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READING KEYNES'S POLICY PAPERS THROUGH THE PRISM OF HIS *TREATISE ON PROBABILITY*: INFORMATION, EXPECTATIONS, AND REVISION OF PROBABILITIES IN ECONOMIC POLICY

BY
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When scholars investigate the legacy of John Maynard Keynes's Treatise on Probability *(1921) for the development of Keynes's thinking, the attention usually focuses on the connections among Keynes's probability theory, his conception of decision-making under uncertainty, and the theory of the functioning of the macroeconomic system that derives from it—through the marginal efficiency of capital, the preference for liquidity, and the self-referential functioning of financial markets. By contrast, this paper aims to investigate the connections between Keynes's probability theory, on the one hand, and his economic policy recommendations, on the other. It concentrates on the policy recommendations defended by Keynes during the Great Depression but also after the* General Theory. *Keynes's economic policy can be understood as a framework for decision-making in situations of uncertainty: fiscal policy aims to induce private agents to change their "rational" probability statements, while monetary policy aims to allow more weight to these statements.*

I. INTRODUCTION

The year 2021 celebrates the 100th anniversary of the publication of John Maynard Keynes's *Treatise on Probability* (1921), a work that aroused little interest among Keynes's disciples during the first decades following the publication of the *General Theory* (1936). While mentioning the pioneering works of Anna Carabelli (1988) and Roderick O'Donnell (1989), Sheila Dow (2019, p. 255) reminds us that "it is now conventional in

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Keynes studies to accept this continuity, but the inattention to the philosophical foundation and character of Keynes's economics was common throughout the post-war years of Keynesian policy when uncertainty was relatively absent (owing, arguably, to that policy stance)." Even when the *Treatise on Probability* is revisited with the aim of better understanding Keynes's economic writings, attention is usually focused on the connections among Keynes's probability theory and his conception of decision-making under uncertainty and the theory of the functioning of the macroeconomic system that derives from it—through the marginal efficiency of capital, the preference for liquidity, and the self-referential functioning of financial markets—as these concepts are developed in the *General Theory*. Curiously enough, the connections between Keynes's probability theory and his economic policy recommendations have not been deeply investigated so far. Yet, it is noticeable that the issue of uncertainty and expectations permeates the whole of Keynes's policy recommendations all along his career (Rivot 2020).

Our aim in this paper is to fill this gap regarding the theoretical underpinnings of Keynes's economic policy advocacy by rereading the policy recommendations he defended during the worst of the Great Depression (circa 1932) but also after the publication of the *General Theory* in the light of his *Treatise on Probability*. As we will see, Keynes's economic policy pleas can be understood on the basis of his framework for decision-making in situations of uncertainty to be found in his *Treatise on Probability*: public works aim to induce private agents to change their "rational" probability statements, while monetary policy aims to change the weight given to these statements.

The paper is organized as follows. Section II briefly presents the main tenets of Keynes's *Treatise on Probability* that require our attention for a proper understanding of the interrelationships between Keynes's treatment of the decision-making process under uncertainty and his policy views. Section III addresses the issue of fiscal policy at the time of severe recession (as it was the case during the Great Depression), while section IV deals with monetary policy. Section V shifts the attention for the long run and considers the policy recommendations defended by Keynes during the 1940s—and in particular his plans for an "economic policy for a peacetime economy," together with his concept of "capital budgeting" that he argued well after the publication of the *General Theory*.

II. SOME KEY TENETS OF THE *TREATISE ON PROBABILITY*

Identifying the theoretical underpinnings of Keynes's policy advocacy, and in particular his economic policy proposals that he elaborated in the early 1940s, based on his understanding of the decision-making process under uncertainty developed in the *Treatise on Probability* published in 1921 (but that he started working on in 1907), basically means jumping over decades in the development of Keynes's thinking, with many potential pitfalls. Yet, it seems to us that a through line is at work in Keynes's advocacy, regarding how public authorities should act to stabilize a decentralized market economy. This through line applies to the decision-making process under uncertainty, which is faced by any economic agent but crucially by wealth owners who cannot but develop long-term views regarding the prospective returns of the assets they hold.

