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SCHUMPETER DISCUSSION PAPERS

The Behavioral Economics of John Maynard Keynes

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The Behavioral Economics of John Maynard Keynes

Abstract

After the publication of Keynes' "General Theory," economics was frequently described as schizophrenia: (neo-) classical at the micro-level, but Keynesian at the macro-level. In actuality, Keynes' revolution was, to a substantial part, based on the behavioral micro-foundations of the *world we live in*, which has been dismissed as ad hocery, or simply ignored or reclassified in the neoclassical synthesis. Keynes' *General Theory* is truly general. It includes the full-employment equilibrium as a special case. In addition, its microeconomic foundations are broader than the extremely narrow behavioral assumption of the neoclassical model. Consequently, we argue that Keynes' microeconomics – although not fully worked out - is actually revolutionary. This may be difficult for (neo-) classical economists to accept, but it is strongly confirmed by the recent results in behavioral economics. Keynes' macroeconomics is the result of his microeconomics. Keynes' theory is a criticism of (neo-) classical economics, where he offers alternatives from micro to macro. It is truly a general theory, micro and macro.

Keywords:

Keynes' economics, behavioral economics, microeconomics, macroeconomics, knowledge, information, uncertainty, animal spirits

JEL classification:

A1, A13, B21, B22, B31, D01, D81, D84, D9, E12, E14, E7

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The Behavioral Economics of John Maynard Keynes

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1. Micro, Macro: What Foundations for Economics?

Keynes' theory is typically equated with macroeconomics but *behavioral economics* focuses on individual behavior, which is microeconomics¹. Is Keynes' theory and *behavioral economics* related? Some would say no. However, limiting Keynes' theory to macroeconomics and neglecting its microeconomic foundations, or worse, substituting it with the behavioral axioms of the neoclassical model, has led to schizophrenia in economics; Keynesian at the macro level and neoclassical at the micro level. This was the outcome of the *neoclassical synthesis*, the neoclassical interpretation of Keynes' theory, not of the *General Theory (GT)*².

"About two thirds of the *General Theory* deals with the theory of the action of agents, their motives for saving and for holding money, their investment and speculative behavior etc. It is a consequence of intellectual coarseness and not of Keynes that University syllabuses are so frequently divided into watertight macro- and micro-courses... Keynes argues that the actions of agents in markets would not result in the equilibrium posited by his predecessors. It is hard to see how this very important proposition is to be understood without micro-theory (Hahn 2003: 34).³"

The micro-macro split of the neoclassical synthesis led Lucas and Sargent (1978) to declare that the predictions of Keynesian theory "... were wildly incorrect, and that the doctrine on which they were based is fundamentally flawed..." (Lucas/Sargent 1978:

¹ see e.g. Kahneman/Tversky (2000), Kahneman (2002, 2011), Thaler (1993, 2015), Camerer/Loewenstein/Rabin (2004), and Frank (1985, 1997, 1999). Some efforts have been made to include behavioral economics into macro; refer to Akerlof (2002, 2007), Akerlof/Shiller (2009), and De Grauwe (2011, 2012).

² *GT* is used as an abbreviation for Keynes' *General Theory of Employment, Interest and Money* (1936).

³ It is sometimes argued that one can apply neoclassical microeconomics, but take off the auctioneer, and one can derive the Keynesian underemployment equilibria. However, in real science, reliable theories need to be based on axioms that do not contradict real world behavior.

49). They claimed that there is only one economics, which needs to be based on micro-foundations, that is, in their view, maximization and equilibrium.⁴ We argue that the allegation of the missing micro foundations in Keynes' theory is false, as is the allegation that Keynes' micro is "purely neoclassical" (Leijonhufvud 1967). On the contrary, Keynes' micro-foundations lead to his macro-conclusions. They refer the *world we live in* to the actual behavior of humans, just as behavioral economics does.

The *GT* is truly general in two aspects: (1) it covers the full-employment equilibrium as a special case, and (2) it is based on the microeconomic behavior of which the socially isolated, self-interest maximizing *homo oeconomicus* of neoclassical⁵ economics is, at best, a very special case. Consequently, we argue that Keynes' micro has a lot in common with behavioral economics, a long neglected, but currently flourishing area in economics.

Although *micro-foundations* became identified with maximization and rational-choice, with neoclassical micro, its very meaning is to better understand how humans act as entrepreneurs, consumers, investors, and speculators, as well as what motivates their actions. Neoclassical economics simply assumes utility maximization,⁶ but is quiet about what is specifically to be maximized and how that maximization is achieved; hence, it takes an axiomatic approach. In contrast, Keynes' micro-foundations are not deduced from artificial behavioral axioms, but are based on observations of the *world we live in* and on the motivations and circumstances of actual choices. Motivation is core to the *GT*, when Keynes discusses how individuals

⁴ Commenting on Lucas/Sargent (1978), Robert Solow (1978) argued that assuming the economy to always be in a state of equilibrium is false. Maximization is meaningless, unless it specifies what is to be optimized.

⁵ Keynes used "classics" to distinguish his theory from the mainstream of his time. We use "classic", "neoclassic", "general equilibrium", "Walrasian system", and "perfect market", synonymously.

⁶ At the "Keynesians against New Classical Economics" conference of the Boston FED, even economists opposing *rational expectations*, like Benjamin Friedman, claimed that it is not optimization that distinguishes the camps: "Equilibrium business cycle theory has no monopoly on optimizing behavior" (Benjamin Friedman 1978:75).

behave in an economy where money is not simply a veil covering a barter economy, but where money may be used for savings, speculation or as precautionary device affected by expectations in an uncertain world.⁷

The entrepreneur's production (micro) decisions depend on the expected demand, which, in turn, affects employment, labor income and demand. When considering historical time, the sequence of the events matters (Shackle 1957, Robinson 1974, 1980, Howitt 1986). '*The economy we live in*' depends on sequential decisions. It is not static. In addition, instability may occur, because all decisions are future oriented and based on expectations,⁸ which cannot fully rely on well calculated optimization procedures. Decisions are based on uncertain knowledge, limiting maximization (Heiner 1983).

Uncertainty requires expectations to be influenced by emotions, intuition, routines, heuristics and *animal spirits*. Furthermore, the instability of the economy may be endogenous, as opposed to an assumed stable market system, where only external shocks can disturb the equilibrium. The uncertainty for these decisions increases the longer the time horizon.⁹ One feels more confident in estimating next year's sales than sales in 10, or even 20, years in the future, for which investments are necessary.

⁷ The interpretation of the GT was strongly influenced by Hicks' (1937), where he neglected uncertainty and constructed a mechanical relationship between the money-supply, interest rates and investments and where he equated Keynes with the "liquidity trap" and labeled it as an extra case (Kromphardt 2013).

⁸ Keynes' expectations are radically different from *rational expectations*. Lucas made it clear that he did not refer to *the economy we live in*, because he stated: "Economics has tended to focus on situations in which the agent can be expected to 'know' or to have learned the consequences of different actions so that his observed choices reveal stable features of his underlying preferences" (Lucas 1986: 218). Lucas refers to a stationary world with (small) stochastic deviations from the equilibrium, which Arrow (1986) labeled a stochastic version of the perfect foresight. Limiting economics to steady states is an overly narrow definition (Winter 1986).

⁹ Assuming that the economy is always in equilibrium is unproven and implausible. A conundrum is also the short-run vs. long-run distinction in the neoclassical synthesis, where a disequilibrium may occur in the short-run, but for the long-run, the perfect market equilibrium is assumed.

The “Keynesian analysis violates the commonly regarded sine qua non of good economic theory – a microeconomic foundation based on perfectly rational maximizing behavior. In our reading, economists have accorded the assumption of rational, self-interested behavior, unwarranted ritual purity, while alternative assumptions – that agents follow rules of thumb, that psychological or sociological considerations matter, or that, heaven forbid, they act downright irrationally at times – have been accorded corresponding ritual impurity” (Akerlof/Yellen 1987: 137).

Keynes did not fully develop “micro” and probably was even a bit sketchy about it. That being said, his micro has recently been verified by numerous experiments and tests in behavioral economics. In Keynesian theory, the *economy we live in* suffers from imperfect information, from the absence of an auctioneer, the substitute for perfect information in the Walrasian model, money allowing for precautionary savings, for speculation, for savings, for investment, and for trade at non-equilibrium prices. There is no reason to assume that price reactions proceed quantity reactions.¹⁰ On the contrary, the economy may stabilize at an underemployment equilibrium¹¹ through quantity reactions (the multiplier process) (Leijonhufvud 1967, Howitt 1986).

