigma_p} \times e^{(-\frac{\left(\frac{\pi_{hi}}{\alpha}\right)^2 (1-\nu+\frac{m_p}{(\pi_{hi}/\alpha)})^2}{2\sigma_p^2})} d\nu) \times$$
$$\times (\int_0^p \Theta \times \tilde{b}((1-\frac{1}{v})^{\Theta}) \times (1-v)^{\Theta-1} \times v^{-\Theta-1} d\nu) ds dp \ . \tag{40}$$

That is the contribution of agents with arbitral expectations to the change in average expectations according to (7).

Thereby it's possible to define the significance of influence of arbitral way of formation expectations on previous rates of inflation. It's also feasible to measure the possibility to face this risk in current term and to develop with an allowance for this risk the optimal behavior to achieve inflation target in the conduct of monetary policy on basis of this model as well as to set stable price level in the long run.

Conclusion

It's no doubt in importance of expectation channel of transmission mechanism in the conduct of monetary policy. Thus, for example, Ben Bernanke[16] has noted the incontestability of significant influence of inflation expectations on its actual value and thus on achievement of price stability. As it was noted in the ECB paper[17] dedicated to the analysis of agent expectations in the conduct of monetary policy the central banks need to form and monitor agent expectations of economic agents on continuing basis. So far as authority actions affect the macro parameters with lags, monetary policy needs to lever against agent anticipations of random process in the framework of financial stability to keep current economic risks to a minimum. In addition expected changes in economic variables can strongly influence on current agent behavior by means of various channels of transmission mechanism[18].

This model is based on that it is not possible under information economics to exclude the possibility of current signals perception by economic agents. This supposition begs the question

[16] Ben S. Bernanke: Inflation expectations and inflation forecasting, National Bureau of Economic Research Summer Institute, Cambridge, Massachusetts, 10 July 2007, BIS Review 79/2007.
[17] Expectations and the conduct of monetary policy, ECB Monthly Bulletin N5, May 2009, pp.75-90.
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of information asymmetry so far as it affects the volume of information available for every agent in economy. Thus we've tried to incorporate useful ways of information asymmetry eliminating under guesswork of imperfect up-to date published monetary transparency assessments.

It should be pointed out that knowledge of the essence of forming agent expectations favours its manageability by monetary authorities, which in turn facilitates asset prices management. The importance of this fact can scarcely be exaggerated by Japan which combats the consequences of asset price bubble collapse over last twenty years.

In conclusion we would like to note that for the purposes of tackling crisis phenomenon the feasibility to define inflation expectations of economic agents basing on perceived data in information economy appears to be extremely relevant.

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