



Department of Economics and Finance

Chair of Principles of Economics

**Historical development of the Rationality Paradigm in Micro and
Macroeconomics: the Case of Wage Rigidities**

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To my grandparents and my family,
who taught me that to climb a mountain
you should only look at your feet.

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The Italian philosopher Galileo Galilei said that the laws of Nature are written in mathematical terms. Triangles, circles and other geometrical figures are the language in which the book called “universe” is written. Enough for natural phenomena then. But what is the language in which the laws of human behavior are written? For a long time Economics relied on the use of a rational representative agent, which enabled the interpretation of economic phenomena in terms of mathematical utility maximization. This necessary abstraction relies on a specific characteristic: rationality. This thesis will analyze its role in economics.

In order to do this, we will first trace the development of this paradigm by comparing modern mainstream economics with early neoclassical one. This comparison will highlight a major methodological shift, whose starting point is identified with Pareto’s theory of logical action and the separation of psychology from economics.

Having identified the formation of the rationality framework, we will ask what repercussions did it have on macroeconomic theory. To answer to this question the microfoundation of Keynesian theory will be analyzed and the Phillips curve will be presented as a particular case, in which the introduction of the homo economicus as representative agent transformed the interpretation and the policy implications.

It will be argued that the phenomenon of wage rigidities, which is central in the interpretation of the Phillips curve, confirms the need for more solid microfoundations that take into account the concern for fairness and the actual cognitive capabilities of individuals. Behavioral Economics can offer some insights on the dynamics of wage determination, which should be transferred to macroeconomic theory in order to improve its descriptive capacity. In conclusion, McDonald’s (2009) model for the Phillips curve will be proposed as an example of such integration of Behavioral Economics’ observations with macroeconomic theory.

The understanding of the limitations of the rationality paradigm is important on theoretical grounds, as it can foster the development of more elaborate theories, but plays a fundamental role also in economic policy as the use of unrealistic assumptions might lead to suboptimal solution to concrete economic problems.

Chapter One: A Brief History of Rationality

*“A man of realities. A man of facts and calculations.
A man who proceeds upon the principle that two and two are four, and
nothing over, and who is not to be talked into allowing for anything over.”*

(Charles Dickens, *Hard Times*, 1854)

Among the vast class of subjects labeled as social sciences, Economics is one of the youngest if we consider the XVIII century as a satisfying reference point for its foundation. Nevertheless, economics has experienced more radical changes than other fields of study. If we also consider the fact that most economic writers (or at least the most influential) developed their theories in times where printing technology had already been discovered, making the spread of ideas over time relatively easy, we can appreciate how the comparison among different school of thought is both accessible and fruitful. The juxtaposition of different thoughts throughout the centuries highlights not only the development of the subject but also the change in methodology, to which -in the author’s opinion- economics is highly susceptible.

The aim of this first chapter is precisely to underline and analyze the radical methodological changes economics went through from the end of the XIX century, dominated by the neoclassical approach, until present day mainstream thought.

We will first describe in general terms the characteristics of modern mainstream economics. The approach of the early neoclassical will then be presented and a comparison of the two will be proposed. The historical juxtaposition will highlight a major change in the method of science, which we claim has been caused by Pareto’s economic thought. A critique to this method will follow and its legacy on future economic theory is then presented. The last part will analyze the rise of behavioral economics as a reaction to the mainstream rationality paradigm.

Taking for granted that an exhaustive description of each scholar’s approach to the subject of the last 130 years would go far beyond the scope of this thesis and

the capabilities of the author, I shall focus on those economists or those school of thought that changed the method of interpreting and enquiring the economic phenomena.

In order to better appreciate this difference, it might be useful to start from a general description of how the economic world is interpreted nowadays.

I. Overview of Today's Mainstream Economics

Every undergraduate student is familiar with the idea that rationality is the standard assumption imposed on the representative agent of most models.

According to the Nobel Prize winner Joseph Stiglitz, rationality implies:

“...that people weigh the costs and benefits of each possibility. This assumption is based on the expectation that individuals and firms will act in a consistent manner, with a reasonably well-defined notion of what they like and what their objectives are, and with a reasonable understanding of how to attain those objectives.” (Striglitz, 2003 as in McAuley, 2010)

In economic terminology rationality implies that preferences of individuals are complete, reflexive and transitive. As we shall see later, this specific microeconomic formulation comes from the pioneering works of many different scholars of the last century and had a major impact in the way research is conducted. The legacy of this assumption can be seen in many sub-fields of economics: the traditional macroeconomic equilibrium models, the relatively recent studies of game theory, law and economics and finance all share the same faith in the cognitive capabilities of the Homo Economicus, which is depicted as a heartless utility maximizer.

Even though the use of such representative agent has not been blindly adopted and the restrictions imposed by it are clear to all, there is (still today, but mostly during the 80ies and 90ies) widespread consensus that models built on those assumptions can yield convincing results. The “as if” hypothesis formulated by

Friedman (1953) can be seen as theoretically appealing justification for the adoption of the rationality assumption. The Nobel Laureate claimed

“(...) that the large majority of individuals in economic institutions behave according to the fully rational strategies formulated by expected utility theory, even if they do not possess the necessary calculation abilities.”
(in Egidi, 2002)

This hypothesis relied on the idea that competition would induce agents to behave according to the most rational behavior, whereas those that deviate from the optimal strategy are driven out of the market. Individuals are thus assumed to behave as if rational.

Although it would be inaccurate to generalize in such a way the immense body of economic theory of the last decades, given that the debate over rationality had already been deepened as early as 1960 with Simon and March (1958), we can still claim that the mainstream view and the teaching of economics follows the rationality paradigm. Indeed many attempts to challenge this methodological status quo (like Simon’s theory of bounded rationality or Kahneman and Twersky’s behavioral approach), though valid and insightful, did not change the track followed by mainstream economics.

The source of the supremacy of this paradigm perhaps lies in the fact that it enlarged the domain of economics to more and more real world situations and represents a theoretically appealing abstraction against the complexity of discovering how individuals make decision and form preferences. Of course, it offered some good explanation and solution to important public issues and it immensely enlarged our understanding of the economic world.

Even though the microeconomic framework, which comprises the assumption of rationality and description of preferences, is the cultural inheritance of the neoclassical and marginalist revolution, it is hard to argue that the method of enquiry of the economic science did not change since then.

II. The Neoclassical Approach

If a neoclassical economist of the XIX century could read today's works, it would for sure be quite surprised to see how economic phenomena are analyzed. The certainty with which we model agents' behavior and ascribe them certain preferences without any test of some sort would probably raise the eyebrows of scholars like Edgeworth and Pantaleoni. The early neoclassical were concerned with the definition of the determinants of price, but saw the limits of classical analysis, which narrowly focused on the supply side and instead proposed the concept of utility as the main driver of individual consumption choices and consequently of relative prices. In his "*Theory of Political Economy*" Jevons wrote:

"Repeated reflection and inquiry have led me to somewhat novel opinion, that value depends entirely upon utility." (Jevons, 1871)

Unlike the classical school of thought, which used the concrete deductive method to formulate theories, the neoclassical paradigm was influenced by positivism, which translated into a common belief that a unit of measure for pain and pleasure could be found by applying psychological laws.

From the measurability of sensation to the interpretation of choice (and therefore of prices) the step is close. Given that for the early neoclassical writers agents were rational utility maximizers driven by self-interest, it sufficed to understand their utility functions from empirical estimation and a theory of price could be formulated. The important step to be noted here is of course the measurability of sensations. To a present day reader any attempt to quantify in a scientific way the idea of utility may seem like a pointless exercise or, at best, a declaration of blind positivistic faith. For Edgeworth the quest for such connection between the abstract concept of utility and individual sensations was the *sine qua non* of economic theory.

The role of psychology in the neoclassical analysis can better explain this point. As Bruni and Sugden (2007) explain, during the last decades of the XIX century, when Edgeworth, Jevons and Pantaleoni were publishing their works, the boundary between economics and psychology was anything but clear. Psychology was concerned with the analysis of mental processes and sensorial stimuli,

economics instead tried to deduce general laws of individuals' behavior and choice in order to find how to optimally allocate resources. For the scholars of the time, those questions were two sides of the same coin. Fechner's research program of psychophysics, as defined by "the scientific study of the relation between stimulus and sensation" (Gescheider, 1997), can be seen as the closest connection between the two social sciences.

As a matter of fact, Edgeworth grounded his analysis of marginal utility on the evidence from psychophysics. As Bruni and Sugden (2007) explained, in his work "*Mathematical Psychics*", whose title already winks at Fechner's work, the English economist proposes two explanations to the diminishing sensitivity to stimuli, which was one of the main topic to be analyzed in the building of microeconomics. The first explanation followed the neoclassical idea of diminishing marginal utility. The second instead is grounded on the evidence from psychophysics and states that the utility function shifts according to previous consumption experience (Edgeworth, 1881). As Bruni and Sugden (*ibidem*) notice, this second formulation anticipates the famous behavioral economics work of Kahneman and Twersky (1991) on individual preferences being reference-dependent.