Opponents of (neoclassical) “micro-foundations” have argued that it rather needs macro-foundations for microeconomics. “...- a common Post-Keynesian mantra asserts that what is needed is a macroeconomic foundation for microeconomics... But this position is rarely developed and often leaves unexplained how the

¹⁰ Producers may observe that when quantities demanded change first, they sell less or more at a given price, which, in turn, may lead them to rethink their pricing (Howitt/McAfee 1992). Hirschmann (1970) describes in “Exit, Voice and Loyalty” the limited information carried in prices.

¹¹ In Keynes’ theory, an equilibrium is used to express a balance, a state of rest, not as an optimum, as in neoclassical economics where equilibrium results from individual maximization.

macroeconomic aggregates relate to individual decisions” (Chick 2016: 99).¹² For sure, the options available to individuals depend on macroeconomic conditions, as we argued previously (Schettkat 1994, 1996, 2010, Schettkat/ Sun 2009 Gorter/Schettkat 2009). However, mirroring the claim for the *micro-foundation* of macroeconomics, by request for the *macro-foundations* of microeconomics, is merely rhetorical. What is at stake is the (complex) interaction of Micromotives and Macrobehavior (to use the title of Schelling’s 1978 book).

The causation does not run in one direction from micro to macro or vice versa. The levels interact and the aggregate outcome is simply not the multiple of the individual actions, as Schelling (1978) so brilliantly showed. Sometimes, it is analytically necessary to focus on the one or the other. However, when doing so, the scholar has to be aware that a partial abstract model cannot always be applied to “the world we live in” directly.¹³ What is actually at stake is that the neoclassical micro-foundations are referring to a very special case to determine whether the more descriptive, more realistic, microbehavior of consumers, investors, entrepreneurs, and speculators can improve the economic theory for *the world we live in*.

Stripping off actual human behavior until only *homo oeconomicus* - a robot (Frydman/Goldberg 2011) - remains and reducing uncertainty to risk is not only misleading, but also dangerous. This is because it may lead to counterproductive policy advice. Akerlof dreamed of overcoming the neoclassical interpretation of Keynes’ theory: “That dream was the development of a behavioral macroeconomics in the original spirit of John Maynard Keynes’ General Theory (1936).

¹² Some Keynesians emphasize Keynes’ underemployment equilibrium, for which it does need an alternative micro; the missing auctioneer is sufficient. However, we believe Keynes’ goal was to develop a theory for *the world we live in*, not to find the minimum deviation from classical assumptions, to establish the possibility of an underemployment equilibrium.

¹³ If the interactions of individuals are restricted to market exchanges, if the individual is isolated from society and if everybody is the same, the aggregation problem is assumed away.

Macroeconomics would then no longer suffer from the ‘ad hocery’ of the neoclassical synthesis, which had overridden the emphasis in *The General Theory* on the role of psychological and sociological factors, such as cognitive bias, reciprocity, fairness, herding, and social status” (Akerlof 2002: 411).

The aim of behavioral economics is to describe actual human behavior and develop an alternative to the overly abstract, unrealistic assumptions of *homo oeconomicus* by integrating insights from other disciplines (e.g., psychological, cognitive and emotional factors). It aims to understand how individuals decide and often test the validity of neoclassical axioms. It includes the concepts of framing, bounded rationality, norms, socially embedded individuals and their interactions, routines, and heuristics.

Behavioral economics has roots in (old) institutional economics, which also put individual economic behavior into a social context (Veblen 1899). We do not limit *behavioral economics* to those authors who classify themselves under this label. Instead, we use the term ‘broadly including all theories,’ which integrates actual human behavior.¹⁴ Behavioral economics has discovered the many regularities of individual economic behavior, which are not “rational” (logical, as Keynes put it), in the sense of maximizing real income. They do, nevertheless, exist. They also produce regular patterns.

The most flourishing area of behavioral economics is “behavioral finance,” although the financial markets are presumably the closest of all markets to the “perfect market” model (Schettkat 2010). It has long been recognized that expectations in financial markets are interdependent and affected by moods, as Keynes’ “beauty contest”

¹⁴ We also include Herbert Simon, Thomas Schelling, Edward Chamberlain, Reinhart Selten, Richard Nelson, Tibor Scitovsky and Sidney Winter, as well as the “old institutional” economists, Thorstein Veblen, George Katona, and James Duesenberry, to name a few.

emphasized.¹⁵ “He (Keynes, RS) was a true forerunner of behavioral finance” (Thaler 2015: 209). Today, Keynes would probably be labeled as a theoretical behavioral economist.

Consequently, this paper emphasizes the major issues of Keynes’ theory, which are supported by the recent findings of behavioral economists, but sharply deviating from the (neo-) classical assumptions. These findings include:

- Market adjustment mechanisms: No full information and no auctioneer (i.e., exchange may occur at non-equilibrium prices). Quantities may adjust and the economy may stabilize at an underemployment equilibrium.
- The endogenous instability of markets, because decisions depend on expectations in an uncertain world.
- Expectation forming and decision making: Uncertainty, instead of risk, requires heuristics, conventions, norms, routines, and *animal spirits*.
- Individuals do not maximize (optimize) labor supply decisions in consumption.
- Socially embedded individuals (i.e., interdependence of utility functions and social comparisons).
- The monetary economy (i.e., speculation, precautionary savings, “over-savings”) is recognized.
- Nominal values and magnitudes affect behavior.
- Equilibrium concepts (balance vs. optimum) and the equilibrium below full-employment are possible.
- Habituation and asymmetric responses to gains and losses may occur.
- Inductive vs. deductive methodology: *The economy in which we live*.

¹⁵ Minsky (1977, 1992), whose recognition skyrocketed post hum after the Great Recession, emphasized the instability of financial markets in his works, but got only limited attention before (Kindleberger 1978).

- Humans vs. *homo economicus*.
- Discounting may violate maximization over time (hyperbolic discounting).

2. Motivation of Economic Agents

What motivates humans to make the decisions they do? Why do they make certain choices? Which variables enter the utility function? “They select among the myriad of options those which maximize their utility conditional on their budget constraint i.e., they optimize” is a common answer, labeled *rational choice*. Taking an axiomatic approach, neoclassical economics equated rational behavior with maximizing utility and profits. At the very abstract level, this narrative seems plausible. That being said, are observed choices actually utility maximizing? Can they be *rational choices*?¹⁶

Utility itself is very abstract, leaving unspecified what actually provides utility. This blurred definition allowed Becker (1965, 1993) to apply *rational choice* to all areas of life, from families to drug addictions. If utility remains unmeasured, how is maximization to be proven? How are the alternatives judged with respect to utility? What are the conditions to make utility-maximizing choices?

Different approaches have been applied in economics (and other fields): 1) the axiomatic approach of neoclassical economics, 2) the analysis of the conditions for *rational choice*, 3) the interviews/ questionnaires on the motives for choices, and 4) observing choices in a controlled environment (experiments).

1) The Axiomatic Approach

To reduce the overwhelming complexity of real-world neoclassical economics requires an axiomatic approach. More specifically, selfish, socially isolated and independent individuals maximize their own utility along well-ordered and stable preferences using all available information, subject to the budget constraint,

¹⁶ Utility is abstract and usually unspecified. An allegation therefore is, that maximization (of abstract utility) is meaningless unless it is specified (Solow 1978).

optimization. The interaction between individuals is limited to a market exchange (i.e., the choice of one individual leaves the preferences of others unaffected (Section 3). Only changes in relative prices may affect the utility maximizing choice via changes in the budget constraint.¹⁷

Based on the axiom of independent individual utility maximization (i.e., *rational choice*), it is deduced that observed choices must be maximizing choices. If they were not, the rational individual, who is “free to choose,” would have made a different choice. Not maximizing the utility would be an “irrational” choice. And in the neoclassical world, only rational individuals survive.¹⁸

Skeptics, of course, discovered the circularity in the approach. The assumption is maximization. Therefore, the observed choices must be the result of this maximization. Doubts that actual decision making processes are performed as required, to pick the utility maximizing choice, are confronted with the astounding “as-if” reply of neoclassical economists in the past (Friedman 1953)¹⁹ and in the present (Pesendorfer 2006). Economic agents do not actually perform the necessary evaluation process, but they behave *as-if*.²⁰

¹⁷ This reasoning (i.e., stable preferences) also applies to the individual itself. The choice today leaves the preference function unchanged (see section ...).

¹⁸ The statement does not fulfill Popper’s (1959) criteria of potential falsification, because it is circular.

¹⁹ To support the as-if argument, Friedman offers the famous example of a professional billiard player who does not perform the physical calculations for the path of the balls, but somehow, he knows them; he behaves “as-if.” Applied to economics, the agent does not perform all the calculations, but behaves “as-if”. Gigerenzer (Berg/Gigerenzer 2010) argues that a professional baseball player never thinks about ballistics, nor do they perform “as-if” calculations, to determine where the ball will come down and then run to the calculated location to catch it. Instead, the baseball player uses gaze heuristics: simply watch the ankle to the ball (Gigerenzer/Selten 2001) and move accordingly.