Below, we present the key tenets of Keynes's theory of probability that require our attention if we wish to properly understand how his economic policy proposals are rooted in his conception of decision-making under uncertainty.

The Argument and the Weight of the Argument

As nicely summed up by Jochen Runde, Keynes holds a "two-tier theory of belief." More precisely, "probability is at the first level, a measure of the belief in some conclusion relative to some specific body of evidence. Weight is at the second level, a measure of the completeness of the evidence on which that belief is based" (Runde 1994, p. 133).

In Keynes, a probability is a logical relation. It corresponds to a degree of rational belief in a proposition (Keynes 1973b, p. 3). This implies that, as it is well known, Keynes parts company with the frequentist theory of probability. It is noticeable that the *Treatise on Probability* starts with the following statement: "Part of our knowledge we obtain direct; and part by argument. The theory of probability is concerned with that part which we obtain by argument" (Keynes 1973b, p. 3).

Following along contemporary terminology, one would say that, for Keynes, individuals do not know the whole structure of the "states of the world"; they even do not know the extent to which their knowledge is lacking. This is the reason why they need to place a certain degree of confidence in the expectations they hold: they hold their rational belief with a certain "weight."

To account for various degrees of uncertainty, the notion of weight of the argument is introduced by Keynes "as something independent of probability" (Dow 2019, p. 256). The weight of the argument does not only measure the balance between favorable and unfavorable evidence; it also turns upon the balance between "the absolute amounts of relevant knowledge and of relevant ignorance" (Keynes 1973b, p. 77). In this perspective, Keynes argues:

> As the relevant evidence at our disposal increases, the magnitude of the probability of the argument may either decrease or increase, according as the new knowledge strengthens the unfavourable or the favourable evidence; but something seems to have increased in either case,—we have a more substantial basis upon which to rest our conclusion. I express this by saying that an accession of new evidence increases the weight of the argument. New evidence will sometimes decrease the probability of an argument, but it will always increase its 'weight.' (Keynes 1973b, p. 77)

The weight of an argument does not necessarily correspond to a measurable magnitude. Besides, it depends on the personal judgment of the individual. Because the relative knowledge at our disposal may vary from one individual to another, the weight of the argument, namely the confidence placed in the argument, may vary accordingly. It might be noticed that Keynes's argument that more evidence always increases the weight of the argument has proved doubtful for commentators (Runde 1990; Dow [1995] 2012, 2019). For "not only may new evidence change what is regarded as relevant, but it may also reveal new realms of ignorance" (Dow 2019, p. 256).

Objective Uncertainty vs. Subjective Uncertainty

Expectations at stake here should be viewed as objective—contrary to Frank Knight's (1921) or Frank Ramsey's (1931) subjective treatment of uncertainty—in the sense that the probability formed is independent of our own judgment (Runde 1994,

Roncaglia 2009). Keynes is explicit on this issue in the first chapter of his *Treatise on Probability*:

> [I]n the sense important to logic, probability is not subjective. It is not, that is to say, subject to human caprice. A proposition is not probable because we think it so. When once the facts are given which determine our knowledge, what is probable or improbable in these circumstances has been fixed objectively, and is independent of our opinion. The Theory of Probability is logical, therefore, because it is concerned with the degree of belief which it is *rational* to entertain in given conditions, and not merely with the actual beliefs of particular individuals, which may or may not be rational. (Keynes 1973b, p. 4)

Keynes was criticized by Ramsey precisely because of his defense of the objective character of probability. For both Keynes and Ramsey, a probability should be viewed in terms of degree of belief. Keynes rejected any form of subjective measure of the degree of belief that represents the probability. Yet, Ramsey (1931) strongly opposed Keynes's logical approach to probability and put forward instead his own subjective approach, which led to the subjective expected utility approach framed by Leonard Savage (1954). Ramsey's critique of Keynes precisely entails Keynes's treatment of probability as a logical relation between two propositions (Schmidt 2003). On the one hand, in Keynes, a probability is treated as objective precisely because of the objective character of the logical reasoning rules implemented to make a judgment. On the other hand, from Ramsey until Savage, despite their subjective character, probabilities can be measured within the framework of decision theory.[1]

