

Chapter 2

Expectations in the Theory of Economics

2.1 The Origin of the Economic Theory of Expectations

One of the most significant factors affecting investors' decisions are expectations concerning the future. In economics expectations are defined as forecasts of future events, which influence decision-making. The first known mention of economic expectations was recorded in Ancient Greece. In *Politics*, Aristotle wrote about Thales of Miletus (636–546 BC) who made considerable profit from an accurate forecast of future olive harvest.

The first theory based on expectations relevant to economics dates back to the nineteenth century. In 1887 E. Cheysson argued that it is possible to observe the cyclical nature of prices and revenue behaviour. His theory is considered to be the first version of the *cobweb theorem*. Another development in the theory of expectations was brought by the results of A. Marshall's work. Classical economists were interested in dynamic theories only as far as capital accumulation and economic growth were concerned. They believed that economy remained in a stationary state which could be described with equations. The role of expectations in these theories was negligible. Marshall changed it, when he introduced the notion of a short and long run into the classical theory. He also added another premise—"static" expectations about prices and thus indirectly also towards inflation. The first economist who directly analysed expectations and their influence on the stability of the equilibrium was M. Ezekiel. In 1938 he described stability of the so-called *cobweb model* (Ezekiel 1938).

Expectations started to be relevant for creating macroeconomic models in 1930, when I. Fisher formulated a model which described inflation as a difference between the nominal and real interest rate (Mucha 2009: 11). Another economist responsible for introducing expectations into the theory of economics was G. Myrdal, economics professor from the Stockholm University College, who in the 1930s studied the impact of expectations on business cycles. In 1974, together with F.A. Hayek he was awarded the Nobel Prize in Economic Sciences for their pioneering work in the theory of money and economic fluctuations as well as

in-depth analysis of the interdependence of economic, social and institutional phenomena. But foundations for Myrdal's work had been laid by another Swedish economist—E.R. Lindahl who developed a series of economic analyses which served as the starting point for Myrdal's concept of saving and investment (Lindahl 1939). Nevertheless, it seems that the biggest influence on the theory of expectations can be attributed to the works of J.M. Keynes, especially *The General Theory Of Employment, Interest And Money* in which he highlighted the importance of expectations and their impact on investments. It should be pointed out that introducing expectations as a category to the economic analysis is connected to the fact that Keynes introduced a new research perspective, namely a macroeconomic view of the economy. In the analysis of economic policy and business cycle theories expectations are the main transmission channel for economic policy impulses as well as internal and external interference (Kowalski 1998: 99). Keynes treated expectations as an exogenous variable which alongside money illusion is essential to the business cycle theory (Kowalski 1998: 100). Literature on the subject indicates that expectations in Keynes' theory can be divided into long- and short-term expectations and in the former case they are the main determinant of uncertainty and the reason of economic cycle volatility. This is due to the fact that long-term expectations relate to issues as important as future return on investment or future shape of effective demand, which are not particularly—if at all—predictable.

However, it is important to note that despite having added expectations to macroeconomic analyses, Keynes did not present a coherent theory of expectations. A possible reason is the lack of cohesive microeconomic foundations of Keynesian economics, which is probably its most significant flaw of his theory—and expectations are generally formulated at the microeconomic level. First models of expectations appeared in the 1940s. In 1941 L.A. Metzler formulated two macroeconomic models of *inventory cycles* which included expectations (Metzler 1941: 113–129). Hyperinflation wave at the beginning of the 1920s inspired P. Cagan to try and build a model which would at least partially explain dramatic changes in the economy. The model of demand for money added to the analysis inflation expectations with an assumption that people form their expectations on the basis of infinite time horizon, using all available information regarding historic price changes (Cagan 1956). Acknowledgment of the importance of expectations was reflected in the works of Friedman, who included this variable in his concept of the natural rate of unemployment (Friedman 1968). It was also confirmed later when they became an element of the Phillips curve.