²⁰ Whether economics is a mathematical-logical science or whether it is a real science seems to be a fundamental disagreement among economists. “*In the logical-mathematical sciences ‘truth’ is a logical criterion. A conclusion is ‘true’ if it follows from the premises by means of deductions which are, after all, tautological*” (Kornai 1971: 8). If economics is a real science like physics and biology, where “... *the only criterion of ‘truth’ is experience, the comparison of assertions with reality*” (Kornai 1971: 8). What are acceptable axioms in real sciences? “That is, only those theorems and propositions (deduced from assumptions not in conflict with reality) which describe the real world more or less accurately may be

Friedman (1953) argued that theories cannot be judged by the validity of their axioms, which are instrumental²¹. The only way to prove a theory is to determine whether its predictions are in accordance with the observed outcomes. Friedman declared the observed outcomes to be optimal (utility- or profit-maxima).²² “No one has, in fact, observed whether the actual positions of business firms are the profit-maximizing ones...” (Simon 1963: 230)²³ let alone utility maximization ones.

2) The Conditions for *Rational Choices*

“In situations that are complex and in which information is very incomplete (i.e., virtually all real world situations), the behavioral theories deny that there is any magic for producing behavior even approximating an objective maximization of profits or utilities” (Simon 1986: 39). Analyzing whether agents actually perform the optimization process seems not to be regarded as relevant in neoclassical economics, because it requires insight from other disciplines. However, ignorance can hardly convince the skeptic.

Critics of the neoclassical axioms argue that the human brain is unable to evaluate all possible choices, to bring them in a transitive order and to evaluate all consequences of specific choices (bounded rationality) (Herbert Simon 1955, 1982). Humans have

considered acceptable” (Kornai 1971: 9). That characterization of economics as a real science seems to fit Keynes’ position (Section 6).

²¹ Karl Popper: instrumentalism forces scientists to abandon the search for truth (cited according to Caldwell 1980: 370).

“When verification is demanded, they (neoclassical economists, RS) tend to look for evidence that the theory makes correct predictions and resist advice that they should look instead directly at the decision mechanisms and processes.” (Simon 1986:38).

²² Friedman (1953: 8) even argued: “Truly important and significant hypotheses will be found to have ‘assumptions’ that are wildly inaccurate descriptive representations of reality, and, in general, the more significant the theory, the more unrealistic the assumptions (in this sense).” The worse the assumption, the better the theory? F-twist (Samuelson 1963).

²³ Hassink/Schettkat (2003) argue that firms do not know their demand function, and therefore, lack the information they need to maximize profits. Arrow (1978: 169) emphasizes the importance of quantity constraints on firms: “Indeed it would be hard otherwise to explain why firms lay off workers. Since their capital costs are sunk in the short-run, they should prepare to sell so long as their prices cover variable costs.”

limited information and lack the computational capacity necessary to evaluate all alternatives and their consequences. Even when the future is risky (if the probability distribution is known) humans may not follow the *rational choice* axiom (the so-called Savage's axiom).

Rationality is bounded and humans may try to achieve aspiration levels, satisfying, rather than aiming for, the maximum. New York cab drivers, who can freely vary their working hours, illustrate the point. Instead of maximizing income on busy days, they stop working once their income target is achieved (Camerer et al. 1997).²⁴

3) Interviews / Questionnaires About the Motives for Choices

In interviews, the individuals' intentions for their choices, their motivation, whether they actually perform the necessary evaluation of alternative choices, may be investigated. However, such interviews were regarded with skepticism in economics, because individuals may not reveal their true motives (Blinder 1998, Bewley 1995, 1999, Flanagan/Strauss/Ulman 1974).

Bewley (1995, 1999) argues that econometrics cannot determine anything about the motivation. It can only establish significant deviations from the assumed behavior. Interviews can determine motivations. Bewley's results revealed that employers are reluctant to reduce the (nominal) wages of their workforce, because it negatively affects morale and productivity. Bewley's (1995, 1999) results revealed the answer to the long discussed puzzle of why employers do not push for wage reductions when unemployment is high.

²⁴ There is an intense discussion of this finding (e.g., Farber 2008). Winter-Ebner (2014) argues that taxi drivers are probably specific and not representative of workers. True, they are among the few workers with flexible working hours, where the maximization hypothesis can be tested.

“Bad morale may lead to lower productivity or even to carelessness verging on sabotage” (Solow 1979: 80). Indeed, Bewley (1995: 252) summarizes his study: “However, the main causes of downward wage rigidity have to do with employers’ belief that other motivators are necessary, which are best thought of as having to do with generosity. Employers want their workers to identify with the objectives of the organization and to cooperate in good spirit with coworkers and supervisors.”

4) Observing Choices in a Controlled Environment (Experiments)

Experiments are the dominant method in behavioral economics. Experiments have produced stunning evidence about actual choices. This evidence almost always contradicts the neoclassical axioms. The advantage of experiments is that variables and frames can be changed in a controlled way. Experiments can test whether humans respond differently to variations in environmental conditions, whether they may change the decision criteria, whether they vary discount rates depending on time and magnitudes, and whether preferences remain stable over time. Researchers can test whether choices are consistent, or affected, by past choices. The disadvantage of experiments is that people may behave differently in laboratories than in *the world we live in*.

In an early experiment, Allais (1953)²⁵ found that many (most) individuals do not decide in a manner consistent with Savage’s axiom. They do not adhere to the axiom of rationality. Therefore, the person’s choices cannot be attributed to maximizing the utility functions under subjective probability.²⁶ In an experiment in which participants had to choose successively in two lotteries, which differed from each other only by an

²⁵ Allais’ experiment was among the first in economics. Even earlier was the experiment by Chamberlin (1948) at Harvard.

²⁶ In 1974, the Oregon Research Institute published “Who Accepts Savage’s Axiom,” prepared for the Office of Naval Research, authored by Paul Slovic et al. “et al.” was Amos Tversky.

irrelevant additional option with a high probability, Allais (1953) found that the subjective expected utility (SEU) is violated. This was because the decision criteria changed from expected payments to higher probability, resulting in contradictory choices, known as Allais' paradox.

This "irrational" behavior led Kahneman and Tversky (1974, 1979) to develop "prospect theory". Another forerunner of behavioral economics is Ellsberg (1961), who argued that decisions differ under risk and ambiguity (uncertainty). Similar to Keynes' distinction between decisions under risk and under uncertainty (see also Knight, 1921), Ellsberg argued that human decisions suffer from an aversion to ambiguity (see also Section 5).²⁷

The findings of behavioral economics reveal that humans often make systematic mistakes even in predicting their own future utility. Thus, they fail to maximize their experienced utility. Sometimes humans make the "wrong" choices because they do not fully understand²⁸ the situation. But it is not simply error, or the misunderstanding of situations, which results in decisions deviating from *rational choice*. Even when misunderstandings are clarified, "irrational" choices remain. It is not simply the *money illusion*, when nominal values are recognized in decisions, they can even overrule real values with respect to utility (see Section 4.2).

²⁷ Ellsberg used "ambiguity," but it is similar to uncertainty, or what Keynes earlier labeled in the "Treatise on Probability" (1921) as "non-comparable probabilities." Ellsberg was obviously not aware of Keynes' "Treatise on Probability" (1921) when his paper was published in 1961 (Feduzi 2007).

²⁸ Thaler offers several examples in which humans simply make mistakes, because the situation is too complex to be understood immediately. The smart ones get it right from the beginning and the others correct their answers once the situation is explained to them.

3. Rational Choice, Actual Choice and Time

Assuming that economic agents make *rational choices* and maximize their own utility requires knowledge (expectations) of the utility a specific product will actually provide (e.g., Savage's axiom, SEU). That being said, expected and experienced utility may differ, because expectations may be biased, because utility may change when a person owns the product (i.e., endowment effect, habituation, change of preferences) or because the knowledge of the utility before actually owning the product is limited.

Forward-looking *rational choice* requires discount rates to increase with time. Utility farther in the future should be discounted at higher rates than less distant utility (i.e., the discounting function should be exponential). Discounting utility requires a cardinal measurement of utility and needs to assume that future utility is independent of current choices. In other words, preferences in the future are independent of choices made today, because there is no path dependence, no habit formation, and no reference points.