Second and correlatively, Keynes's disentanglement attempt between "risk" and "uncertainty" does not overlap the frontier established by Knight. Until recently, Keynes's conception of uncertainty was conflated with Knight's. For example, Paul Davidson (1972) spoke of uncertainty "in the Knight–Keynes sense" (Davidson 1972, p. 102). Yet, a closer examination shows that the two conceptions should be more carefully distinguished. For Knight, "risk" refers to quantitative probabilities, while "uncertainty" does not. Keynes's treatment is more subtle, in that he considers a continuum of cases, from perfect impossibility towards certainty: "many probabilities, which are incapable of numerical measurement, can be placed nevertheless between numerical limits. And by taking particular non-numerical probabilities as standards a great number of comparisons or approximate measurements become possible" (Keynes 1973b, p. 176).

The Decision-Making Process of Private Agents in the General Theory

If the two points are being considered concurrently, some new light can be shed on Keynes's treatment of the decision-making process faced by wealth owners elaborated in the *General Theory*. First, the individuals who populate a monetary economy à la Keynes are fully immersed in markets. So the very problem they face is not escaping their subjective and individual uncertainty. In an uncertain world the forecasts regarding the possible future states of the world will have an effect on the decision context to come.

[1] Bateman (1987, 2021) argues that Keynes eventually surrendered to Ramsey's argument about the subjective character of probability.

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As the parable of the beauty contest shows, private agents (and especially wealth owners) develop forecasts about the other market players' forecasts, for it is this common judgment that will determine the relative price structure in the periods ahead. In that sense, uncertainty is objective.

Second, as we have seen above, in Keynes's theoretical apparatus private actors do not merely form expectations on the basis of a fully known distribution of probability. To be precise: if they possessed full knowledge of what might happen, they would hold their expectations firmly, with absolute confidence. This is how the issue of liquidity enters the scene in Keynes's economic theory of the monetary economy functioning: because economic agents have to place a certain degree of confidence in their expectations, because they hold their "rational" probability statements with a certain weight, liquidity "includes the degree to which the value of an asset, measured in any given standard, is independent of changes in the state of the long-term expectation" (Hayes 2006, p. 151). So liquidity does not merely mean ease of convertibility in money because of well-organized markets.[2]

Last, the dividing line at stake in economic analysis applies in the *General Theory*, as it was already the case in the *Treatise on Money*, to the short-run versus long-run distinction as well as to the entrepreneurs' versus investors' expectations (Dow 2019; Rivot 2020). Entrepreneurs' expectations are roughly for the short-run values, mainly sales volumes and production profitability. Contrary to the *Treatise*, which relied on short-term forecasting errors made by entrepreneurs to explain the dynamics at work in a monetary economy, the *General Theory* assumes perfect foresight regarding sales forecasts, which allows Keynes to focus attention towards the mismatches of expectations that apply to the long run, namely, the expectations held by investors regarding the prospective returns of non-monetary assets in the remote future.

In a context of uncertainty, investors are ready to pay to protect themselves against the *liquidity risk* implied by this low degree of certainty regarding the probability distribution of the asset returns. And this is the reason why private agents might prefer to hold a monetary asset that earns no interest at all rather than non-monetary assets, which might earn positive returns: "The possession of money lulls our disquietude; and the premium which we require to make us part with money is the measure of the degree of our disquietude" (Keynes 1973d, p. 116).[3]

The famous parable of the beauty contest (Keynes 1973a, p. 156) illustrates well the conventional determination of the interest rate from this incapacity of wealth owners to hold

[2] Mark Hayes (2006, p. 151) makes this point very clearly and it is worth quoting extensively: "Liquidity means more than convertibility and includes the degree to which the value of an asset, measured in any given standard, is independent of changes in the state of the long-term expectation. Liquidity risk is then the possible (*not* probable or expected) loss of value as a result of a change in the state of long-term expectation. Keynes's liquidity premium is the margin required by investors between the marginal efficiencies of the asset and the standard in order to overcome preference for the standard. The size of this margin will depend upon the difference in the degree of confidence with which investors view the marginal efficiencies of the asset and the standard respectively."