In fact, Friedman's entire monetarist theory assumes that upon realising the mistake made, agents adjust their expectations, so it relies on the adaptive expectations model, hence the criticism of extensive state interventionism. In addition, adaptive expectations concept allows for systematic errors, since it is assumed that agents do not learn from their mistakes and they are capable only of mechanical error-adjustment. Whereas just the knowledge about actions planned by the government (e.g. it is a well-known fact that monetary expansion will cause inflation) is enough for rational agents to take them into consideration in their expectations.

Mechanically reacting agents with adaptive expectations would have to wait until they observe inflation to adjust their expectations (Cierkoński 2011).

From the 1950s and 1960s onwards, expectations became an important premise in almost all areas of macroeconomists' interests. They formed the basis for theories concerning consumerism, investment, demand for money and inflation. At first expectations were modelled using adaptive expectations, i.e. on an assumption that agents react to economic changes post factum. Decision makers are passive participants and do not anticipate future movement of the economy. With respect to forecasts regarding future prices, it means that expectations regarding prices in period t are conditional on price expectations in $t - 1$ period and partially on the forecast error from the preceding period. Friedman claimed that an economic model should not be judged by how plausible its underlying assumptions are. Much more important is how well it performs in making predictions (De Grauwe 2006).

In the 1970s, the monetarist approach gave rise to so-called new classical (macro)economics. The most prominent personality of this school of thought is the 1995 Nobel Prize laureate Robert E. Lucas Jr. Other representatives include Thomas Sargent, Robert Barro, Edward Prescott, Neil Wallace and Patrick Minford. The main achievement of the new classical economics was the introduction of the rational expectations concept. While it is a standard element of economic analysis in contemporary economic literature, it is not free from flaws and is subject to severe criticism.

2.2 Rational Expectations Hypothesis and Its Criticism

The 1973 oil crisis in the USA was a test for the theory of adaptive expectations. To the surprise of the followers of Friedman's theories, methods used until that point for making predictions, based on adaptive expectations theory, failed. The American economy experienced stagflation. In response to the crisis, R. Lucas announced that previous models could not predict the crisis, because they were based on an incorrect assumption about expectations (namely, that individual agents are passive and react post factum). Lucas suggests that quite the opposite true—individual players are rational, intelligent agents who can do more than just passively react to decisions made by the central bank; they try to predict its actions. In conversation with E.C. Wit in 1997, Lucas argued that people can notice and learn that each time the unemployment rate goes up, the government answers with expansive monetary policy. For instance, people in Latin America are so used to the high rate of inflation that monetary expansion does not work as stimulus. But a decision to implement expansionary monetary policy made by Bundesbank or by Alan Greenspan in the USA would induce economic growth. These banks have earned the trust of investors and citizens thanks to their anti-inflation policy. If they were to change it, people would be fooled for a short while (Wit 1997). Economics owes to Lucas the introduction of the **rational expectations hypothesis (REH)**. It is based on research conducted by J. Tinbergen, a pioneer in building complex models of

state economies. In 1969 Tinbergen received with R. Frisch the first Nobel Prize in Economic Sciences in history for their contribution to the development of econometrics—measurement of economic relationships using mathematical models and statistical methods. Lucas' REH was also based on the work of Muth (1961), who proposed that when making forecasts of future states agents use their economic knowledge as well as information available at the moment of creating expectations.

There are two interpretations of rational expectations, defined as statements referring to the economic reality: “weak” and “strong”. According to weak form rational expectations, agents make optimal use of all available information that might influence the considered variable to form their expectations. According to the strong form version, agents' subjective expectations regarding economic variables are close to real, objective expectations. In other words, individuals act as if they knew the “correct” model, so their forecasts may include only random errors, regardless of the information available when expectations are formed. Therefore, the forecast is likely to be accurate (errors will cancel out one another, i.e. their expected value will amount to zero). An important implication of the REH is the fact that agents' expectations cannot be systematically erroneous, because if they were, agents would learn from their mistakes and change the way they form expectations in order to eliminate the systematic error (Garbicz 2008: 62).

However, we should note that the difference between the weak and strong version of the efficient-market hypothesis does not lie in the fact that agents in the strong version are considered to be more rational than in the weak one. The difference lies above all in the realism of assumptions about the information environment. The problem is, the modern world is characterised by a considerable degree of uncertainty, as well as information asymmetry, which will be discussed in Chap. 6.