Time distance and diminishing marginal utility require the higher values to be discounted at higher rates. Wilkinson found the reverse to be true (Wilkinson 2008: 207). Summarizing empirical discount rates from 42 studies (Wilkinson 2008: 314-317), Wilkinson stated: "It should be noted that the effect works in the opposite direction to the effect of diminishing marginal utility". Again, the findings of behavioral economics confirms Keynes' reasoning: "...—human nature desires quick results, there is a peculiar zest in making money quickly, and remoter gains are discounted by the average man at a very high rate" (*GT*: 157). Humans seem to not apply exponential discounting (i.e., discounting with a constant discount rate), but rather applying hyperbolic discounting (Ainslie 1991) (i.e., declining discount rates with time distance).

A necessary condition for utility-maximizing choices are accurate and unbiased forecasts of the hedonic outcomes of potential choices (Kahneman/Thaler 2006). Many findings of behavioral economics suggest that the stability assumption of preferences in neoclassical economics does not hold. The utility of buying a product may be different from the utility derived from owning it. Humans' (expected) utility seems to be strongly affected by the situation, the mood, and the environment. It may also change over time. "However, people do not always know what they *will* like, and they are likely to err most severely when the temporal gap is long and when the agent's state and circumstances vary between t_1 and t_0 " (Kahneman/Thaler 2006: 223). Humans often make systematic errors in predicting their future utility. Consequently, they fail to maximize their experienced utility (Kahneman/Thaler 2006).

Magnitudes are also found to matter. The evaluation of a future payment seems to be affected by magnitudes. However, "rational discounting" requires discount rates to be independent of the magnitude to ensure consistent results. Yet, a common finding in behavioral economics is that greater amounts are discounted at lower rates than smaller amounts (Kahneman/Tversky 2000). This is the reverse of the rationality assumptions.

Thaler (1981) found that the same persons were indifferent among the following choices:

Immediately	in 1 year	Implied discount rate
15 [\$]	60 [\$]	139 %
250 [\$]	350 [\$]	34 %
3000 [\$]	4000 [\$]	29 %

Source: Thaler (1981).

The implied discount rates illustrate an amazing variation, depending on the magnitudes, but in the reverse order, as expected under the *rational choice* assumption. The higher the amounts, the lower the discount rate. This is the “money illusion” or “irrational”, but seems to be a regular pattern. A rational individual should also not be influenced by the order in which choices are presented. However, humans are strongly influenced by the order of choices, which is the basis for “nudge” (Thaler and Sunstein 2008). Whether probabilities are presented (framed) as gains or losses also influences the decision. Humans seem to discount gains more heavily than losses. Participants in financial markets, closest to the perfect market model, illustrate this behavior; investors tend to keep shares whose prices are falling.

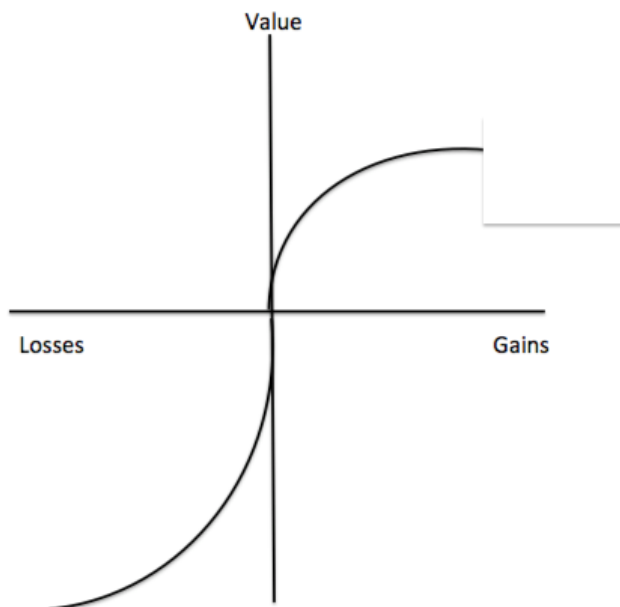
Intertemporal maximization has been advocated to explain labor supply variations over time. It is argued that workers optimize labor supply over longer time periods (possibly the life-span), raising supply (entering the labor market) when wages are high and reducing supply (withdrawing from the labor market) at less favorable conditions (inter-temporal substitution, voluntary unemployment). Again, this behavior requires stable preferences²⁹ and a consistent evaluation of the current and future incomes, as well as the derived utility. If inflation occurs – even it is known and understood - the evaluation of future incomes compared needs to be corrected, assuming that real income is relevant for utility. However, it is not just the *money illusion*. The experimental evidence suggests that nominal values are also important for utility (i.e., happiness).

Prospect theory, as summarized in Figure 3.1, states that the utility function derived from gains is flatter than the disutility function derived from losses. Loss aversion

²⁹ Habit formation (i.e., endogenous changes of preferences) would destroy this assumption, as argued for labor force participation (Clark/Summers 1982).

refers to the tendency to avoid the realization of losses. The orientation on the reference points all fits Keynes' nominal wage resistance well.

Figure 3.1: Prospect Theory



Source: Kahneman/Tversky 1991.

4. Socially Embedded Individuals

4.1 Wages

Just on the first pages of the *GT*, Keynes rejected “utility maximization,” arguing that the second postulate of the (neo-) classical theory, that the real wage equals the marginal disutility of employment, is a false assumption. Keynes rejected the maximization postulate on empirical grounds: “Whilst workers will usually resist a reduction of money-wages, it is not their practice to withdraw their labour whenever there is a rise in the price of wage-goods” (*GT*: 9). And Keynes added: “Wide variations are experienced in the volume of employment without any apparent change either in the minimum real demands of labour or in its productivity” (*GT*: 9).³⁰

For (neo-) classical economists, who are used to thinking about models of socially isolated individuals having formed their utility functions independently and who are solely stimulated by real wages, the nominal wage orientation was simply “irrational.” And since *homo oeconomicus* is assumed to be rational, meaning maximizing real variables and interpreting the world without bias, they turned nominal wage resistance into a *money illusion*. This is because, in this theory, money is just a curtain covering the real values.³¹ “But, whether logical or illogical, experience shows

³⁰ Keynes accepted the first postulate, that labor demand equals the marginal product of labor (i.e., that rising employment requires declining real wages). The empirical papers of Dunlop (1939) and Tarshis (1939) led Keynes to rethink the relationship. Although he remained skeptical about the robustness of the empirical relationships put forward by Dunlop for the UK and Tarshis for the US, he conceded that he might have been trapped easily into a ‘common’ belief. Most importantly, for policy purposes, he argued that, in recessions, the most likely capacity is below the potential, and therefore, output and employment expansion may result in rising, rather than declining, productivity (Keynes 1939). Keynes seemed not to refer to Young’s (1928) work on increasing returns to scale (Kaldor 1972).

³¹ The impact of a real wage reduction on the labor supply is undetermined in the neoclassical model, because it depends on the income effect (raising labor supply) and the substitution effect (reducing labor supply). Could it be that Keynes’ observation of the unchanged labor supply, despite real wage variations, is just the result of income and substitution canceling each other out? This, however, is not possible in the neoclassical model, where individuals are assumed to have well shaped (convex) homeostatic indifference curves. That would be a sharp deviation from the assumed well shaped indifference curves of the model and would result in a vertical labor supply function.

that this is how labour in fact behaves.” (GT: 9) This quote clearly underscores Keynes’ requirement that economic theory needs to be based on, or at least not in contradiction to, the *world we live in*.

The *money illusion* interpretation of Keynes’ argument for nominal wage resistance is totally ignorant to the reasoning Keynes was clearly stating that it is the individuals’ - the micro unit’s - position in society that matters. “...any individual or group of individuals, who consent to a reduction of money-wages relatively to others, will suffer a *relative* reduction in real wages, which is a sufficient justification for them to resist it. On the other hand, it would be impracticable to resist every reduction of real wages, due to a change in the purchasing-power of money which affects all workers” (GT: 14).

Solow (1979b: 79) interprets Keynes correctly and argues: “... in a decentralized labor market, every change in a nominal wage is also a change in relative wages; workers can and do resist reductions in their relative wages in the only way the institutions allow ...” Solow adds that one may be easily convinced that workers resist nominal wage reductions. However, the difficult question becomes, why employers do not take advantage of recessions (excess labor supply) and lower the wages of their workforce or substitute their workforce with unemployed workers at lower wages.

The neoclassical theory is undetermined, with respect to the labor supply effect of wage variations. The supply function may even be backward bending (Killingsworth 1983). Lucas, with his claim for rigorous “micro-foundations” of maximization, refers to sketchy empirics when justifying his labor supply assumptions (Schettkat/Jovicic 2017).

The *money illusion* interpretation of nominal wage resistance is an example that the theory can work as blinders.³² The neoclassical model assumes the individual to be isolated from society. Their utility functions are assumed to be independent of each other. They solely care about their own well-being, depending only on the goods and services they consume (real income) and their leisure time. Assuming well-shaped (convex) and stable preference curves, the individual chooses the income-leisure combination which maximizes the individual's utility, depending on the real wage. This equals the marginal disutility of work or the marginal utility of consumption.³³ Nominal wages are unimportant; only real wages count.