[3] It is noticeable that in a letter to Townshend in 1938, Keynes refers to his *Treatise on Probability* and distinguishes between the risk premium, which can be easily assessed and can be rewarded (the higher the variance of the asset return, the higher its risk premium), and the liquidity premium, which represents the sacrifice we consent to in terms of prospective yield to insure ourselves against a change of value of this asset because of a revision of our expectations—the extent of this possible revision being yet unforeseen.

their expectations with complete confidence (Rivot 2017). Here, the distinction between investment and speculation plays a critical role; and this distinction echoes the one between the professional investor (who takes long-term positions based on his assessment of fundamentals) and the public in general (more likely subject to herd behavior).

Because conventional judgments regarding the remote future are very likely to be harmful, the primary role of public authorities is accordingly to fight against these conventional judgments in developing "genuine and reasonable judgment concerning the future" (Carabelli 2003, p. 224). This also means providing to private agents more reliable knowledge to allow them to escape ignorance and uncertainty and ultimately to place more weight on the probability of the argument. Applying Keynes's "two-tier theory of belief" (Runde 1994, p. 133), this means that "budgetary policy" addresses the issue of the argument under consideration, the belief in some proposition (which corresponds to the heading of the marginal efficiency of capital in the *General Theory*), while "monetary policy" addresses the issue of the weight of the argument under consideration, the confidence placed in the belief held (which corresponds to the heading of the liquidity preference).

III. EXPECTATIONS AND THE ISSUE OF PUBLIC WORKS

Keynes's justification for public works relies elsewhere than in the suggestion for a substitute to a competitive adjustment process that would be judged extremely slow. To take one, but critical, example, one can see Keynes arguing in 1933 that: "Unfortunately the more pessimistic the Chancellor's policy, the more likely it is that pessimistic anticipations will be realised and vice versa. Whatever the Chancellor dreams, will come true! We must begin by resuscitating the national income and the national output" (Keynes 1982, p. 184).

Such a prediction from Keynes might appear as rather cryptic at first sight and it calls for some explanations. To be properly understood, this critical quotation requires, in our view, a return to his *Treatise on Probability*. The quotation above is illuminating of the true purpose of public works, in Keynes's opinion, which is precisely to reverse the pessimistic expectations held by entrepreneurs (who make mainly profitability forecasts in a short-run perspective) but more importantly the expectations held by investors (who make forecasts mainly regarding the prospective returns of the assets they possess in a long-run perspective).

The definition Keynes provided of a "money-wage economy" in the drafts of the *General Theory* is crucial to understand the interrelationships between his theoretical construct in the *General Theory* and his *Treatise on Probability* (Rivot 2013a, 2017). And it is really unfortunate that these drafts were not incorporated in the final version of Keynes's opus. In a monetary economy the factors of production can stockpile the asset in which they are paid (they can hoard "money") instead of consuming now, or purchase a wealth asset with a view to consuming later. Entrepreneurs have now to make forecasts regarding the demand their product will face. And investors have now to make forecasts about the forward yields of the assets they hold. This is the way expectations enter the scene in Keynes's explanation for an underemployment equilibrium.

Keynes made use of a metaphor (as he did quite often) to illustrate the lack of forward markets at stake in a monetary economy, which explains that the marginal efficiency of capital might be too low: the parable of the deferred dinner:

> An act of individual saving means—so to speak—a decision not to have dinner to-day. But it does *not* necessitate a decision to have dinner or to buy a pair of boots a week hence or a year hence or to consume any specified thing at any specified date. Thus it depresses the business of preparing to-day's dinner without stimulating the business of making ready for some future act of consumption. It is not a substitution of future consumption-demand for present consumption-demand,—it is a net diminution of such demand. (Keynes 1973a, p. 210)