As additional evidence of the dependency of Edgeworth's utility theory on experimental psychology, we can see how the axiom that pleasures are commensurable is justified citing Wundt, one of the founding fathers of Psychology:

"Wundt has shown that sensuous pleasures may thereby be measured, and, as utilitarians hold, all pleasure are commensurable ... and the rate of increase of pleasure decreases as its means increase » (Edgeworth, 1881 p.60, 61)

The neoclassical certainty in the feasibility of the research program initiated by Fechner, allowed them to further deepen their analysis of utility and postulate its cardinal measurability and its interpersonal comparability, which are the conditions allowing modern microeconomic analysis to exist.

III. A Historical Comparison

At first glance it seems like the approach of the neoclassical school was the same as the one today's mainstream economics adopts. After all, the assumptions of rationality, self-interest and the description of utility and preferences are a common denominator (more precisely, these concepts were first formulated by the neoclassical economist and adopted by future economists). However, there is a fundamental difference in the two approaches. Friedman's assumption that "economic behavior is clustered in a reasonably tight Gaussian distribution around a "rational" mean" (McAuley, 2010) (the "as if" hypothesis") is opposite to the positivistic approach of the neoclassical school. For Edgeworth, Menger, Jevons and Walras there was no need to justify the characteristics of the representative individual on statistical basis, because they assumed that individual introspection was a reliable source of data from which a measurement of utility -and consequently of preference- could be deduced. The psychological analysis of individual mental processes was in tight connection with economic theory, because it proposed a method to test those regularities in human behavior, from which fundamental laws could be inferred.

A new question therefore arises: what caused this change in methodology and the complete separation between psychology and economics?

IV. The Paretian Turn

According to Bruni and Sugden (*ibidem*) the abandonment of the research program of psychophysics, or better, the progressive dismissal on the part of economics of psychological explanation of mental phenomena was first advocated by the economist Vilfredo Pareto. He believed that the fundamental laws governing the distribution of resources were to be found in the observation of choices, rather than the estimation of sensations. In his view, Economics had to become the science of logical actions. In order to do this, the concept of indifference was introduced:

“[T]his entire theory . . . rests on no more than a fact of experience, that is, on the determination of the quantities of goods which constitute

combinations between which the individual is indifferent. The theory of economic science thus acquires the rigor of rational mechanics; it deduces its results from experience, without bringing in any metaphysical entity.” (Pareto, 1909)

In other words, by observing the quantities of bundles of goods, which make the individual indifferent in his preference, economics can understand the decision made by individuals.

It should therefore be noted that this indifference between bundles rests on the hypothesis that the action taken are logical. For Pareto it meant that actions are “the result of valid instrumental reasoning from objectively true premises” (Bruni and Sugden, 2007). Moreover, they have to be repeated over time so that “subjective facts conform to objective facts” (Pareto, 1909). This argument sounds extremely similar to that of Friedman and it is indeed so. Both describe a similar dynamics: Friedman intended that agents learn what the optimal behavior is through continuous repetition; Pareto postulated that individuals align their preferences (“subjective facts”) to how the world really is (“objective facts”) thanks to the same mechanism. In addition, logical actions (buying and selling) are performed in order to satisfy those preferences that conform to reality and take the form of an “ordering over the relevant set of end states” (Bruni and Montesano, 2009).

The implication of this narrow definition of the dynamics of choice was that the reliance on psychological laws was not a concern anymore. Given the observation of indifference between goods and the assumption of instrumental rationality, all that was needed was the right formalization in mathematical terms.

To conclude, the Paretian turn changed the path of economic analysis for many years to come by “freeing” economics from psychological analysis. What was at the time the state of the art of psychological studies was removed from economics, giving birth to the Rational Choice Theory of the thirties (more on the Paretian legacy later).

Having briefly outlined the discontinuous trajectory of economic analysis from the neoclassical period, it is now possible to enter into the details of the critique to the Paretian methodology and its legacy on modern economic thought.

V. Logical Action and Pareto's Legacy: a Critique

The first methodological problem one encounters in Pareto's argument lies in the specification that logical actions (the object of economic enquiry) are directed toward the satisfaction of tastes, which take the form of a series of cardinally-ordered end states. The fact that through repetition the individual can align subjective facts with objective ones, does not imply that he/she will be able to form preferences according to some fixed rule (Bruni and Sugden, 2007). Indeed, agents compare different sensations using the same preferences only if they do this using the same objective unit of measurement (pleasure or pain). However, this unit corresponds to the "metaphysical entity" Pareto intended eliminate from economics.

In economic terms this is called the integrability problem and it involves the demonstration that the choices

"an individual makes between combinations of goods differing by infinitesimal amounts [will] be consistent with the choices he makes between combinations differing by finite amounts. For example, the individual starts with the combination 100X1, 100X2, 100X3. By infinitesimal steps we obtain an infinite number of combinations, each equivalent to the preceding, reaching ultimately the combination 90X1, 85X2, 120X3. Will the individual consider this last combination equivalent to the first?»

(Stigler 1950 [1965], pp. 122-123).

The integrability problem undermines the consistency of consumer preferences, which is a fundamental feature of the theory. Instead, for an economists who believed in the hedonistic approach of the neoclassical this was not an issue, since the measurement of utility ensured comparability across commodities.

A second deficiency in the Paretian framework stems from the restriction of economic analysis to only those actions which are directed towards the satisfaction of tastes. Since only choices are observable there is no assurance that they are grounded on preferences and not on norms, for instance. In principle, it is therefore impossible to "identify the situations to which the theory applies, prior to observing

the behavior that it is intended to predict “ (Bruni and Sugden, 2007).

Note -as before- that this was not a problem for the neoclassical as Edgeworth, because they believed utility could be measured so that it was possible to distinguish between economic and non-economic acts.

These shortcomings were clear to Pareto, who tried to solve them for a long time, but were swept under the carpet by those economists, who re-proposed Pareto’s theory in the thirties as the backbone of Rational Choice Theory. According to Hicks the integrability problem “fascinates mathematicians, but it does not seem to have any economic importance at all” (Hicks, 1939 [1946], p. 19, footnote 1). Samuelson too considered this problem unimportant, because he saw it from the pure mathematical perspective and not as a methodological fallacy (Samuelson, 1950).

It should be noted that Hicks and Samuelson’s works are highly dependent on Pareto’s framework and can be considered a radicalization of his theory of logical action. As a matter of fact, Hicks was –together with Allen– a leading exponent of the ordinalist revolution, “which replaced traditional utilitarianism with the modern consumer theory” (Bruni, 2010). Samuelson from his part further developed Hicks work and formulated the revealed preference approach.

What those economists failed to recognize is that Pareto’s method implied a major restriction of the phenomena that can be analyzed by economics. He recognized two main components of action, namely a logical and a non-logical one. The former -being based on instrumental reasoning- was to be analyzed by economics, whereas the latter pertained to sociology. As he himself specifies, the theory applies “to many logical, repeated actions which men perform to procure the things which satisfy their tastes “ (Pareto, 1971 [1906], III, § 1).

In spite this fundamental distinction, his followers translated his message as an enlargement of the field of study:

“The methodological implications of [the new] conception of utility . . . are far- reaching indeed. By transforming the subjective theory of value into a general logic of choice, they extend its applicability over wide fields of human conduct.”

(Hicks and Allen 1934, p. 45).

This statement sheds some light on the path of economics thought. Today's mainstream view based on the rational Homo Economicus is rooted in Pareto's framework, but the theory of the Italian economist has been pushed beyond its field of applicability. Pareto opened a sort of Pandora box of rationality, which gave the impression that economics could actually acquire the same predictive power and status of other natural sciences. This way the "rationality mantra" was created.

Going back to Hicks and Samuelson, the legacy of the Paretian turn can be seen in the economic analysis of the thirties. His idea of eliminating psychology from economics was pushed forward by ordinalism and revealed preference theory. The former, of which Hicks was a major exponent, radicalized Pareto's insight on indifference curve stating that utility maximization was an unnecessary concept. People simply had a preference scale over different combination of goods. Hicks took Marshall's theory of consumer behavior, the mainstream at the time, and substituted its dependence on utility with indifference. Their contribution to economic theory can thus be seen in the specific definition of indifference curves and budget constraints. Samuelson, on his part, took Hicks' conclusion one step further and set the goal of making the axioms of indifference curve theory operational, which means confirming or disproving them by using experiments. He realized –however– that those choice experiments were not "feasible in the sense of being observable in a market environment" (Mas-Colell, 1995). His solution was then to impose preference rationality on the observed choices. Revealed Preference Theory was therefore formulated as a way of eliminating the estimation of utility functions, which was considered scientifically unsound.

VI. The Advent of Behavioral Economics

The rationality paradigm, which stem from Pareto's approach, insulated economics from other social sciences for most of the XX century. The neoclassical method and their positivistic faith in the measurability of utility through psychological analysis could have led to some absurd results, but -apart from being theoretically sound- it represented a positive example of multidisciplinary analysis.

This is what Bruni and Sugden (2007) call “the road not taken”, namely the chance of conducting economic research in parallel with psychological one.

It is hard to infer what we have missed from the separation of psychology from economics, but some of the dynamics of preference developed by the early neoclassical have a strong connection to the BE literature developed during the seventies. As noted before, in 1881 Edgeworth had already noticed that utility function shifts according to previous consumption experience, which is a good approximation of Kahneman and Twersky’s idea that preferences are reference dependent (Kahneman and Twersky, 1979).