The interaction of individuals is restricted to the market exchange, e.g., consumption of other individuals may affect relative prices and thus the budget constraint, but the utility functions remain unaffected.³⁴ Comparisons of income and consumption between individuals, i.e., concerns of the relative position in society affecting the utility functions are excluded from the neoclassical theory, by assumption. Positional goods³⁵, fashion, *keeping up with the Jones*, etc., do not affect the utility of *homo oeconomicus*. Every individual maximizes utility independently from others, in isolation.

Keynes' theory does not abstract from socially embedded individuals. On the contrary, individual utility functions are interdependent and social status is important. This is the core of *nominal wage rigidity*. It is also listed among Keynes' subjective motives for consumption (GT: 108). However, the utility functions of socially

³² Even Herbert Simon (1992) seems to rely on the interpretation of nominal wage resistance as a money illusion. He argues that the Lucas model is guilty, since it depends on the *money illusion* on the employer's side (Schettkat/Jovicic 2017).

³³ Assuming no savings.

³⁴ In game theory, individuals interact, but they also negotiate along well-defined preference functions, which remains unaffected by the "game" (see Elsner 2012, who enhances the traditional microeconomic analysis to complex interactions).

³⁵ Hirsch (1976) emphasized the gains derived from the scarcity and prestige of goods and positions.

embedded individuals are directly connected, but much more difficult to analyze, let alone to aggregate (for consumption, see Section 4.3).

The neoclassical theory works as a blinder. It leads to incorrect conclusions and the non-response of nominal wages in slack labor markets. Their inflexibility became, and still is, the main explanation for unemployment repeated in every talk-show on the subject. If prices are fixed, the argument goes, markets cannot clear and the almost universal recipe for battling unemployment is the downward flexibility of wages.³⁶ However, as Keynes laid out in Chapter 19 of the *GT*, downward nominal wage flexibility would make a recession worse and would not result in lower real wages, because it would lower prices if the markets are competitive. What may be an attractive micro policy, a measure for an individual firm, will turn out to be counterproductive at the macro level, especially if the perfect market model is assumed to hold.

Theory, in line with actual observed human behavior, with empirical facts, was Keynes' ambition: "Moreover, the characteristics of the special case assumed by the classical theory happen not to be those of the economic society in which we actually live, with the result that its teaching is misleading and disastrous if we attempt to apply it to the facts of experience" (*GT*: 3).

³⁶ Higher wage flexibility would have two sides: downward and upward flexibility (Freeman/Bell 1985).

4.2 Behavioral Economics Confirming Keynes' Observations of Wage Behavior

The main findings in behavioral economics can be read as strong confirmation of Keynes' observations, representing human behavior in *the world we live in*. Situations are evaluated from a reference point, often the status quo (endowment effect), from which gains and losses have asymmetrical utility effects. Losses reduce utility more than similar gains raise it (prospect theory, loss aversion). Individuals care about fairness³⁷ and its violation may even outweigh individual gains.

The importance of nominal values is impressively revealed in a study by Shafir, Diamond and Tversky (1997). Participants were asked to indicate who was better off, in monetary terms and in satisfaction, between two individuals, A and B, who graduated from the same college, but faced different pay increases and inflation. Who did the participants in the experiment think were better off: Person A or Person B?

Person	1 st year		End Year Pay Rise	2 nd year		Respondents Thought:		
	Salary [\$]	Inflation		Salary Nominal [\$]	Real [\$]	Better off Econo- mically	Happier	Propensity to Quit
	1	2	3	4	5	6	7	8
A	30,000	0%	2%	30,600	30,600	71%	36%	65%
B	30,000	4%	5%	31,500	30,300	29%	64%	35%

Source: compilation from Shafir/Diamond/Tversky (1997) cited in Wilkinson (2008: 32/33).

³⁷ Fairness is important in so-called efficiency wage models (Akerlof 1982, Akerlof/Yellen 1985, Solow 1979).

Obviously the participants in the Shafir, Diamond and Tversky (1997) study understood the differences between nominal and real income very well (Column 6 in the table). At the end of the year, Person B receives the higher nominal income, but also experiences inflation. Person A is judged to be better off economically, where most respondents do not suffer from the *money illusion*. Nevertheless, most respondents thought that the higher nominal income that Person B receives makes them happier (Column 7). Person A (the person better off in real terms) is more likely to quit their job if they receive another job offer (Column 8).

This finding sheds light on a conundrum in labor economics, where it was found that upward sloping wage profiles are not necessarily related to productivity improvements (Medoff/Abraham 1980, 1981). In actuality, workers seem to prefer increasing wage profiles, even if the advantage of declining wage profiles is explained to them (Loewenstein/Sichermann, 1991). When Californian teachers were offered a choice to split their annual salary into 10 payments or into 12 payments, they overwhelmingly chose 12 (i.e., they paid for self-control). Other examples include payments for diets and high interest on credit card debt.

Based on the income and job satisfaction data for 5000 workers in Great Britain, Clark and Oswald (1996) conclude that workers care about relative wages and summarize: "These results appear to offer statistical credence to the hypothesis that feelings of well-being depend on a reference or comparison level of income. By contrast, they provide little support for the simple view, presented in microeconomics textbooks, that a worker's level of well-being is a function of absolute income" (Clark/Oswald 1996: 373).

Probably the strongest evidence for the importance of relative pay results from experiments using magnetic resonance imaging (MRT, medical scanners). Brain

activity increases with absolute income, but controlled for absolute income, relative income is important (Dohmen et al. 2011, Fliessbach et al. 2007). Reference levels (e.g., minimum wages) even serve as a reference point after they have been removed (Falk/Fehr/Zehnder 2006).

Neumark and Postlewaite (1998) tested the law of relative incomes for utility and found that a woman's decision to start paid work depends on whether her sisters and sisters-in-law are employed and how much they earn. Thurow (1975) reported results from Gallup questionnaires asking United States citizens about the minimum amount of money a family of four needs to survive. Over a 17-year period, the answers fell to between 53% and 59% of the average income, although average income rose substantially.

Labor supply decisions have long been related to habit formation. Comparing the labor force participation of women during WWII ("Riveting Rita") and after that date, Clark and Summers (1982) found that the cohorts of women who were employed during WWII showed higher labor force participation, even after WWII. If women were attracted to employment solely by high wages during WWII, they should have withdrawn from normalized after-war labor markets. However, their participation rates remained higher, which Clark and Summers interpreted as habit-formation³⁸ (i.e., their participation in labor markets has changed their preferences towards work, towards income, towards consumption). In other words, their reference points changed (see Section 4.4).

³⁸ See also Clark (1999).

4.3 Consumption

Keynes distinguishes the effects on consumption into short-term, long-term, objective and subjective consumption. Among the subjective factors, he lists “enjoyment, shortsightedness, generosity, miscalculation, ostentation and extravagance” (GT: 108).³⁹ This list is amazing for neoclassical economists since, again, Keynes recognizes the socially embedded individual. More specifically, ostentation, for sure, cannot be a spending motive for the socially isolated *homo oeconomicus*. Keynes’ list could come right out of a “Behavioral Economics” book.

Robert Frank (1985: 146) observes: “To many economists, the notion of consumers being strongly influenced by demonstration effects must have been probably inconsistent with the reasoned pursuit of self-interests, if not completely irrational”. Nevertheless, several economists took relative positions and social interactions into account. *Keeping up with Joneses*, from Veblen (1899), is an early example. Duesenberry (1949: 48) also argued: “Any particular consumer will be more influenced by the consumption of people with whom he has social contacts”. In addition, of course, past consumption/income may serve as a reference point, leading to path dependence (i.e., habituation).

Frank (1999) argued that the consumption of the neighbors, the Jones’, as a reference, were substituted by the consumption of the very wealthy through mass media, which arguably leads to overconsumption. Signaling social status, lifestyle through consumption (in the wider sense) is important for socially embedded individuals (Leibenstein 1975, Hirsch 1976).

³⁹ Curiously, Keynes lists under subjective factors of consumption 8 motives NOT to consume: precaution, foresight, calculation, improvement, independence, enterprise, pride, and avarice. Then he lists the “corresponding” motives FOR consumption.

“The fundamental psychological law, upon which we are entitled to depend with great confidence both *a priori* from our knowledge of human nature and from the detailed facts of experience, is that men are disposed, as a rule and on the average, to increase their consumption as their income increases, but not by as much as the increase in their income” (GT: 96). This stability in consumption, relative to income, was thought to be characteristic for short-periods, for “so-called cyclical fluctuations,” when there was not enough time to adapt to changed objective circumstances.