This parable illustrates well the market incompleteness for commodities (i.e., the absence of forward markets for a wide range of goods), hence the coordination failures between long-term production and consumption plans. That is, an act of saving does not automatically create the corresponding investment. Investors have to expect the state of effective demand in the long run, and that corresponds to the issue of the marginal efficiency of capital. Worse, an increase in the propensity to save is likely to induce a fall in the marginal efficiency of capital since one is very likely to extrapolate the current tendency due to the inertia in expectations. As Axel Leijonhufvud (1968) or Rodolphe Dos Santos Ferreira (2000) show, the market system is not able to reconcile the intertemporal choices on the respective part of savers and investors. Thus, marginal efficiency of capital might be too low regarding the current propensity to save, hence the coordination failures between long-term production and consumption plans.

The basic problem that Keynes identifies in the functioning of a monetary economy is not merely a matter of forecasting errors or short-term mismatches. Neither is it delay in the competitive adjustment process because of nominal rigidities, to take one, but very representative, example of the diseases suffered by a monetary economy. Actually, the problem at stake for Keynes is more severe than that and much more difficult to handle. This absence of forward markets for a wide range of commodities easily results in the possibility of an excessively depressed state of long-term expectations regarding the prospective returns of the assets held by investors (Rivot 2013b, 2017). At the heart of this defect lies the indeterminate character of the long-term expectations held by private actors, and especially by investors. This is how expectations enter the scene in Keynes's explanation of market failures. And this is how critical links can be identified with the *Treatise on Probability*.

Because the expectations at stake here are not simply inflationary expectations but prospective returns of the assets held by wealth owners in the remote future, the problem individuals face is that these prices are the product of the structural characteristics of the economy and that, seen from today, the future distribution of probability underlying the structure of the economy is, at least partially, unknown. So, for Keynes, uncertainty here applies to the structure of the economy in the periods ahead.

Next, in general, people do not change their mind very quickly about the distribution of probability they currently face, and they do not very often deeply rethink their position regarding their relative ignorance: "the … conventional method of calculation will be compatible with a considerable measure of continuity and stability in our affairs, so long as we can rely on the maintenance of the convention" (Keynes 1973a, p. 152). The very issue in Keynes is that individuals and the community as a whole are likely to be *trapped*

in harmful conventions regarding the economic climate in the periods ahead, with no competitive mechanisms at their disposal to reduce the resulting inefficiency (Carabelli 1988, 2003; Carabelli and De Vecchi 1999, 2000).

That is the reason why public works should be viewed as the falsification of pessimistic long-term expectations. Public authorities, hence, play a critical role in falsifying and reversing the pessimism of private agents when needed, and maintaining a suitable state of expectations regarding the possible future prospects of the economic system. In an economy in which the long-term state of expectations is too depressed, because investors are overly pessimistic regarding the prospective returns of the assets they hold (i.e., because of a too low marginal efficiency of capital in comparison with the current interest rate), there is no reason to produce long-lived capital assets. In turn, the current underemployment equilibrium gives some reason to investors to anticipate the continuance of the existing situation, with the ultimate consequence of this conjecture that the economy is actually trapped in an underemployment equilibrium. Investors prove absolutely right in their long-term pessimism, which implies that the long-term expectations they hold are locked at a less-than-full-employment level of investment. In this context, the true ambition of fiscal policy is to demonstrate to investors that they are wrong in holding long-term pessimistic expectations. In Keynes's own words: "In the main … restoration of confidence must be based, not on the vague expectations or hopes of the business world, but on a real improvement in fundamentals; in other words, on a breaking of the vicious circle" (Keynes 1973c, pp. 363–364).

From 1930 to the middle of 1932, Great Britain experienced a long-lasting tendency to falling production, falling investment, and falling wages and prices. The originality of his advocacy is that the public works Keynes advocated were not intended to substitute for private investment but rather aimed first and foremost at the restoration of confidence. Later on, Keynes argued: "the *first step* has to be taken on the initiative of public authority; and it probably has to be on a large scale and organized with determination, if it is to be sufficient to *break the vicious circle* and to stem the progressive deterioration" (Keynes 1972, p. 354; emphasis added). As a careful reading of Keynes's economic papers shows (as in Bateman 2005, for example), Keynes's policy advice can hardly be conflated with budget deficits.