It might be argued that the methodological imperialism of rational choice theory could have triggered the formation of behavioral economics analysis. In the last quarter of the XX century increased dissatisfaction with the indiscriminate application of rational choice theory and its strictness, fueled the creation of a new scientific enterprise. Together with this skepticism toward mainstream orthodoxy, the normative use of expected utility and discounted utility models helped the formation of behavioral economics, because their predictions were more easily testable, than the ones of general utility theory (Camerer, 2002).

From this point of view we can see that the rise of this new field is rooted on the use of experiments to confirm or falsify the economic theory using insights from psychology. Experiments are an essential tool to understand and isolate the different causes of a particular behavior and understand what does not conform to the standard economic theory.

The procedure proposed by Camerer (2002) explains this point. Firstly, normative theories like expected utility and the axioms of microeconomic preferences are identified. Secondly, the violations of these axioms are verified through experiment by minimizing the effect of alternative forces (e.g. transaction cost, information cost), from which the normative theory abstracts. Thirdly, these violations are used to construct models that generalizes the existing ones.

Using this procedure BE was able to explain or at least account for an increasing number of systematic inconsistencies. A brief summary is proposed here.

Preferences

As we have mentioned, the assumption of rationality comprises the idea that individual preferences are reference independent, not influenced by the formulation of the offer and that the elicitation of those preferences does not depend on the unit of measurement. All those assumptions were found to be not realistic and their systematic violations has been reported by Slovic (1995). "Framing effects" show that the way choices are presented to an individual often determine the preferences that are "revealed" (Camerer, 2002 /13). The "anchoring effect" and "endowment effect" disprove the idea of reference independence and are a key part of the prospect theory propose by Kahneman and Twersky (1979). The "endowment effect" is another important deviation analyzed by prospect theory that will be further analyzed in the following chapter. Overall, BE research found that the utility functions of individuals are not smooth as in microeconomic textbooks and suffer the influence of many external factors.

Preference over uncertain outcomes.

Expected utility theory assumes that people probabilistically weight the utilities of different outcomes in order to decide. This theory is based on the indifference axiom, which states that "if you are comparing two gambles, you should cancel events which lead to the same consequences with the same probability" (Camerer and Loewestein, 2004). A large number of studies has repeatedly contradicted this theory (Starner 2000 offers a precise summary) when outcomes probabilities are low or extremely high and behavioral economist have proposed the idea of non-linear cumulative probabilities to account for such phenomenon. Again, Kahnemnan and Twersky (1992) offered cumulative prospect theory as an explanation.

Bias in Judgment

The standard assumption is that even though information are not completely correct, individuals will process them in a rational way and update them following Bayesian rules. Experiments showed instead that people use heuristic mechanism to approach complex problems. This give rise to a series of systematic errors as: "the law of small numbers", memorable evidence over weighted, "base-rate neglect" and

confirmatory bias (Holden, 2004).

It is surprising how these findings wreak havoc the assumptions on preferences, expected utility and on the general maximization capacity of economic agents, which piled up after Pareto's definition of economics as a science of logical actions. Basically the whole microeconomic program of undergraduate students.

A final remark on the method of BE will help us understand its role in- and the difference with modern economic thought. BE, though dealing with more or less the same economic problems, is very different from standard economics, since it does not propose a unified theory of behavior, but rather tries to interpret different phenomena with different theories. Cartwright's metaphor can better synthesize the difference between the standard economist and the behavioral economist: the former conceives the economic law as a perfect pyramid, whereas the latter sees them as an incomplete patchwork (Cartwright, 1999, 9). Samuelson shared the same idea about a general theory. He wrote that his goal was to explain the implication for economic theory of this statement:

“The existence of analogies between central features of various theories implies the existence of a general theory which underlies the particular theories and unifies them with respect to those essential features.” (Samuelson, 1955/ 3)

This approach is in sharp contrast to standard economics, whose analysis –in principle- does not start from experiments but rather tries to deduce general laws of behavior from established regularities. The metaphor used by J. S. Mill exemplifies this point. The theory of ocean tides is a general law that comes from the theory of gravitation and as such it should leave out more complex interaction with the specific geographical characteristics (Mill, 1846). The method proposed here is for sure a valid one, since every social science needs some level of simplification in order to understand the different forces at play. Abstraction, which comes from the Latin word *abstrahere* to take away, involves the essential mental process of capturing the essence of a complex phenomenon. Through abstraction the abundance of details is reduced and what is left is considered the real object of science.

The Paretian turn and his legacy, however, imposed a degree of abstraction

on the description of human nature, which sometimes made it hard for the theory to reconcile with the facts. To this regard, Kreps notes that “a somewhat large leap of faith” is required to fill the gap between real behavior and the behavior based on the theory of choice (Kreps, 1988, 6). Moreover, it has not promoted the exchange of theories and data between different social sciences. The division of labor in the study of social sciences is only effective “if there is effective coordination, and all too often economist fail to conduct intellectual trade with those who have a comparative advantage in understanding individual human behavior” (Camerer and Loewenstein, 2004/ 42).

BE can therefore help us complete our descriptive capacity of human behavior and, in a sense, continue the “road not taken” because of the rationality imperialism, which followed the Paretian turn.

Chapter Two: Rationality and Aggregate Behavior

“Siccome però questa massa, avendo la maggior forza, la può dare a chi vuole, così ognuna delle due parti attive usa ogni arte per tirarla dalla sua, per impadronirsene: sono quasi due anime nemiche, che combattono per entrare in quel corpaccio, e farlo muovere.”

(Alessandro Manzoni, I Promessi Sposi, 1840)

What are the consequences of the assumption of individual rationality on the theory of aggregate economic behavior? How did the Paretian turn, described in the previous chapter, influence macroeconomics? These are the main questions we will try to answer in this chapter. In order to do this, we will first analyze Keynesian macroeconomic approach, explaining the source of its popularity and its methodological affinity with the behavioral economics analysis (Part I). The microfoundation of Keynesian theories will then be presented as an application to macroeconomics of the rationality paradigm, which stem from the Paretian turn. We then show that the introduction of a utility-maximizing agent in Keynes theory, together with the rational expectation assumption completely changed the results put forward by “The General Theory” and had major impact on the conduct of monetary policy as well as the role of government in the economy. Following Akerlof (2006) analysis, we will contest the validity of these propositions, which form the bulk of New Keynesian Economics and claim that broader microfoundations are needed (Part II). We will then focus on one specific implication of the microfoundation literature: the Phillips curve. We will see that in case wages are fixed, a tradeoff may arise between inflation and unemployment even in the long-run, contrary to natural rate theory (Part III).

I. Keynesian Macroeconomic Approach

In the history of economics thought, macroeconomics began to attract the curiosity of scholars at a relative late period. As we have seen, the most important questions for the Classical as well as Neoclassical pertained the domain of microeconomics. What determines the price of goods? What is the optimal distribution of income? Those were the main themes and focus of analysis until the end of the XIX century. To be fair, one of the earliest macroeconomist was Adam Smith, who focused on the question of growth and the forces of comparative advantage. But as soon as Ricardo joined the discussion, the attention was shifted toward income distribution and microeconomic theory. The neglect of macroeconomics perhaps stems from a series of assumptions on the economic forces, which hijacked any plan for further research. As Schumpeter explains, most classical economists “(...) were convinced that technological improvement and increase in capital would in the end fail to counteract the fateful law of decreasing returns” (Schumpeter, 1954 p.571). This meant, of course, that growth was conceived as a temporary phenomenon doomed to vanish as soon as those economic forces prevailed.

As far as business cycles theory is concerned, another problematic assumption stood in the way. Say’s Law, which became essential for Classical as well as Neoclassical economic thinking, expressed the idea that an economy untouched by government’s intervention would produce full utilization of resources and, consequently, full employment. Even though the economy has had ups and downs until the mercantilist period, this strong belief in the self-equilibrating forces of the market prevented any systematic attempt to explain those phenomena. The idea that in the long run the economy would provide full employment can best be appreciated in the works of Hayek, who interpreted business cycles as coordination failures. Overall, until 1890 mainstream “work on depressions and cycles had been peripheral and tangential” (Hansen, 1951 p.225).

A macroeconomic theme that many economists until the end of the XIX century largely analyzed was –instead– the determination of the level of prices. This is for sure a problem for macroeconomists and Marshall together with Fisher put a great deal of effort to solve it. But, again, the assumption of full employment was

the starting point, so that real income's dynamics were not explained.

Macroeconomics took a turn –certainly comparable to the Paretian one in microeconomics– as the Great Depression shook the foundations of capitalism in 1929 and the long queue of unemployed filled the streets of New York. The *laissez-faire* party was over. The Economic profession was all but prepared to answer to the question of how to pick up the pieces of that broken system, given the blind faith that was put in it and the kind of analysis carried out until that time. The work of John Mayard Keynes fitted extremely well in this social and cultural context. His theories gave a boost of energy to macroeconomic analysis and were quickly accepted by the profession for a number of reasons.

Firstly, Keynesian theories developed fiscal policy analysis advocating an active role of the government in “driving” the economy. By giving up the Marshallian assumption that real income was determined by non-monetary forces, Keynes built a model in which the level of income was controlled by aggregate demand, which in turn could be affected by monetary and fiscal policy. Both were thus conceived as the “steering wheel” to be used in order to maintain employment or decrease inflation. If the former problem occurred, the government should increase the deficit, if instead the latter phenomenon prevailed, the government should decrease the deficit (Lerner, 1975). Obviously this theory was politically palatable, as it offered a way out of the crises that was more attractive than the standard policy prescription of leaving the invisible hand do the job.