“For a man’s habitual standard of life usually has the first claim on his income, and he is apt to save the difference which discovers itself between his actual income and the expenses of his habitual standard; ... Thus a rising income will often be accompanied by increased saving, and a falling income by decreased saving, on a greater scale at first than subsequently” (GT: 97).⁴⁰ This statement of Keynes can be interpreted as a description of Duesenberry’s (1949) ratchet effects, caused by habituation, reference points in the modern behavioral economics literature.

Reference points depend on experienced consumption and employment patterns (i.e., habituation). They also depend on the observed patterns of the reference groups (Baxter 1988), which itself are affected by the cultural influences, making preferences endogenous (Drakopoulos 2011). Keynes’ “fundamental psychological law” refers to the short-term objective factors. However, in the long-term, he recognizes subjective factors: “The propensity to consume of a community depends partly on its amount of income, partly on other objective attendant circumstances and

⁴⁰ Thus, the propensity to consume may change in the short-term, when income fluctuates.

partly on subjective needs, habits, psychological propensities of the individuals and the income distribution” (*GT*: 90/91).⁴¹

Keynes regards the subjective motives as roughly stable, although they may vary over the long-term and between countries or regions. In the short-term, he assumes the objective factors (e.g., changes in the wage-unit, changes in fiscal policy) are most relevant, whereas the other factors (e.g., windfall change in capital-values, wealth effect, changes in the rate of time-discounting, changes in the expectations of the relationship between the present and future level of income) are, at most, marginally significant. In the long-term, and aside from income, he allows for changes in the propensity to consume.

Keynes argues that changes in the expectations of future incomes are too uncertain to exert much influence (on average, although not necessarily for an individual), which may be read as a “pre-publication” neglect of Friedman’s ‘permanent income hypothesis’ (Friedman 1957), which relies on the (right) expectations on future incomes.⁴²

⁴¹ In response to allegations by Staehle (1939) that the distribution of income is not recognized in the *GT*, Keynes refers back to the *GT* (90, 91). Keynes points out, that for the community as whole, the propensity to consume “obviously depends (i) partly on the amount of (the community’s) income, (ii) partly on the other objective attendant circumstances, and (iii) partly on the subjective needs and the psychological propensities and habits of the individuals composing it and *the principles on which the income is divided between them (which may suffer modification as output is increased)*.” This is cursive by Keynes in the 1939b article.

⁴² The “permanent income hypothesis” (Friedman 1957) states that short-term variations in income (e.g., a tax reduction) will not affect consumption, unless expected to be permanent. Life-time consumption is oriented on life-time income. The so-called Ricardian equivalence –the assumption that current public deficits are translated into higher tax rates in the future and that “deficit spending” will not initiate the assumed expansionary effect – is argued. See Arrow’s (1978) critical comments.

4.4 The impact of endogenous preferences

The valuation of situations related to a reference point is arguably the most important finding in behavioral economics, especially for methodological concerns. The endowment effect (Kahneman/Knetsch/Thaler 1991) refers to changes in the valuation of products, depending on the possession of a product, which then changes the indifference curve. When buying a product, its utility should be equal to the utility of the money that was paid for it (respectively, to the alternative products the money could have bought). It turns out, however, that once a product is processed, it would only be sold at a significantly higher price, although the owner would not have paid the potential selling price.

The utility for the owner, derived from the possession of the product, must have risen after he/she possessed it. Put another way, preferences are endogenous and are evaluated asymmetrically. Similar effects are described with prospect theory, where adding an additional unit of a certain product raises the utility by less than how the subtraction of a unit of the very same product would reduce the utility. Thus, the orientation on reference points implies changes in the utility function (i.e., the neoclassical assumption of stable preferences is violated).

If humans evaluate gains and losses relative to a reference point (i.e., the status quo), the indifference curves change their shape around the reference point. Given the myriad of choices, utility maximization is already difficult if preference curves are assumed to be stable in a static environment. If preference curves shift or change their shape, if the utility of various choices changes, depending on the decisions made in the past, maximization is much harder, if not impossible, and dynamic optimization would be required (Pesendorfer 2006).

Individuals would not only have to evaluate the utility of the myriad of options they are facing. They would also have to evaluate the changes in utility once certain decisions have been made. As Pesendorfer put it: “In a standard model, maximizing a utility function is simply a concise representation of how the agent behaves. But once the model is interpreted as a mental process, we must imagine that the decision maker actually performs the optimization. Since the decision maker is systematically wrong about future behavior there is no obvious benefit from maximizing the objective function as opposed to taking some other (perhaps arbitrary) action” (Pesendorfer 2006: 9). Pesendorfer determines that the reference-point orientation of preferences is not compatible with the basic axioms of neoclassical economics.

One might also argue that rational individuals do not perform the optimization procedure, because they know that once a decision has been made, preferences will change around the reference point. Integrating all the changes is just not paying off. A sort of optimization of the decision process, which fits *homo oeconomicus*' rationality but, which, of course, is also the justification for heuristics and other fast decision procedures. Whatever the underlying reasoning, be it the impossibility of the dynamic optimization of the myriad of options or a “rational” decision not undertaking the efforts, the consequence for actual choices is that non-optimizing decision procedures are applied.

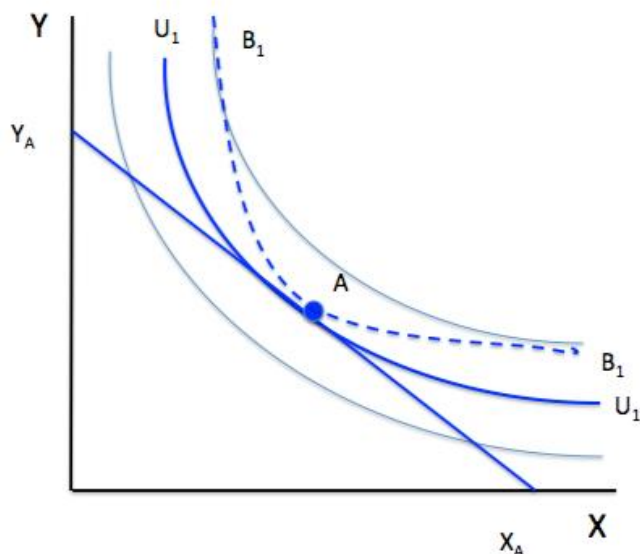
Komlos (2014) analyzed the impact of utility, depending on reference points in the framework of conventional indifference curves. Komlos concludes that even after the initial optimization, where the budget constraint is tangential to an indifference curve, kinks will occur at the reference point if there is a tradeoff between the two commodities. This is because of the differing valuation in the gains and losses, according to the prospect theory.

Komlos (2014) explains that prospect theory changes the marginal rate of substitution between a good X and another good Y ($m = -dY_i/dX_i$), because the loss in Y weighs higher than the gain in X . That being said, when initially approaching the point, the two were equal. In other words, the slope of the indifference curve changed.

The endowment effect implies that a substitution of X against Y requires “ex post” compared to the initial indifference curves, higher increases in Y to compensate for a loss in X . More specifically, Point A in Figure 4.1 represents the utility maximum, given the budget constraint $Y_A - X_A$. The utility evaluation of Y and X changes once Point A is achieved. Under loss aversion, the utility loss of X will be higher than the utility gains from Y . In this way, to the left of Point A, the behavioral indifference curve will be steeper (dashed function). To the right of Point A, the behavioral indifference will be flatter. This is because it is compensating for the loss in utility related to a decline in Y , which requires a higher increase in X , when compared to the initial indifference curve ($U_1 - U_1$). The behavioral indifference curve ($B_1 - B_1$) will cross the initial preference curve, which violates the assumed well ordered (and stable) preferences and will make the process of optimization even more difficult, if not impossible.⁴³

⁴³ Komlos (2014) refers to additional effects, such as the non-response to price variations.

Figure 4.1: Behavioral Indifference Curve



Source: Inspired by Komlos (2014).

Keynes' labor supply function is vertical line in the real-wage employment space (the textbook presentation of the labor supply), where the level of employment is determined by habits, norms, standard hours, and historical trends. In the nominal-wage employment space, Keynes' labor supply function is horizontal at the current nominal wage, to the left of the current employment, and probably upward sloping, to the right of actual employment. This is in contrast to the neoclassical model, where the labor supply is the result of the optimization, where the real wage equals the marginal disutility of work or the marginal utility of leisure.

A decline in the real-wage (due to inflation) would lead to a change in the labor supply. The direction of the change is undetermined, because the income and the substitution effect operate in reverse directions: lower (higher) real-wage rates will lead to less (more) demand for leisure. At the same time, they raise (dampen) the demand for leisure, because the opportunity costs of leisure decline (increase). The

net effect depends on the relative strength of the two reverse effects. Keynes denied that the labor supply follows such an optimization process. Indeed, the labor supply varying with the real wages cannot be observed.