IV. EXPECTATIONS AND THE ISSUE OF MONETARY POLICY

As we are reminded by Donald Moggridge and Susan Howson, "Keynes was first and foremost a monetary economist, whose views on the appropriate role and mode of monetary policy changed during his lifetime but who hardly denigrated its importance" (Moggridge and Howson 1974, p. 226). In our opinion, as it is the case for fiscal policy, Keynes's concern for the effectiveness of monetary policy must be understood with regard to his treatment of the decision-making process under uncertainty.

Why would private agents hold money, which bears a nil interest rate, instead of holding a non-monetary asset that in contrast earns a return, however low this return may be? The answer is, because of the *potential* loss of value this asset might bear. In the case of a low confidence in their expectations regarding the prospective returns of the non-monetary assets they hold—i.e. in the case of a very low weight placed on their

probability of rational statements regarding the prospective returns of these assets—private agents (and crucially investors) will prefer to stay liquid in holding assets the value of which is weakly dependent on a sudden change (and unforeseeable from today's perspective) in their expectations regarding the prospective returns of non-monetary assets in the long run, namely, their long-term state of expectations. It is noticeable that, as a practitioner, Keynes was an investor (Marcuzzo and Rosselli 2018; Marcuzzo 2019): he did his best to stand against conventions, and developed long-term strategies based on knowledge and expertise; he also developed networks to get a variety of information. If interrelationships can be identified between financial activities and theoretical investigations in Keynes, it can also be argued that "it was Keynes the economist who finally prompted Keynes the investor" (Cristiano, Marcuzzo, and Sanfilippo 2018, p. 39).[4]

In this context of the need to provide firm knowledge and reliable information in order to help private agents to hold their expectations with more weight (to borrow the terminology of the *Treatise on Probability*), monetary policy, whose potency is quite strong, in Keynes's opinion, becomes a policy device that aims to compel private agents to place strong weight on their "rational" probability statements. To take one, but critical, example, in the summer of 1931, at a time when the Great Depression was developing dramatically, Keynes made a statement about the relevant policy for the US that might appear very strange at first sight: "I think the argument for public works in this country is much weaker than it is in Great Britain. … I think in this country deliberate public works should be regarded much more as a tonic to any change of business conditions, but the means of getting back to a state of equilibrium should be concentrated on the rate of interest" (Keynes, summer 1931, Harris Foundation meeting, quoted in Moggridge and Howson, 1974, p. 236).

Six years later, Keynes made another statement that might appear as strange as the one quoted above. At that time, Great Britain was experiencing an inflationary boom, despite an average unemployment rate of about 12%. Keynes argued against a dear money policy to control inflation in Great Britain—despite his strong concern for inflationary pressures. He argued that trying to control the boom by dear money amounts to "playing with fire" (Keynes 1982, p. 389).

Both these arguments—the disentanglement attempt between the US economy and Great Britain in 1931, and the opposition to a dear money policy in 1937—are not so surprising if Keynes's conception of uncertainty and liquidity is kept in mind. In the first statement that is made by Keynes in 1931, the issue at stake is that the US economy is hit by a severe shock, but the economic climate until the 1929 financial crisis was favorable so that the long-term state of expectations was not so pessimistic in the US. By contrast, Great Britain was already trapped in a more or less prolonged recession during the 1920s. So in 1931 the key issue in the US is to compel private actors to hold their expectations with more confidence, whereas the issue at stake in Great Britain more critically implies compelling private actors to reverse their pessimistic expectations regarding the economic climate in the remote future. Accordingly, the best policy device for the US is monetary expansion, whereas Great Britain needs a more direct effect on the price-demand for investment by aim of fiscal policy.

[4] Cristiano and Marcuzzo (2018) review the literature about Keynes as a speculator and investor.