Secondly, Keynesian theory seemed to offer a good description of reality. As Coase wrote: “(...) its analysis in terms of the determinants of effective demand seemed to get to the essence of what was going on in the economic system”(Coase, 1994 p.21). Rather than being a theory drawn from abstract concepts and complicated mathematical calculations, it started from the plain description of the economic phenomena of the time. It was contextual and directly tackled the problems faced by the entire society.

Finally, the academic acceptance of the new macroeconomic theory was fostered by its relative simplicity, which made it easy to teach to most students. Samuelson's textbook, which had a major impact on the teaching of economics

included the Keynesian multiplier model. This of course created a good deal of confusion as Greenwald and Stiglitz (1987 p.119) explain:

“Keynesian economics created schizophrenia in the way that economics was taught: macroeconomic courses, in which students were introduced to Adam Smith's invisible hand and the fundamental theorems of welfare economics, were followed by macroeconomic courses, focusing on the failures of the market economy and the role of government in correcting them.”

Having analyzed the source of the success of Keynesian macroeconomics, it is now useful for our discussion to analyze the method of enquiry used by the English economists, as this will enable us to appreciate the difference with the neoclassical synthesis, which followed during the post-war period.

As already mentioned, Keynes' method of enquiry was not comparable to the one used by his predecessor. The models he developed were based on his “(...) knowledge of human nature and from the detailed facts of experience” (Keynes, 1936 p.96). His theories were contextual, since the assumptions on which they were based were deduced from actual behavior. For him it was reasonable, for instance, to assume that wages and prices were to some extent fixed, since that corresponded to the state of things at that time. He never justified this assumption, because his intention was to explain the relevant problem of unemployment (Landreth and Colander, 2002). Such an approach would have been unthinkable if he had developed analytic models as his predecessors. General equilibrium models, which played a fundamental role in neoclassical analysis, were indeed built in an institutional void (thus being non contextual) beginning with carefully stated assumption from whose interactions the conclusions would flow. Those assumptions are detached from reality, as the focus is on the logic of the system and the forces at play. Keynes' theories can therefore be called “realytic”, since the method used is somewhere between a realistic and an analytic approach (Landreth and Colander, 2002).

In this sense, his method is similar to the one used by behavioral economists as previously described. Since Keynes did not argue the rationality or irrationality of the motives which conducted to actual behavior, but rather adapts its models to

tackle specific problems taking into account such motivation, it is clear to see that the disillusionment toward the rationality paradigm is common to both school of thought.

In conclusion, it is reasonable to affirm that Keynesian theories were a revolution for macroeconomics and for economics in general. They challenged (quite effectively) the dominant view on the market equilibrium and fostered a prolific debate on this issue. However, the relationship with past microeconomic theory was still complicated, since the Keynesian analysis started from the "(...) interrelationships of the aggregates rather than developing these relationships from first principles" (Landreth and Colander, 2002 p.442). This gap between micro- and macroeconomic theory was eventually filled with the so-called microfoundation literature, which will be now analyzed.

II. Microfoundation of Macroeconomics: Rationality Strikes Back

Two popular quotes can be used as ideal benchmarks (though not precise) to trace the success and decline of Keynesian economics as was first formulated by its author. The first, written by Paul Samuelson in 1946 exemplifies the power of Keynes' theories and the shock they represented for macroeconomics. He wrote:

"The General Theory caught most economist under the age of thirty-five with the unexpected virulence of a disease first attacking and decimating an isolated tribe of South Sea Islanders." (Samuelson, 1946)

The second, by Milton Friedman was first incorrectly quoted in a famous "Time" article, which reported only the first part of the sentence. The Chicago economist stated in 1965:

"In one sense, we are all Keynesians now; in another, nobody is any longer a Keynesian." (Friedman, 1966)

Between these two symbolic quotes there are twenty years of Keynesian consensus, whose decline was nevertheless imminent for several reason. On the one hand Keynesian IS-LM analysis was constrained by comparative static analysis, but

the dynamics of prices and income adjustment was as important as the analysis of the end state. This shortcoming did not pass unnoticed in the economic profession. On the other hand, a major economic phenomenon started unsettling policymakers, namely inflation. In this case Keynesian analysis was not well suited to describe the role of monetary policy, since the consumption function used in the analysis in the fifties was highly simplistic and money did not play a central role in it¹. Moreover, the demand for money, which builds the LM curve, did not capture the prominent role of the financial sector and –of course– was not based on a general equilibrium model (Landreth and Colander, 2002).

By the seventies, when inflation was a two-digit concern and fiscal policy adjustments –governments’ steering wheel in Keynes’ view– were politically unattainable, the monetarist school of thought led by Friedman had gained momentum, while at the same time an attempt to save Keynesian economics was made with the microfoundation of macroeconomics.

The microfoundation literature consisted in an attempt to reconcile neoclassical microeconomic analysis with macroeconomic theory. The idea was to analyze aggregate economic phenomena by describing individuals and firms decision, for which a set of coherent theories already existed and was grounded on general equilibrium analysis. By filling the gap between macro- and microeconomics one could thus attain a comprehensive explanation of all economic phenomena, including what was left relatively untouched by Keynes theory, namely inflation. The elimination of the frontier was possible thanks to the revival of the supremacy of the “homo economicus”, whose preferences and choices were the result of constrained optimization as the legacy of the Paretian turn had established.

The new methodology pushed forward by the microfoundation approach yielded over the course of the decades some interesting results, which, however, either turned Keynesian analysis on its head or disproved it.

As a matter of fact, the rationality criterion applied to Keynesian theory, which stems from neoclassical microeconomics, had to go beyond the description of preferences to enter the domain of expectations in order to deal with

¹ In its first description the consumption function was: $C = c_0 + c_1(Y - T)$

macroeconomic shocks and policies. John Muth, while working on the problem of understanding why firm's behavior did not seem to fit neoclassical individual optimization, proposed his assumption of "dynamic rationality" and his work became a turning point for macroeconomic theory. The rational expectation assumption held that as long as individual optimally adjust their behavior to new information, they would always be on the right adjustment path.

The similarity with the neoclassical method is clear. The rationality of expectation is used to obtain the result much in the same way as neoclassical rationality is instrumental to the tangency between the individual's budget line and indifference curve.

When Robert Lucas applied this concept to macroeconomics the debate over the long run or short run behavior of markets, which had reached an agreement between monetarist and Keynesian, became meaningless. As a matter of fact, once the theory proposed by Friedman -according to which, once inflation is built into expectation, there would be no tradeoff between unemployment and inflation- was accepted, the only way to reconcile it with involuntary Keynesian unemployment, was to assume that in the short-run Keynesian theory was right and instead in the long run Friedman's accelerationist Phillips curve was valid. But the rational expectations hypothesis made this view obsolete, because if agents have rational expectations then anything that happens in the long-run will also happen in the short-run. If the adjustment is instantaneous, then Keynesian policy is ineffective also in the short-run.

The assumption of a utility-maximizing consumer imposed by microfoundation makes also consumption not dependent on income receipts, which is the opposite of what Keynes stated. Using Fisher's model, Friedman (1957) showed that if the utility function over two periods of a rational consumer is maximized, then current income will have the same effect on consumption as discounted future income. If we call permanent income the amount of discounted income (or wealth) which despite consumption remains unchanged, then by imposing that the utility curve is tangent to the budget line (representing wealth) it is obtained that consumption is a function of permanent income and the interest rate (which is used for discounting). Current income is out of the game. Keynes instead

was convinced that consumers “(...) increase their consumption as *income* (italics added) increase, but not by as much as the increase in income” (Keynes, 1936 p.96). He based this “fundamental psychological law” (ibidem) on his observation of the “detailed facts of experience” and “knowledge of human nature”. We can thus further appreciate the different and possibly incompatible methodologies adopted as well as understand the challenge of unifying the theories built with them.

Microfoundations applied to firms’ analysis also yielded the result that investment decisions are independent of firms’ liquidity position. Modigliani and Miller (1958) developed the so-called capital structure irrelevance principle using the same rationality background made of efficient markets, managerial maximization of shareholder value and perfect information. The opposite of what early Keynesian thought. For them, investments depended on current cash flows and firm’s holding of liquid assets.

As this last paragraphs tried to make clear, the relationships between inflation and unemployment, current income and consumption, investment and liquidity as Keynes envisaged them have been radically changed in the attempt to reconcile Keynesian Theory with microeconomics’ general equilibrium theory. To this regard Samuelson (1983 p.212) stated: “the new classical economics of rational expectations is a return with a vengeance to the pre-Keynesian verities”.

These opposite (in comparison to Keynesian) results are the byproduct of adopting the rational utility-maximizing representative agent used in microeconomics, whose preferences are –according to Akerlof (2006)– too narrowly defined. Indeed, it should be made clear that the microfoundation of macroeconomics per se is not to blame, since the shortcomings of Keynesian analysis, which was instrumental to the solution of specific economic problems, were clear and his theory had to acquire more solid bases. It is the fact these more solid bases were found in the adoption of the homo economicus, which is debatable.