The rational expectations hypothesis has been widely criticised and the criticism has focused mainly on its strong version.

One of the criticised aspects of the REH is the manner in which agents obtain information about the correct economic model. The strong-form hypothesis states that agents behave as if they knew the correct model to such a degree that expectations they form cannot be systematically erroneous. It seems, however, that such a situation would be possible if agents operated in a static world with typical transactions and predictable behaviours of other market participants (Garbicz 2008: 63). But the current situation is not very—if indeed at all—predictable and the economy is extremely dynamic, which calls into question whether it is possible to predict the future accurately and whether expectations can be constructed by everyone in an uniform manner. In principle, every agent operates in a different information situation and none of them have access to full information, so their expectations are based on different criteria. It should be emphasised, however, that the current theory of rational expectations describes rather reasonable than rational expectations. The Austrian School and its main representative, F.A. Hayek, points out that under conditions of real uncertainty rational construction of expectations is not possible, because each agent has access to different and only partial knowledge (Hayek 1937a, b). Furthermore, according to Gomes (1982)

the fundamental weakness of the REH lies in the assumption that every agent is an expert in economics. Similar view was presented by Wible (1982), who claimed that according to the rational expectations hypothesis individuals share one and the same economic knowledge and use it as proficiently as expert economists. However, it is worth noting that the current version of the REH includes also the learning process of market players, which may justify its relevance.

In the light of the discussion featured in this book, it would seem that a single agent's expectations are not the only significant problem. Another equally important issue is the fact that the source of uncertainty and inability to make accurate forecasts lies also in principles of cooperation between agents. Newly emerging forms of economic agents' organisation are undoubtedly the source of significant changes in the entire economic system dynamics. They influence the system's predictability and increase its uncertainty, which in turn directly affects the way expectations are formed.

Another criticism of the rational expectations hypothesis addresses the cost of acquiring and processing information for the purpose of forecasting and forming expectations (Mucha 2009: 29). It is highly unlikely that given acquisition and processing costs, particular agents will be using all available information. Furthermore, information can be obtained directly (when there exist rather strong probability that they would be authentic and reliable) or indirectly, e.g. from mass media. However, information or forecasts obtained from the media may differ significantly from one another, and in that case it is necessary to choose from the available selection.

Econometric models used in the rational expectations hypothesis were criticised as well. Frydman and Goldberg (2007), among others, pointed out that if a model accurately reflects relationships between studied variables in a given period, than in the following period they are usually subject to unpredictable changes. In addition, previous economic models regarded uncertainty and unpredictability in a very limited scope, adding to the econometric description only the element of randomness. As a result, the model failed to reflect any unpredictable changes in the environment, especially qualitative changes. This brings us to a conclusion that people's decision concerning the future cannot depend on precise "mathematical expectations", because there are no foundations for appropriate calculations. However, it seems that criticism of the mainstream economics from the perspective of Frydman and Goldberg's *Imperfect Knowledge Economics* is not yet entirely constructive. Leszek (2009) concludes that while it gets to the bottom of the current economy's problems, it wreaks havoc, and the remedy it provides is only partial. R. Shiller notes that models used in mainstream economics to study, analyse and forecast market conditions do not take into consideration speculation bubbles. In a conversation with J. Żakowski, Shiller explains that this is why analysts lose orientation when a speculation bubble reaches a dangerous size and lose it completely when it bursts inducing a crisis. Economists who prefer so-called neoclassical economics cannot grasp the mechanism of bubbles, since they assume that the market is where rational players make decisions based on knowledge and establish rational value for goods (Żakowski 2009).

The recent crisis aroused a particularly lively dispute about the state of economic sciences. P. Krugman (Noble laureate from 2008) argues that the current economic crisis has revealed the failure of basic assumptions of the neoclassical economics, built on the notion that investors and consumers are rational (Krugman 2009).

Furthermore, we should discuss the increasingly more pronounced need to prolong the time horizon which bears significance for the predictability of certain phenomena and for creating expectations. H. Hazlitt, referring to the views of the renowned economist F. Bastiat, maintains that one of the most common mistakes in the popular understanding of economics is short-sightedness (Hazlitt 1946/2008: 13). The so-called *broken window fallacy* shows that short-sightedness in economics ultimately leads to negative consequences.