The second statement, with Keynes's opposition to dear money, is theoretically supported by his understanding of liquidity premium as the reward that private agents agree to pay to protect themselves against uncertainty regarding the prospective returns of non-monetary assets. Again, the crucial point to emphasize is that private agents do not only hold expectations, they also have to place confidence in their expectations. They might need time to revise both their expectations and also to revise the confidence they place in their expectations. Besides, a strong signal might be needed to reverse pessimistic expectations but more critically to ensure a strong weight on these revised expectations.

Hence, monetary policy is not supposed to be used as a short-term weapon; it should not react to the inevitable fluctuations of the economic climate by successive rises and falls in the interest rate. While escaping what is now called "discretionary interventions," monetary policy must be deployed in a long-run perspective, with the view to help private agents to place even more confidence in their expectations regarding the prospective returns in the long term of the non-monetary (and long-lived) assets they hold.[5] This point leads us to the deployment of stabilization policy in a long-run perspective, which proves crucial in Keynes's policy advice schemes.

V. PREVENTION PLANS: THE ECONOMIC POLICY PRESCRIPTIONS FOR AN OPTIMISTIC REMOTE FUTURE

In the early 1940s, Keynes's attention turned towards the economic policy for a peacetime economy. The memoranda written at that time can be understood as the ambition of conveying what had been learned during the Great Depression. To that extent, Keynes's policy proposals for preventing depressions can be viewed as a "conventional approach to policy" (Bateman 1996, p. 150).

With no surprise, the theoretical underpinnings of the policy mix Keynes developed during the early 1940s for a peaceful economy correspond to his "two-tier theory of belief" (Runde 1994, p. 133): the expectations held by investors, on the one hand, and the confidence placed in these expectations, on the other.

The Capital Budget for the Economy as a Whole

How should policy-makers proceed to prevent large-scale fluctuation in the market evaluation of the marginal efficiency of capital? How to encourage investors to expect a level of effective demand corresponding to full employment in the remote future? To deal with this problem, Keynes elaborated his concept of "Capital Budget," a concept that can be applied to the private sector, to the public sector, or to the economy as a whole. The Capital Budget is distinguished from the Ordinary Budget (which is supposed to have as far as possible a positive surplus). Keynes's main concern is the "Public Capital Budget," which is defined as "a compilation of and budgetary forecast of *all* capital expenditure under *public* control, including local authorities and public

[5] The relevant interest rate for this ultimate purpose is the long rate because non-monetary assets in Keynes are long-lived (Leijonhufvud 1968; Rivot 2013a).

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boards" (Keynes 1980, p. 405), its key role being to "balance and stabilise the Investment Budget for the national economy as a whole" (Keynes 1980, p. 409). The implementation of such an authority requires "up-to date information about net investment in the private sector" (Keynes 1980, p. 409) and the inventory of the different capital expenditures to be implemented or to be delayed, according to the circumstances.

The implementation of capital budgeting involves accounting for the information issue in a twofold perspective. First, there is of course the crucial need to get information on the economic climate, in order to prevent ill-timed measures. This means to obtain "up-to date information about net investment in the private sector" (Keynes 1980, p. 409) and the inventory of the different capital expenditures to be implemented or to be delayed, according to the circumstances. The emphasis placed on the necessity of obtaining information on contemporary business conditions is a recurrent theme in Keynes's policy writings.[6]

Second and conversely, there is the need to send strong signals to private agents in order to convince them—and, in particular, investors—to revise their judgments about economic prospects. In that respect, it appears that Keynes does not aim to fine-tune the economic machine but rather, and more modestly, to escape generating pessimistic long-term expectations. That is the reason why public authorities can be viewed as an "agent of social responsibility" (O'Donnell 1989, p. 301)—that is, the very entity in the economy able to take long-term views, and, by the way, long-term commitments.