New Classical as well as Keynesian took for granted that the preference specifications of the representative agent were general and descriptive enough. In so doing they interpreted the deviations from their results as caused by frictions or market imperfections. But –as Akerlof (2006) argued– the problem lies in those

preferences, which do not take into account the actual cognitive capabilities or the deviation from economic rationality. To be precise, Akerlof describes this “missing motivation in macroeconomics” as the lack of consideration devoted to the role of social norms in affecting individual behavior.

To better explain this point, we will now return to the Phillips curve relation. This topic can further clarify how microfoundation literature modified the Keynesian analysis and what are the consequences of this modification. In the last chapter we will see that BE theory can provide the “missing motivation in macroeconomics” and fill the gap between Keynesian analysis and microfoundation literature.

III. Phillips Curve and Aggregate Supply

The Phillips curve as it was first formulated by Phillips (1958) and later analyzed by Samuelson and Solow (1960), described the negative relation between the unemployment rate and inflation. The Keynesian consensus was that there was a tradeoff between these two variables, so that the government could decide to lower unemployment at the expense of higher inflation. In more formal terms, Blanchard et al. (201X) derive starting from the aggregate supply relation:

$$P = P^e(1 + m)F(u, z)$$

where P is the price level, P^e the expected price level, m the mark-up imposed by firms and $F(u, z)$ the function, which captures the effect on the wage of unemployment (u) and the other factors that affect wage setting (z). By defining $F(u, z)$ as $1 - \alpha u + z$ and rewriting the equation in terms of inflation and expected inflation, we get that

$$\pi = \pi^e + (m + z) - \alpha u$$

This equation shows how expected inflation, unemployment and the remaining two variables affecting wage determination will influence actual

inflation. For early Keynesian, however, expected inflation was equal to zero, so that the relation reduces to

$$\pi = (m + z) - \alpha u$$

This is the standard Phillips curve which presents the government with the aforementioned tradeoff.

New Classical analysis, however, criticized such a model, because it implies that wage-setters systematically underpredict inflation. Friedman and Phelps argued that if the government tried to sustain lower unemployment at the expense of inflation, the tradeoff would disappear, as people would change their expectations.

By adding the expected inflation back and imposing it equal to the actual inflation it is therefore possible to find the unemployment rate consistent with non-increasing inflation, namely the natural rate of unemployment.

This reasoning can also be seen in terms of the AS-AD model, which will highlight the main difference between the Keynesian approach and the New Classical based on microfoundations.

Indeed, for Keynes the labor market could avoid reaching the equilibrium because of the phenomenon of downward wage rigidity. For him, workers are not utility maximize as depicted by New Classical analysis and they care about their wage level relative to other workers as well as their nominal wage. Keynes wrote: “Every trade union will put up some resistance to a cut in money wages, however small” (Keynes, 1936 p.14). Again, Keynes does not try to explain this behavior but rather talks about the “psychology of workers” (ibidem p.302) and takes this pure fact of experience as an assumption on which to base his model. This is what Joan Robinson describes in her chapter on “Indeterminacy” (Robinson, 1937 p. 171), namely the impossibility to describe certain phenomena, like the determination of the level of wages, by means of pure economic analysis. To this regard she wrote: “It is idle to attempt to reduce such questions as Trade Union policy to a cut and dried scheme of formal analysis”(Robinson,1937 p.4).

The attempt to provide solid microfoundations to Keynesian theory by

Lucas and Rapping, however, inscribed the determination of money wages in the general equilibrium framework, which by definition is based on the equality of demand and supply. But, for Keynes, this equality was not reached when a recession made aggregate demand fall, because the absorption of the excess supply of labor was hampered by wage rigidities.

With the imposition of equilibrium in the labor market, unemployment returned to be seen as a voluntary phenomenon. This was a straightforward result, because an increase in unemployment would present firms with an opportunity to reduce wages and increase profit, which would be irrational not to exploit.

Going back to our discussion, the presence of nominal wage rigidity supports the idea of a permanent tradeoff between inflation and unemployment and rules out the existence of a natural rate of unemployment. Akerlof, Dickens and Perry (1996) explained this in their model, which is characterized by monopolistic competition, heterogeneous demand and supply shocks and of course downward wage rigidity. They thus conceive the wage determination as the bargaining solution between firms and workers, in which an index of trade unions' bargaining power is used to obtain wage rigidity. If this index is zero, wage setting becomes competitive as assumed by the New Classical. The aggregate demand curve- under the assumptions of monopolistic competition and constant elasticity- is found to be a horizontal line, which intersects the upward-sloping aggregate supply. The equilibrium will thus be at their intersection². The effect of downward wage rigidity is to shift the aggregate supply upward following an increase in inflation. The effect of the shifts is passed on totally to employment, as wages remained fixed (Figure 1 in Appendix). Approaching this dynamics from another perspective, the authors claim that an attempt by the central bank to push inflation toward zero (growth rate of nominal demand is reduced) would eliminate the possibility to reduce real wages. Firms would thus reduce employment. The conclusion is therefore that moderate inflation could "grease the wheels" of the labor market by speeding the downward real adjustment of wages (Tobin, 1972).

² This seems to contradict Keynes' disequilibrium, but the aggregate supply here is corrected for downward wage rigidity, so that the equilibrium in this model corresponds to an excess supply in the New Classical one.

Akerlof et al simulate this model and find a long-run Phillips Curve, in which unemployment increases at an accelerating rate as inflation is held under 3 percent. The unemployment-inflation tradeoff is therefore confirmed.

The pivotal role of wage determination should now be clear. Its formulation shapes the conception of unemployment and changes the monetary policy prescription. What remains to be done is therefore an empirical estimation of this rigidity, in order to see if the phenomenon is relevant. Also a theoretical explanation for this phenomenon, which goes beyond the use of a simplistic homo economicus³, is needed. In the next chapter we will try to accomplish both goals.

³ Note that Akerlof et al. model presented before is still based on the rational representative agent used by New Classical and the microfoundation literature.

Chapter Three: Wage Rigidities Beyond Standard Theory

*“The most important thing in our life
is the choice of a career, and chance decides that.”*

(Blaise Pascal, *Thoughts on Religion and other Curious Subjects*, 1727)

Wage rigidities have always been a puzzle for economic theory. Having outlined in the first two chapters the role of the rational representative agent in economics, this should not come as a surprise. Indeed, the rationality paradigm does a modest job in explaining how workers and employees bargain over wages and employment. This is because the goods being exchanged in such market are skills and effort, which respond more to psychological laws than simple demand and supply.

To shed some light on wage rigidities the chapter is organized as follows. The first section will propose a model to estimate wage rigidities, following Maida and Devicienti (2004)'s work. A series of descriptive statistics will then be presented in order to grasp some information on the presence of rigidities in the recent years for three European countries. In the second section a short literature review highlights the relevance of this phenomenon and the main theories developed to explain it are mentioned. However, we claim that most of those theories miss the important inclusion of the psychological dynamics at play. BE can instead capture some of the determinants of rigidities as fairness considerations, reference dependence and loss aversion (Section 3). In the last section we show that BE' description of behavior can be used as a more realistic macroeconomic microfoundation. McDonald's (2009) model for the Phillips curve is introduced as an example of such process.

I. Identification of Rigidities

The word “wage rigidity” is a comprehensive term to define the general behavior of workers compensation, which adjusts only slowly (or even does not) to labor market conditions. We can further deepen our analysis by distinguishing different types of rigidities. This division can help us in understanding and conceptualize the causes of such slow adjustment.

Downward *nominal* wage rigidity implies that workers oppose or employers are not willing to introduce pay cuts, so that low levels of inflation –by lowering the real wage– could actually rebalance demand and supply, reduce the relative prices set by firms and consequently raise employment. The same reasoning could not be applied in case of downward *real* wage rigidity, which by definition is not affected by inflation. Instead, real rigidities are influenced by labor market institutions such as: minimum wages, salaries’ indexation and centralized collective bargaining. These rigidities can only be overcome by changing the policy.

Nominal rigidities are non conceivable if we assume workers’ full rationality and therefore they call for a different psychological explanation, which we will discuss below.

The estimation of downward wage rigidity can be carried out using two different methods. The first involves interviewing employers and employees and asking a series of question regarding their recent pays and workers turnover. Using this procedure requires careful sampling procedure for the potentially distorting bias encountered in picking specific companies. This method, however, has the advantage of shedding some light on the reasons why employers would not favor pay cuts or workers being so averse to them even in period of poor overall economic performance. It can therefore distinguish among different types of rigidities and offer some insight on the psychological dynamics which lead to this phenomenon.

The second method is more complex, since it requires the use of an econometric model, but can yield robust result and avoid the sampling problems and cost encountered in interviewing workers. The model proposed by Maida and

Devicienti (2004) works as follows. A hypothetical distribution of wages' increase f , which is not affected by any kind of rigidity, is assumed between t and $t+1$. This *notional* distribution of nominal pay increase represents the counterfactual situation which is not observable. In Figure 2 the effects of nominal and real rigidities are represented by the arrows. Nominal rigidity prevents salaries from decreasing in absolute terms and therefore is to be found at zero. Real rigidity, instead, forces pay increase to be uniform (because of collective bargaining, for instance) so that both positive (but lower than r) and negative notional variation are aligned to coincide with r . The two arrows named "real" exemplify this dynamics.