While workers resist nominal wage reductions, the effect of rising nominal wages remains open. As discussed previously, rising nominal wage profiles can be observed and seem to be preferred. They also appear to affect job satisfaction positively. Clark (1999) found evidence for a high significant correlation between job satisfaction and wage increases, but only an insignificant relationship with the current level of income.

Freeman (1978) found that job-satisfaction reduces, in addition to monetary variables workers quitting. Labor contracts are stipulated in nominal terms and seem to serve as a reference point. Testing whether the “perfect market” hypothesis holds that wages are paid according to marginal productivity, Krueger and Summers (1988) regressed individual wages on personal characteristics (e.g., education, experience), job characteristics (occupations) and industries. The latter should be insignificant under the perfect market hypothesis, but it is not.

Industries pay significantly different wages controlled for personal and jobs characteristics. More specifically, “standardized” workers receive different wages, depending on the industry. The authors interpret their result as a contradiction of the marginal productivity theory of wages and a clear hint that the “fair wage” hypothesis may hold. According to this hypothesis, firms with high profitability share their rents with their workforce.⁴⁴ Therefore, there may be “good” jobs and “bad” jobs. Indeed, workers are queuing for higher paying jobs (Thurow 1975), i.e., individual firms may

⁴⁴ Persistent inter-industry differences in profitability require so-called imperfections in product markets.

face an upward sloping labor supply function (Manning 2003). In addition, the number of people that quit their jobs is significantly lower in higher paying industries (Schettkat 1993). This is another reason why firms pay “efficiency wages” (Schlicht 1978).

5. Decisions Under Uncertainty: *Animal Spirits*

Is the future certain, risky or uncertain? Optimization under certainty and risk⁴⁵ is solvable. A large part of the economics literature limits itself to these situations (Keynes 1937: 212/213) in the past and in the present. But even with these limitations, *rational choice* may be difficult, if not impossible. Herbert Simon (1986) emphasized the external and internal constraints for *rational choice*, arguing that rationality is bounded. It is impossible to gather information on all alternative choices (external constraint) and it would be impossible to process that information (internal constraint).

“In situations that are complex and in which information is very incomplete (i.e., virtually all real world situations), the behavioral theories deny that there is any magic for producing behavior even approximating an objective maximization of profits or utilities” (Simon 1986: 39).⁴⁶ Under risk, the probability distribution is known and expected values can be computed. This is the basis for Savage’s SEU,⁴⁷ although some math is required.⁴⁸

Steady states (or even a static state) is the basis for *rational expectations*, in the Lucas sense, who deliberately limits economics to equilibrium (Winter 1986). This involves reducing economics to a stochastic version of perfect foresight (Arrow 1986). The economy is like the game of roulette. The number of the next draw is unknown, but the probability distribution is known. This allows for the computation of

⁴⁵ “.. regard certainty as a special case of probability, as being, in fact, the *maximum probability*.” (Keynes 1921: 15)

⁴⁶ Simon (1986) mentions that the “optimum” of the actual outcomes is an assertion that has not been shown.

⁴⁷ SEU-maximization requires knowledge and ranking of the utility ascribed to the various choices and *homo oeconomicus* to perceive the environment as it really is (i.e., no misperception). Kahneman (2011) illustrates misperceptions with numerous examples.

⁴⁸ Individuals may ascribe a certain probability to events, but in an open dynamic environment, these are bets (Dow 2012).

the expected values. Keynes' concept of uncertainty⁴⁹, especially relevant for investment decisions concerning a longer time horizon, refers to situations where no probability is known and cannot be known.⁵⁰ More specifically, "we simply do not know" the long-run price or interest trends (Keynes 1937: 214).⁵¹

What is the basis for the decisions under uncertainty, when the probability distribution of events is unknown and when complex interactions occur in a dynamic economy which cannot be foreseen? Today, neoclassical economics (as so-called new-Keynesian economics)⁵² simply builds models for situations of risk and ignores uncertainty, as was common when Keynes was writing (Keynes 1937: 212/213).⁵³

Academic economists can ignore uncertainty and construct theories for an assumed certain or risky world (Arthur 1994b). But how can entrepreneurs make decisions in the real world, where uncertainty cannot be ignored? All decisions are future-oriented, and thus, depend on expectations. Time is important in the *GT*, because there is always a time lag between the decision to produce (and invest) and final demand. The entrepreneur has to form the best expectations upon which business decisions depend.

"Cold calculations" cannot bring decisions about. This is because "Business men play a mixed game of skill and chance, the average results of which to the players are not

⁴⁹ Whether Keynes' concept of uncertainty and '*animal spirits*' was already inherent in his "Treaties on Probability" (Keynes 1921), or whether he developed it later, is debated. Pasinetti (2007) claims that Keynes was stimulated by discussions with his young fellows (i.e., Richard Kahn, Joan Robinson) to regard uncertainty as most relevant.

Barnett (2017) argues that Keynes' view of 'human nature' changed from the traditional view to including emotions and conventional wisdom.

⁵⁰ Some authors distinguish between true, immeasurable or fundamental uncertainty, where probabilities cannot be known, while uncertainty is where probabilities can be known in principle, but are unknown for the decider (Dow 2012).

⁵¹ See also Knight (1921).

⁵² See Greenwald/Stiglitz (1993).

⁵³ Nelson/Winter (1982) mentions that several AER presidents and other professional organizations have complained that "traditional" microeconomics cannot handle uncertainty, or bounded rationality (page 4 footnote 1).

known by those who take a hand. If human nature felt no temptation to take a chance, no satisfaction (profit apart) in constructing a factory, a railway, a mine or a farm, there might not be much investment merely as a result of cold calculation” (*GT*: 150). Expectations affect the aggregate demand in the economy, and therefore, “... a mere change in expectation is capable of producing an oscillation of the same kind of shape as a cyclical movement, in the course of working itself out” (*GT*: 49).

Keynes distinguishes between the two types of expectations:

Type 1 (short-term): “... the price which a manufacturer can expect to get for his ‘finished’ output at the time when he commits himself to starting the process which will produce it ...” (*GT* 46).

Type 2 (long-term): “... what the entrepreneur can hope to earn in the shape of future returns if he purchases output in addition to his capital equipment (*GT*: 47).

Decisions based on short-term expectations are frequent and may be classified as routines.⁵⁴ Although sales expectations in the next period are affected by uncertainty, the confidence in the entrepreneur’s expectations is higher than in the long-term, when major investments need to be made. For decisions affecting the long-term, confidence in the expected trends will be more insecure and the reasoning will be more elaborate although uncertainty will remain. It cannot be eliminated.

Keynes’ argued that expectations made on future investments are uncertain, rather than risky, due to an “extreme precariousness of the basis of knowledge” (*GT*: 149).

⁵⁴ “It is that most of what is regular and predictable about business behavior is plausibly subsumed under the heading “routine”, especially if understand that term to include the relatively constant dispositions and strategic heuristics that shape the approach of a firm to the non-routine problems it faces” (Nelson/Winter 1982:15).

Keynes' reasoning may relate to Kahneman's 'maps of bounded rationality'. Keynes' Type 1 expectations may fit the System 1 decision of Kahneman, which are characterized as fast, parallel, and automatic. Keynes' Type 2 expectations may fit the System 2 decisions of Kahneman, which are serial and require more efforts.

Maps of Bounded Rationality: A Perspective on Intuitive Judgment and Choice

Perception	Intuition System 1	Reasoning System 2
	Fast, parallel, automatic Effortless, associative, slow-learning	Slow Serial, controlled, effortful, rule-governed Flexible
	Short-term	Long-term

Source: upper part: Kahneman (2002:451) Prize Lecture, Maps of Bounded Rationality: A perspective on Intuitive Judgment and Choice.

If knowledge under uncertainty is always incomplete and investment decisions need to be made in the real world, some other decision rule must be applied.⁵⁵ Keynes labeled this *animal spirits* in the *GT*, indicating a necessity to action, without being able to calculate the outcomes of all of the options. "Most, probably, of our decisions to do something positive, the full consequences of which will be drawn out over many days to come, can only be taken as a result of *animal spirits* -of the spontaneous urge to action rather than inaction, and not as the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities" (*GT*: 161)⁵⁶.

⁵⁵ "... a spontaneous urge to action rather than inaction ..." (*GT*: 161).

⁵⁶ Keynes adds: (*GT*:161, 162) "We should not conclude from this that everything depends on waves of irrational psychology. On the contrary, the state of long-term expectation is often steady, and, even when it is not, the other factors exert their compensating effects" (*GT*: 162).