The art of economics consists in looking not merely at the immediate but at the longer effects of any act or policy; it consists in tracing the consequences of that policy not merely for one group but for all groups (Hazlitt 1946/2008: 5).

Frydman, the creator of the already mentioned imperfect knowledge economics, claims that in economic sciences certainty simply cannot occur and whoever seeks universal certainty is doomed to fail. He underlines that even the most eminent experts will not free us from uncertainty and it is simply not possible to create a reasonable economics leaving aside the unpredictability of human response to signals, information, commands and stimuli (Żakowski 2008). The present times are marked by increasing changeability and uncertainty. The multidimensional and profound character of these changes opens the field for the development of complexity economics, including the imperfect knowledge economics.

To recapitulate the discussion presented above, we can say that the rational expectations hypothesis is widely criticised in the literature, but we should also bear in mind that the REH made a significant impact on development of economics, particularly with regard to modelling financial markets and macroeconomic policy (see Table 2.1).

Econometrics, a field which enables testing various models of expectations theory, has become a very important tool in studying and forming expectations. A detailed development of econometrics in research concerning expectations was described thoroughly by Evans and Honkapohja (2001).

2.3 The Psychological Factor in the Study of Expectations

The normative approach and macroeconomic theories discussed in previous sections made assumptions regarding what agents' expectations (which constitute foundations for building correct macroeconomic models) are or should be.

And yet, people use all available information to create certain expectations about the future state of various economic phenomena, such as business cycle, rate of inflation, etc. It is understandable that these predictions—usually defined as expectations—affect human behaviour considerably. For instance, expectations about

Table 2.1 Macroeconomics and the way expectations are formed

School of macroeconomics	Expectations
Keynesian orthodoxy	Adaptive
Monetary orthodoxy	Adaptive
Neoclassical	Rational
Real business cycle (RBC)	Rational
New Keynesians	Rational
Austrian School	Reasonable
Post Keynesian	Reasonable

Source: Mucha (2009: 32)

inflation will undoubtedly influence decisions about purchases, savings, borrowing or negotiating salaries between employers and employees (Tyszka 1997: 74). Investors make similar decisions, taking into account not only past and current information, but also expectations concerning future conditions. Future states are, however, burdened with uncertainty. The more limited access to the information on which investors base their expectations, the higher the uncertainty. It means that the less information traders have, the higher uncertainty must be calculated into their decision-making. What is relevant to the discussion featured in this book is the fact that the higher uncertainty, the less homogenous expectations become, since agents create them differently. The analysis of investors' expectations, which will be presented in Chap. 3 is, unfortunately, flawed by an assumption that investors' expectations are homogenous. I am aware that high economic uncertainty during the period when the research was conducted translated into high volatility of expectations as well as their divergence, but it would be extremely difficult—if at all possible—to study all investors' expectations, hence the assumption that expectations are homogenous.

Forming economic expectations can be regarded as a decision-making process. During this process an individual makes a decision and thus forecasts future states of the economy. Such a definition of expectations demonstrates the crucial role of the decision-making process, in which factors that determine the final decision can be distinguished. From this perspective, it would seem that rational expectations are too strong an assumption, whereas adaptive expectations do not appreciate the intelligence of the decision maker (Pietrzak 2009). According to the REH, decision analysis is derived from the assumption that a decision maker's fundamental objective is utility maximisation. As Tyszka (1997: 214) reminds us, this notion was criticised in 1955 by H.A. Simon, who maintained that such an objective was unrealistic both for individuals and for groups (organisations), considering limited cognitive capabilities of a decision maker (individual and organisational alike). Simon suggests that instead of that ambitious yet unrealistic goal decision makers incline rather towards a satisfactory choice, i.e. one that satisfies some of their requirements. Koziński (quoted in Tyszka 1997: 214) described this objective as looking for a good solution, not necessarily the optimal one.