If we assume that f and the measurement errors are normally distributed and that rigidities are constant for each year, we can infer from the model the probability that the nominal and real constraint are operating as well as the distribution parameters of f .

This model can yield interesting results. Maida and Devicienti (2004) applied it to the Italian labor market and found that the probability that an individual's wage is influenced by real rigidity is between 50 and 55 percent for the 1985-1998 period, while it is 25 percent for nominal rigidity.

The main problem encountered in testing this model for the more recent decade is the availability of data. Indeed, Maida and Devicienti constructed a dataset with actual wages but also the wages as specified by the 25 national contract bargained by the trade unions. These latter data are used to estimate real rigidities, as those national contracts represent a benchmark, under which compensations cannot fall. Such a dataset can therefore monitor both the actual and contractual wage changes for each individual.

Unfortunately we do not possess such detailed dataset and the model cannot be applied without such information. Nevertheless, we can still grasp some information on wage rigidities during the last decade from some basic manipulation of data.

By using the Istat data on wages for firms with more than 500 employees, we found the actual distribution of wages increase. The time span runs from January

2009 until March 2015 and data have monthly frequency, so we can expect to see the impact of the economic crises. Figure 3 represents such distribution. At first glance we can see that the shape resembles a normal distribution as posited by Maida et al (ibidem). Most observations are on the right side, suggesting a general tendency for wages to increase. The average increase, however, is 0,13 percent. The raw data indeed can be misleading, because there are sharp increases for the December pay, which is nearly twice as much as the November one each year. This means also that the data on the far right or left of the distribution should not be interpreted as actual wages increase. Taking into account such fact, reduces the average much closer to zero.

We also tried to use other set of data from the OECD statistics, for which the average wage in the total economy is available from 2005. The distribution is again clustered at zero with predominance of positive increase and the average is 0,06 percent with a standard deviation of 0,7 percent (Figure 4).

Using the same source, we replicated the exercise for Germany (Figure 5) and the UK (Figure 6). The comparison yields some interesting results, given the important differences in labor markets between these nations. Germany's average is 1,2 percent, while UK's one is 0,7 percent. The standard deviations are 1 percent and 2,5 percent respectively. Between 2005 and 2015 a major global recession influenced economic outcomes and we would expect to see its impact also in the labor market. For this reason we calculated the averages and the standard deviations for the 2005-2008 period and the 2008-2014 period separately. The standard deviations increased for all countries during the recession. For Italy and Germany the average change in compensation remained the same, while it decreased by 0,3 percentage points for the UK.

From these information we can conclude, even without applying the model, that:

a) Downward nominal wage rigidity is a pervasive phenomenon. The data for Germany, Italy and the UK all show an asymmetry in the distribution. The lower number of nominal pay cuts can be seen if the frequencies on the left of the zero are compared with the ones on the right. Apart from the distribution extrapolated from the Istat dataset, which is not extremely informative for the reasons mentioned

above, all other distributions reveal this pattern. Even during this last recession, nominal wages did not seem to fall.

b) Wage rigidities differ among countries. This is straightforward, as institutions governing employment differ considerably. The UK, for instance, has a lower EPL (Employment Protection Legislation) index than Italy and Germany (OECD, 2013 p.78) and a more flexible labor market. To some extent this influences the deviation in the distributions of wages, since employers are more free to increase and decrease compensations. Despite this difference, the average change is quite similar for all three countries.

c) The differences in the labor market lead to different wage distributions during an economic downturn. Not surprisingly, more flexible labor markets as the UK imply more variations in the parameters of the distribution, but the averages remain positive contrary to what economic theory would suggest in case of a fall in demand.

II. Literature Review and Theoretical Explanations

The phenomenon of downward wage rigidity is not new to the economic profession and many studies have tested its presence for different countries. The following is a brief review of the most important ones.

Fortin (1996) in analyzing the sources of the Canadian recession of the early nineties, states clearly that the role of downward wage rigidity is all but negligible. He presents a distribution of wage changes that is extremely clustered at zero as evidence for that (pp. 779).

Other supportive evidence is provided by Chapple (1996), which examines the case of New Zealand for the 1988-1993 period finding a similar distribution (pp.35). In Australia Dwyer and Leong (2000) also found significant rigidities.

Given the difficulty in estimating the extent of this rigidity, agreement is certainly not always met. Lebow et al. (1994), found that even though there is a

spike at zero in the distribution, only a quarter is due to nominal rigidity. Akerlof et al. (1996), however, challenge these findings and claim that the presence of wage cuts has been amplified by reporting errors in the PSID data (Panel Study of Income Dynamics). They conducted a survey on more than 500 workers and found that among those who did not change jobs, less than 3 percent experienced wage cuts.

This non-exhaustive summary of the evidence in support of wage rigidity calls for a theoretical explanation. As for most economic problems, the opinions and theories differ.

Contract theory, first developed by Fisher (1977) and Taylor (1979) identifies the source of rigidity in the staggered negotiations of contract.

Implicit contract theory states instead that workers' risk aversion creates the basis for the formation of an implicit contract with the employer, according to which real wages are kept stable over the business cycles in exchange for lower wages (Stiglitz 1986, Gordon 1974, Baily 1974).

Lindbeck and Snower (1988) formulated another theory –the insider-outsider theory–, according to which workers are able to higher the cost of replacing them by not cooperating with newly hired employees. This power gives a certain degree of freedom to workers to set the desired wage.

These theories, which seem reasonable at first glance, were not easily accepted when additional evidence on the motivation moving employers and employees against pay cuts was presented. In his famous work “Why Wages Don't Fall During a Recession”, Truman Bewely (1999) found that in fact people reason in a different way. After interviewing employers and employees from 258 firms, he concluded that managers themselves were reluctant to cut wages because of the adverse effect it would have on morale and their sense of belonging to the firm. Generalized pay cuts can cause festering resentment and induce the best workers to leave, targeted ones might instead be seen as unfair. Layoffs can therefore avoid these costs and are relatively less harmful. What this research showed is that “wage rigidity is the product of more complicated employee behavior, in the face of which manager reluctance to cut pay is rational” (Bewely, 1999 p. 1). From this standpoint previous theories seem to be lacking a realistic description of workers'

and employees' utility functions. Instead of the simplistic maximization of consumption and working conditions –Bewely concludes– economists should consider the dependence of those utility functions on other people's welfare and internalization of firm's objectives.

This line of reasoning echoes what this work has been pointing out in each chapter, namely that a better description of individual behavior can enrich our understanding of the economic phenomena. It is therefore useful to see how BE, whose goal is precisely the correct identification of psychological factors influencing preferences, has contributed to this topic.

III. A Behavioral Economics Explanation

As Bewely (1990) noticed, the New Classical description of employment relationship does not seem to capture the important dynamics, which lead to the determination of wages. Part of the problem lies in the assumption of self-interest behavior on the part of economic agents. The homo economicus does a great job at representing actual behavior for certain scenarios. The factory worker or the cook chopping vegetables all day, might well behave as predicted by the standard theory and be motivated only by the compensation they receive. But most jobs are nowadays different in nature and fairness, instead, seem to play a significant role in the game. Akerlof and Yellen (1990) first put forward the fair wage hypothesis, according to which workers that perceive their wage as unfair put a degree of effort in their job that depends on the difference between their compensation and the compensation they regard as fair.

Evidence on the role of fairness comes from the famous ultimatum game, where two players have to decide how to divide a fixed sum of money by accepting or rejecting the offer made by the one of them. This first experiment showed that people care not only about their own payoff but also about a just division (see Camerer and Thaler 1995; Güth, Schmittberger, and Schwarze 1982).

Having said that, it would be improper to generalize such a concern for fairness to all situations, as if it were a constant and immutable preference. For this

reason, Kahneman, Knetsch, and Thaler (1986) tried to better understand if workers had a reference frame for judging fairness as hypothesized by Akerlof and Yellen (1990). They found that past interaction between employer and employee shape this frame.

Fairness considerations can also be stronger (in terms of preferences) than real outcomes. Goette and Huffman (2007) found that a nominal wage cut is met with more hostility than when a similar cut is the result of the price level rising faster than the nominal wage. Although it might seem contradictory, workers *do* take into account inflation, as studies by Mankiw, Reis, and Wolfers (2004) on consumers' expectations have shown, but the psychological effect of a nominal pay cuts has a stronger negative impact on utility.

To add further subtlety to the description of workers behavior, the effect of loss aversion is worth mentioning and, in particular, its interaction with fairness judgments. Mas (2006) provides evidence for the fact that actions made by the employer that are considered fair have lower positive impact on employees' performance than unfair ones. In other words, losses (unfair treatments or wage cuts) are more intensely felt than gains (fair treatments). Further evidence on that is also provided by Kahneman, Knetsch, and Thaler (1986). This latter scholars also identify the presence of two different fairness frames in the labor market. Workers that are employed evaluate the fairness of any contractual change with what other colleagues have, while workers that will join the firm compare the offer with the opportunities present in the whole labor market. For this reason, entry-level wages and incumbent wages will respond differently to changing market conditions (Fehr, Goette, Zehnder, 2007). Evidence of that can be found in Devereaux (2001).

This division in the labour market, which is somewhat similar to the insider-outsider theory, makes the incumbent worker's wage dependent on the previous contract, which becomes the reference outcome for the next year. This of course reinforces downward wage rigidity as the concerns over fairness are anchored to this wage.