People rely on a limited number of heuristic principles which reduce the complex tasks of assessing probabilities and predicting values to simpler judgmental operations (Kahnemann 2002:465). There are three heuristics of judgment: representativeness, availability and anchoring (Kahnemann 2002:465). Accepting emotional factors influencing decisions macroeconomic phenomena (e.g., instability) or self-enforcing the ups and downs, or the “rollercoaster ride” of the economy (Akerlof/Shiller 2009: 1), is based on the microeconomic effects self-inferring each other.⁵⁷

Keynes’ short-cut for emotions and moods finally affecting decisions is *animal spirits*. These *animal spirits* are the basis for economic decisions under uncertainty. Moods, optimism or pessimism, lead to the final pros or cons, for the final “push” to decide, because, under uncertainty, no decisions can otherwise be made. “Thus if the *animal spirits* are dimmed and the spontaneous optimism falters, leaving us to depend on nothing but a mathematical expectation, enterprise will fade and die;- though fears of loss may have a basis no more reasonable than hopes of profit had before” (GT: 162).

Regarding the maximizing *homo economicus* as the reference for rationality, many economists refer to other concepts of decisions as “irrational”.⁵⁸ *Animal spirits*, however, are not irrational, in the sense that decisions are just based on moods. They are the only option necessary to make a decision in an uncertain situation. An assumption is made that “rational” decisions under uncertainty are ignorant or

⁵⁷ For positive feedback effects, see Arthur (1994), Young (1928).

⁵⁸ Giegerenzer (2001a) argues that “rational” theories are based on optimization, whereas “nonrational” theories are not. That being said, “nonrational” theories should not be confused with the theories of “irrational” decision making (Giegerenzer 2001a, 2001b, Chase/Hertwig/Giegerenzer 1998). Even if an optimizing strategy exists, it requires an unrealistic amount of knowledge about the alternatives and consequences. In other words, rational optimizing behavior is a theoretical construct, not a description of the real world. “Indeed, nonrational theories are concerned with psychological plausibility, that is, the capacities and limitations of actual humans, whereas rational theories have little concern for descriptive validity and tend to assume omniscience” (Giegerenzer 2001a: 3).

“irrational”. Instead, conventions and heuristics need to be applied. Actually the work of the neurologist Damásio (1994) shows that without emotions, without *animal spirits*, people are unable to decide. They will continuously collect information and evaluate alternatives but will hesitate to decide.

Akerlof and Shiller (2009) used *animal spirits* broadly in comprising all “irrational” behavior or *non-rational expectations*.⁵⁹ It is difficult to think about economic decisions, which are not *non-rational*, since the conditions for rational decisions of full information and calculable risks are hardly ever fulfilled.⁶⁰ However, uncertainty in the unpredictable future affects all decisions. This is a major distinction between Keynes’ theory and *animal spirits*. It is just the short-cut Keynes used to emphasize the importance of emotions, intuition, feelings, and moods. Without these, decisions cannot be made.

Expectations are the basis for endogenous instability in Keynes’ theory. Dow and Dow (2009) emphasize the importance of *animal spirits* for Keynes’ economics. They cite Robinson (1973: 3) “... the (Keynesian) revolution lay in the change from the principle of rational choice to the problems of decisions based on guesswork and convention.”⁶¹

The late Minsky (1977, 1992), who gained great respect among economists after the “Great Recession,” always emphasized over-optimism for hypes in financial markets, which became known as the “Minsky moment”.⁶² “Even apart from the instability due to speculation, there is the instability due to the characteristic of human nature that a

⁵⁹ Barends (2011) mentions, in his “skeptical remarks,” that in the Akerlof/Shiller book, the authors may overemphasize *animal spirits* when they want to build a new economics on this concept. Barends states that *animal spirits* only appear three times in the *GT*, all on one or two pages. Jefferson and King (2010, 2018), however, find *animal spirits* to appear only twice in the *GT*. To the best of our knowledge, we find Barends to be right.

⁶⁰ Arrow (1978) emphasizes the missing future markets for almost all products.

⁶¹ Marglin (2018) argues that the Keynesian revolution was methodological.

⁶² Kindleberger (1978) presents an early recognition of Minsky’s theory.

large proportion of our positive activities depend on spontaneous optimism rather than on a mathematical expectation, whether moral or hedonistic or economic" (*GT*: 161). Keynes adds: "Enterprise only pretends to itself to be mainly actuated by the statements in its own prospectus, however candid and sincere" (*GT*: 161 f.). Keynes emphasizes conventional behavior (a routine, a heuristic) as an important decision rule under uncertainty. Conventional behavior or conventional method of calculation assumes "that the existing state of affairs will continue indefinitely, except in so far as we have specific reason to expect a change" (*GT*: 152). Thus, Keynes recognized that past experience and knowledge, habit formation, plays a key role current decisions.

6. The Economy in Which We Live

“All theory depends on assumptions which are not quite true. That is what makes it theory” (Solow 1956: 65). Theory should be glasses enabling to better understand the overly complex economy. But does theory based on false assumptions help people to better understand reality or is it rather impeding a better understanding? Does it work as blinders⁶³? Keynes is pretty clear on the requirements of economic theory: “... *the economic society in which we live* ...” (GT: 372) is with variation, a recurring phrase in the GT⁶⁴. Theory has to relate to the real world and an overly restrictive theory may misguide politics.

Keynes regards economics as a real science in which the criterion for truth is deduced from assumptions that are not in conflict with reality (Kornai 1971). This is in contrast to mathematical, logical science, in which the truth is established through formal deductions from axioms, which are not necessarily related to reality. Commenting on (neo-) classical theory, Keynes wrote: “The beauty and the simplicity of such a theory are so great that it is easy to forget that it follows not from the actual facts, but from an incomplete hypothesis introduced for the sake of simplicity” (Keynes 1926: 32). He emphasizes the axioms of (neo-) classical theory, rather than the internal consistence that is problematic: “For if orthodox economics is at fault, the error is to be found not in the superstructure, which has been erected with great care for logical consistency, but in the lack of clearness and of generality in the premisses” (GT: XXI).

⁶³ “Labor market institutions without blinders” titled one analysis (Freeman 2005).

⁶⁴ E.g., “...*the economic society in which we actually live*,” (GT: 3), “... *misunderstanding of how in this respect the economy in which we live actually works*” (GT: 13), “...*the kind of system in which we actually live*.” (GT: 247), “... *the economic system in which we live*” (GT: 249), “... *the world in which live*.”(GT: 250).

This is the fundamental methodological approach Keynes shares with behavioral economics, which intends to increase “the realism of the psychological underpinning of economic analysis will improve the field of economics on its own terms – generating theoretical insights, making better predictions of field phenomena, and suggesting better policy” (Camerer/Loewenstein 2002: 3). Camerer and Loewenstein continue that the previous statement does imply a “... wholesale rejection of the neoclassical approach to economics based on utility maximization, equilibrium, and efficiency” (Camerer/Loewenstein 2002: 3).

Behavioral economics frees the motivation of humans from the overly restrictive behavioral assumption of *homo oeconomicus*. It may also serve as the seeds of a scientific revolution in the Kuhnian sense (Kuhn 1970).⁶⁵ These seeds, for a broader more realistic motivation of human behavior overcoming the very restrictive assumption of *homo oeconomicus*, were already underlying Keynes’ micro. However, they were reframed in the neoclassical synthesis.

Keynes’ theory is more general than (neo-) classical economics, because it allows for other equilibria than the optimum, the full-employment equilibrium. It is also more general than (neo-) classical economics, because does not limit the motivation of economic agents, to the selfish *homo oeconomicus*. The behavior of the socially isolated, self-interested maximizing *homo oeconomicus* is a very special case, as is the full-employment assumption. Keynes’ socially embedded individuals caring about fairness, hierarchy, income distribution, and demonstrative consumption is important

⁶⁵ For a discussion of whether behavioral economics is an extension or an alternative to the neoclassical approach, whether it is “Revision or Revolution” see Schettkat (2018)

for the *economic society we live in* where uncertainty rather than risk dominates and where consequently future events cannot be fully calculated.

The commonalities between Keynes' and behavioral economics may be summarized in the following overview. At the same time the topics listed are distinguishing the Keynes' theories and behavioral economics sharply from the neoclassical model.

Overview: The Commonalities Between Keynes and Behavioral Economics

Socially Imbedded Individuals, Social Status Relevant, Fairness Important
Interdependent Utility Functions, Broad Motivation, Imperfect Self-Control
Expectations under Uncertainty (non-rational), Heuristics, Routines, Context, Mental State, <i>Animal Spirits</i>
Preferences Dynamic Depend on Reference Points, Groups, History, Habits
Limited Computational and Information Handling Ability
Optimization Impossible
Historical Time, Sequences Important
Inductive Methodology, Descriptive to <i>the World We Live In</i>

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