In fact, contrary to the rational expectations theory, it is not true that all agents in the economy base their decisions on complete, perfect knowledge. In reality, decision makers' economic knowledge is limited and they use fragmentary

information, which they believe will allow them to make maximal profit at minimal cost. Besides, we should remember the natural human inclination for simplifying observed phenomena. Tyszka points out that when Simon criticised the rationality paradigm in decision-making based on utility maximisation principle, he remarked that it did not match the limited capabilities of the human cognitive system at all. People have a tendency to label events they observe, as it helps them to process the world around them (Tyszka 1997: 145). Therefore, in the real world, at every stage of the decision-making process (problem recognition, information search, evaluation of alternatives, decision, post decision behaviour (Przybyłowski et al. 1998)) agents face limitations resulting both from their environment and internal factors. The problem recognition itself requires being aware of one's needs and goals as well as the ability to manage conflicts between intermediate objectives. Information search, on the other hand, may be very misleading due to imperfect information and an agent's cognitive and analytical limitations. In this light, it seems that adaptive expectations theory is equally far from reality. It assumes that agents react to changes in the economy post factum, which means that decision makers are passive participants who do not anticipate future economic events. Thus, it denies them the ability to learn or grasp certain economic relationships and to use that knowledge to their advantage.

There can be no doubt that the theory of expectations and the process which leads to their formation should be considered not only from the perspective of normative studies, but also psychology of market participants' actions.

Therefore it is necessary to introduce the assumption of bounded rationality, which is derived from:

- Agents' cognitive abilities and limited perception of possible actions—people are not capable of considering all possible decisions, so the set of analysed options does not always have to include the decision optimal according to the maximal utility criterion.
- The occurrence of systematic errors in human behaviour—many decision makers in the same situation make the same mistakes, which implies they might be using heuristics. In other words, to make decision, form judgments or solve the problems, instead of resorting to algorithms or making an exhaustive comparison of all available options, they prefer to apply the rule of thumb based on their experience (Colman 2001). Heuristics are (cognitive) strategies that direct the information search and modify the representation of a problem, which makes them helpful in solving it (Zdrahal-Urbanek 2004). They enable managing new situations, reduce the difficulty of a task and cognitive effort (Maruszewski 2002). It is important to note that heuristics share certain features: vagueness, since they do not encompass a clear procedure; fallibility, because they do not lead to unambiguous results; and brevity. Nevertheless, they play a particularly important role in solving complex and creative problems (see Kozielecki 1997; Lindsay and Norman 1984). Using heuristics is motivated on the one hand by a person's particular traits, and on the other hand by requirements of a situation. According to A. Tversky and D. Kahneman the use of

heuristics is determined by two characteristics of a decision-making situation (Cieślak 2003): time pressure as well as information complexity and overload, the latter being of particular significance on contemporary markets.

- Perceiving another theoretical probability system—if agents are not able to estimate probability accurately, then they are not capable of utility maximisation.¹
- Limitations in forming rational expectations result, above all, from certain psychological features of the human mind. Koziński (1997: 38) divided them into two groups:
- Invariable features shared by all people: goal orientation, characteristics of memory systems, serial structure of cognitive functions. In the context of this work, the most interesting one is goal orientation, particularly investors' ambitions to gain superior rate of return on investment in a company's stocks.
- Individual features, which demonstrate heterogeneity of people, who base their decisions on various premises. It means that while all agents are goal-oriented, it is highly unlikely that the goals in question are the same for all of them. Even if we assumed that the goal is utility maximisation, it is important to remember that each agent may have a different utility function. Cognitive abilities are similar in this respect. They are not the same for everyone, because perception of each phenomenon is influenced by such factors as age, experience, analytic abilities or access to information.

As far as information access is concerned, it is important to note that the classic model of rational expectations assumed that information is perfect. In reality, information which market agents receive on a daily basis is not perfect, neither is its flow. It can be therefore concluded that information imperfections are another factor limiting the possibility of forming rational expectations. They are after all directly dependant on conditions and available information concerning effects of undertaken actions. Depending on the type of information at our disposal, Pankau and Zielenkiewicz (2007: 19) distinguish decisions taken under the conditions of:

- Certainty, when an agent has perfect knowledge, is aware of all alternative actions and is able to predict effects of these action accurately.
- Risk, when an agent can accurately calculate the probability that various possible states of environment would occur and the risk concerns the consequences of decisions.
- Uncertainty, when an agent knows all possible states of environment, but is not able to determine how probable it is that they would occur.