To conclude, we can see that BE has some interesting insights on the functioning of the labor market and its conclusion could be opposite to what the

standard theory tells us. The question therefore arises of how to translate this micro evidence to build a macroeconomic model, which can better describe aggregate behavior. To answer to this question it is useful to remember what we observed in the first chapter, namely that BE is not a unified theory. It is therefore difficult to incorporate all those finding into a model that is internally coherent. Nevertheless, it is interesting –in the author’s opinion– to see how BE can interact with macroeconomics and offer more robust microfoundations.

IV. Modeling Realistic Behavior

These insights from BE have been translated into macroeconomic theory quite effectively in the last years. This should not come as a surprise, given the impact they have on microeconomics. It seems therefore that the problem of a “missing motivation” in macroeconomics highlighted by Akerlof could be solved, or at least corrected, through the application of broader and perhaps more behavioral-oriented microfoundations. In what follows we shall briefly review a model for the Phillips curve relation, which incorporates behavioral insights and represents, according to the author, a step in the right direction. This would imply that the “road not taken” described by Bruni and Sugden in the first chapter could have been found again.

McDonald’s (2009) model for the Phillips curve can indeed be seen a element of union between the results developed by Keynes and the natural rate models proposed by New Classical Economics. This is due to the fact that the model has explicit microfoundation, thus conforming to the macroeconomic literature that followed the Keynesian revolution, but derives them from a more subtle definition of utility functions, which draws from BE theory. The representative agents’ characteristics are thus far from inscribed in the strict rationality paradigm described in the first chapter. This implies a description of the labor market, which is more in line with the dynamics highlighted in the previous section.

Without going into the details of the model, which would imply repeating the author's analysis, we shall highlight the basic formulation of those utility function and the results that stem from them.

McDonald expresses the bargaining problem between workers and employers as a maximization of:

$$\text{Nash Maximization} = \left[U \left(V, \frac{V}{V^{ref}} \right) - U (V^{res}) \right]^\phi \left[\frac{R(L, L^E)}{P - VL} \right]^{(1-\phi)}$$

where V =real wage, V^{ref} =worker's reference real wage, V^{res} =worker's reservation real wage, L =employment at the firm, P =aggregate price level, ϕ is the relative power in bargaining of the worker(s) ($0 < \phi < 1$). L^E is the level of employment at which the firm's price is equal to its reference price, P^{REF} .

$\left[U \left(V, \frac{V}{V^{ref}} \right) - U (V^{res}) \right]^\phi$ and $\left[\frac{R(L, L^E)}{P - VL} \right]^{(1-\phi)}$ are the net gains from the bargain to the workers and the firm respectively, with $U(\cdot)$ and $R(\cdot)$ being a worker's utility function and the firm's revenue function respectively (McDonald, 2009 p.10).

We can immediately see that the utility of the workers is influenced by reference dependence and if those utilities are further specified as:

$$U \left(V, \frac{V}{V^{ref}} \right) = BV\beta_1 \left(\frac{V}{V^{ref}} \right)^{\beta_2^-} \quad \text{for } V < V^{ref}$$

$$U \left(V, \frac{V}{V^{ref}} \right) = BV\beta_2 \left(\frac{V}{V^{ref}} \right)^{\beta_2^+} \quad \text{for } V \geq V^{ref}$$

$$U(V^{res}) = BV^{D\beta_1}$$

with

$$0 < \beta_1, \beta_2 < 1 \text{ and } 0 < \beta_2^+ < \beta_2^- < 1$$

then also the effect of loss aversion is introduced. This latter effect was first introduced by Bhaskar (1990) and is represented by a kink in the utility function.

The partial differentiation of that function, first with respect to L and then

with respect to V represents the best responses of workers and employers. It defines a maximum and a minimum level of employment, together with a range of real wage levels called V^{low} and V^{high} . The model therefore provides for a diamond of equilibria (Figure 7).

What is important, in the end, is that the model offers a good description of reality. McDonald's model can indeed explain the existence of a short run Phillips curve, which is flat at high rates of unemployment and steep at low ones, and also the inverse relation between the change in the unemployment rate and the rate of inflation.

Once again, this model represents a good example of how a more detailed specification of behavior can offer an interesting explanation of economic phenomena.

Conclusion

To conclude our discussion, we can say that rationality is pervasive in economics. Modern mainstream economics and the theory which is taught in undergraduate courses builds on a series of assumptions on individual rationality that we traced back to Pareto's approach. The comparison with the early neoclassical economists showed how psychology was removed from economics in the attempt to free the latter subject of any metaphysical entity. The reliance on the measurability of utility by means of introspection ceased being a concern, because – according to Pareto – only indifference between bundles of goods was needed in order to ground the theory. In so doing economic enquiry should have reduced the scope of analysis only to those actions, which are considered logical. Instead Pareto's legacy extended the applicability of the theory to a huge variety of phenomena.

The advent of BE in the last decades of XX century can thus be interpreted as a reaction to the ubiquitous presence of rational choice theory and as a rethinking of the role of psychology in economics. Through experiments rather than

abstraction a series of systematic deviation from economic theory have been found. We summarized few of these results and highlighted the importance of BE in completing our descriptive capacity of human behavior.

We then asked ourselves how did the rationality paradigm reach macroeconomics, since its major development came only during the Great Depression and was primarily fueled by Keynes' theories, which did not draw on previous microeconomic studies. The microfoundation of Keynesian theory sought to fill this gap between micro and macroeconomics and, in so doing, it completely changed some previous results. While the development a theory of aggregate economic forces that is consistent with the observation of micro equilibria is a legitimate goal, the grounding of such a theory on simplistic assumptions of human rationality is at least questionable.

To account for this concern for oversimplification we turned our attention to the phenomenon of wage rigidities and its consequences on the Phillips curve relation. We concluded that the existence of wage stickiness changes the interpretation of the labor market's functioning and presented Akerlof et al. (1996) model to highlight this different dynamic.

Given that –in the explanation of the Phillips curve– the bone of the contest is wage rigidity, we tried to investigate its existence. A model to test the presence of downward nominal and real wage rigidities has been put forward and the elaboration of a series of descriptive statistics has confirmed their existence. To corroborate this idea, we then presented similar results of past studies and reviewed different theoretical explanation that were put forward to explain rigidities. We argued, however, that a more complete description of wage determination should take into account the concern for fairness and the effects of reference dependence and loss aversion. For this reason we highlighted some interesting results obtained by BE experiments, which –in the author's opinion– should be transferred to macroeconomics.

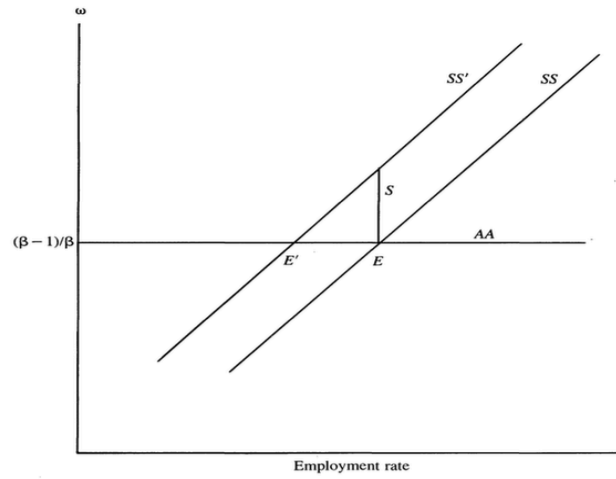
Finally, McDonald's (2009) model for the Phillips curve has been briefly introduced as an example of such integration of BE results to macro modeling. The model does, indeed, consider the effect of loss aversion and reference dependence

on wage setting behavior, thus leaving behind the use of the homo economicus and perhaps rediscovering the path which Bruni and Sugden (2007) called “the road not taken”.

As a final remark, this short analysis should not be interpreted as a complete rejection of the important discoveries made by economics in the last decades. Instead, this critique of the rationality assumption wanted to point out that our understanding and modeling of economic behavior should learn from other subjects and be willing to abandon the use of rational representative agents, when the determination of choice is the result of more complex interaction between norms and mental capabilities.

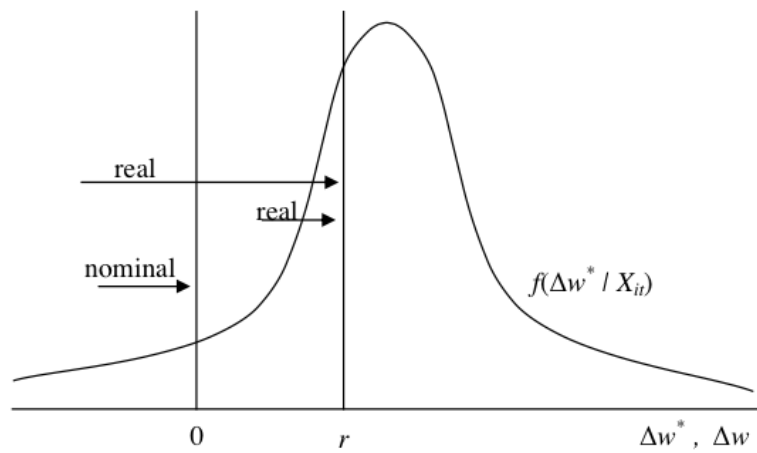
Appendix:

Figure 1: Aggregate Supply in Akerlof et al. model



From Akerlof et al (1996).

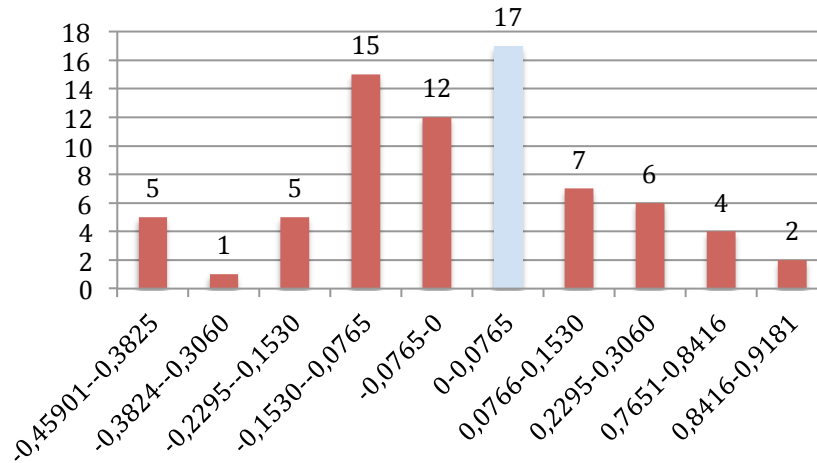
Figure 2: Notional Wage Distribution



From Devicienti and Maida (2004)

Figure 3:

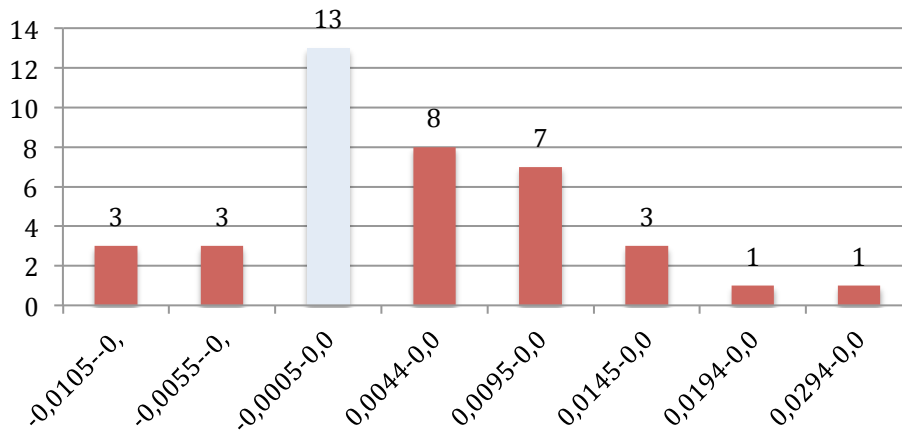
Frequency Distribution of Monthly Wage Changes, Italian Firms >500 employees, '09-'15



Source: Istat dataset on Labor, author's elaboration

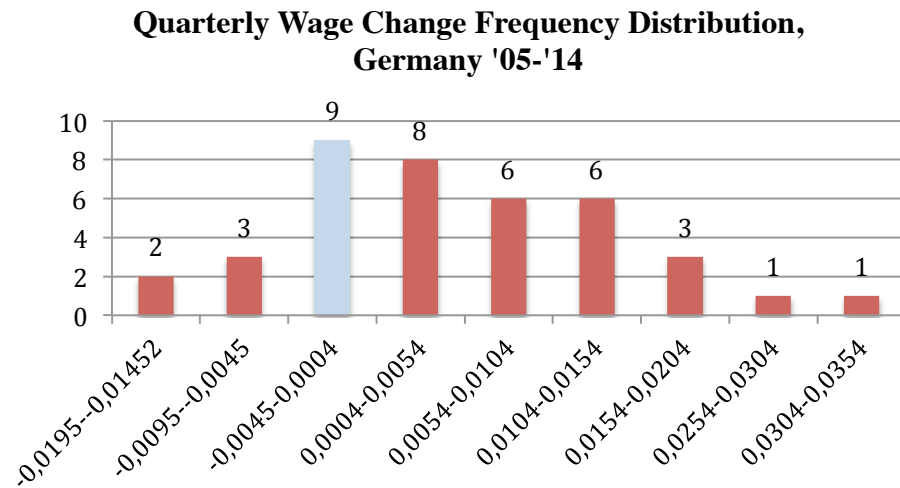
Figure 4:

Quarterly Wage Change Frequency Distribution Italy '05-'14



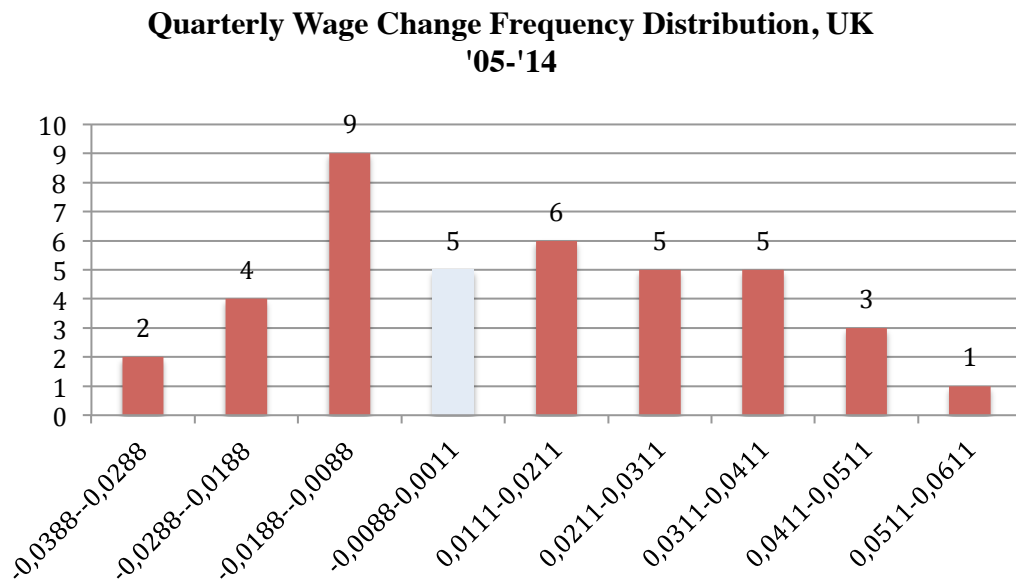
Source: OECD Statistics, Labour, Hourly Earnings, Italy

Figure 5



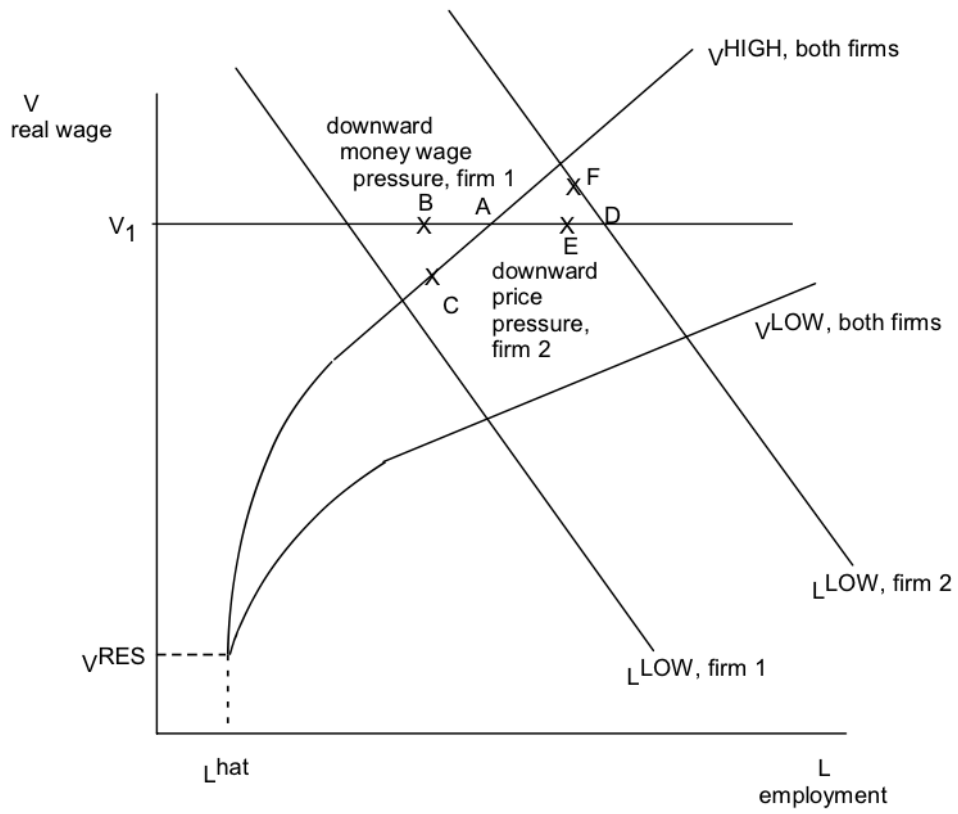
Source: OECD Statistics, Labour, Hourly Earnings, Germany

Figure 6



Source: OECD Statistics, Labour, Hourly Earnings, UK

Figure 7



Source: McDonald (2009)

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