¹ Research confirming differences in the perception of probability can be found, among others, in studies by Sokołowska J (2005) *Psychologia decyzji rynkowych. Ocena prawdopodobieństwa i modele wyboru w sytuacji ryzykownej*, Academica, Warsaw, Tyska T and Zaleskiewicz T (2001) *Racjonalność decyzji. Pewność i ryzyko*, PWE, Warsaw, p. 177–184.

- Ignorance, when an agent not only may not know all possible states of a given phenomenon, but also may not fully realise what alternative actions are available and what results each of them would bring.
- Conflict, when the environment works in a deliberate manner, for instance to gain personal profit, which may mean a decrease of an agents' profits.

The main reasons why information is imperfect are:

- Information acquisition cost. If the cost is higher than the advantage of having information, gathering information becomes inefficient, which forces an agent to operate under conditions of ignorance (Forlicz 2001). Pankau and Zielenkiewicz (2007: 21) point out that the process of determination of the perfect scope of information should include its character as commodity, which means that the information is effective if it is complete and undivided. Acquisition of fragmentary information is pointless and may interfere with certain economic laws (Stiglitz 2004: 158–159).
- Lack of access to data and thus lack of ability to forecast, resulting from high volatility of the environment and difficulty in acquiring and processing information. Moreover, there are limitations in transmitting uncoded knowledge, which stems from experience or years of observation of certain phenomena (Hockuba 1995). Additional difficulties include the illusion of having complete information (Buchanan 1997: 220) and the problem with assessing the real utility of information (Klimkowski 2002: 841–842).
- Information asymmetry, which indicates a situation where participants of a transaction have different amount of knowledge. It means that information asymmetry impacts the effectiveness of the market mechanism. This phenomenon will be described in detail in Chaps. 6 and 7, as it is one of the core issues of this book.

While embarking on a discussion of psychological aspects of decision-making, it is important to remember that agents often lack analytic abilities to draw conclusions from available information. The manner of solving conflict decisions is equally important. K. Lewin supposes that people are inclined to use various escape routes from unpleasant conflict situations, i.e. they try out various irrational ways to make a problematic decision. It would seem that in the situation of conflict the main goal of a decision maker is not maximising utility or finding satisfactory alternative, but mainly getting rid of the unpleasant state of discontent. Thus, decision-making becomes the search for the justification (reason) for choosing one of possible alternatives (Tyszka 1986: 215).

Studies on behavioural finance conducted in the recent years clearly indicate that one of the major determinants of making investment decisions and forming expectations are emotions.² A breakthrough in this field was presented in an article *Risk*

²Loewenstein G and Lerner J S (2003), The role of affect in decision-making [in:] Davidson R, Goldsmith H, Scherer K, Handbook of Affective Science, Oxford University Press, Oxford, p. 619–642; Rick S, Loewenstein G (2008) The role of emotion in economic behavior [in:]

as *Feelings* in which Loewenstein et al. (2001) proposed a model called *risk-as-feelings hypothesis*. The model shows that emotions play the key role in making risky decisions concerning investments, and even finances in general. It illustrates the manifold influence of emotions on the decision-making process, from basic emotions, such as e.g. mood (which determines risk assessment as well as inclination for making risky decisions³) to experimental emotions (generated by the decision-making process itself) which modify cognitive assessment of the situation, predicted emotions and emotions connected with the analysis of consequences of the decision made.

To sum up our considerations, it is important to highlight that expectations are not formed rationally. Gaps in information and perception as well as the use of simplifications undoubtedly affect the process of forming expectations, which by nature are not the same for all market agents due to differences in experience and knowledge of economic processes. These conclusions relate also to decision-making on capital markets, and thus investors' expectations, which are the subject of further deliberation.

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³ Cf. Isen A M (2005) Pozytywny afekt a podejmowanie decyzji [in:] Lewis M, Haviland-Jones J. M. *Psychologia emocji*, GWP, Gdańsk, p. 527–549.

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