Two kinds of problems can arise in a decentralized economy subjected to mismatches in long-term expectations. The first kind of disease is instability. For, "the variability in the confidence of expectations, both among individuals and within each individual, has an impact on how they are transmitted to markets, which in their turn may convey signals to individuals to revise these expectations, producing instability" (Marcuzzo 2020, p. 60). Paradoxically, the second disease is the stability of a pessimistic state of long-term expectations, with the economic system trapped *ad aeternam* at a less-than-full-employment equilibrium (Rivot 2020). As Carabelli (2003) argues, this means to not follow the rules dictated by habits and conventions but instead to rely on autonomous judgment, to form "genuine and reasonable judgement concerning the future" (Carabelli 2003, p. 224). Here, "reasonableness" must be understood with regard to Keynes's *Treatise on Probability*; it means "'having some reason' to believe or to act. It is a kind of cogent rationality, which varies according to circumstances" (Carabelli 2003, p. 17).[7]

Monetary Policy as a Long-Run Discretionary Policy Rule

As we have seen above, for Keynes, monetary policy is best deployed in a long-run perspective. Monetary policy is the policy weapon that aims to compel private agents to escape uncertainty, to place more confidence in their expectations (Rivot 2013a, 2017). That is, if investors hold their forecasts regarding the prospective returns of

[6] It should be noted that the need for the private sector to obtain "economic and industrial knowledge" (Keynes 1981, p. 643) from the state is underlined as early as the 1920s.

[7] Accordingly, "to Keynes reasonableness does not depend on the fulfillment of expectations, for mere luck does not turn foolish judgements into reasonable judgements (a point against Friedman's instrumentalism or positivism). Reasonableness is based on a non-demonstrative logic and on intuition versus psychology and behaviourism. But reasonableness must not be confused with following habits, rules and market conventions: Keynes defends partial knowledge against mere experience" (Carabelli 2003, p. 18).

non-monetary assets with a high weight, they will prefer to hold the latter, however low their expected returns (the risk premium being included), rather than monetary assets that earn, by definition, no return at all. On the contrary, if a significant liquidity premium is identified with the holding of an asset (whatever capital goods, financial assets, and so on), then a high liquidity premium is attached to the holding of money.

That is why "Keynes's [monetary] policy has two dimensions: managing 'money' and managing expectations" (Tily 2006, p. 662). And this management of the private agents' expectations basically entails that "there is no reliable way of establishing a low long-term rate of interest except by fostering a reasonable expectation that the rate of interest will continue low in the future" (Keynes 1982, p. 352).

The monetary policy advocated by Keynes in a long-run perspective and in relation to his treatment of the decision-making process in situations of uncertainty takes the form of a "downward tendency of interest rates" (Keynes 1982, p. 317) for two distinct reasons. The first reason is the downward slope of the marginal efficiency of capital: without a downward tendency in the interest rates, the stationary state feared by classical economists is in sight. The second reason is more subtle and is related to Keynes's conception of liquidity and uncertainty. If monetary policy aims to encourage private agents to ask for lower and lower liquidity premiums, this means encouraging them to place more and more weight on their expectations. The downward tendency of interest rates basically means that private agents are going even further from uncertainty.

Furthermore, obtaining this "downward tendency of interest rates" requires securing that each reduction on interest is not to be reverted. It can happen that "a greater degree of confidence than now exists in the maintenance of the rates of interest we already have at a level not above their present figure is our most pressing need" (Keynes 1982, p. 351). But how to proceed? Here, Keynes compels the Treasury to send to private actors the strong signal that interest rates won't rise in the future. They must engage themselves in the downward tendency of interest rates: "it is simply a question of waiting and of making it clear that loans will only be available at a modest rate of interest, becoming still more modest as time goes on" (Keynes 1982, p. 540).

VI. CONCLUDING REMARKS

To sum up our results, the twofold problems faced by a monetary economy—the lack of forward markets, on the one hand, and the functioning of financial markets, on the other —correspond to the two-tier understanding of the probability relation in Keynes's treatment of decision-making under uncertainty: the logical probability and the confidence placed in the argument.

The absence of forward markets for a wide range of commodities turns into market failures, namely, an excessively depressed state of long-term expectations. Accordingly, the proper meaning of the "pump-priming" role of loan expenditure is this: confronted with increasing aggregate demand, investors would be compelled to correct their falsified expectations of future prices and profits, leading them to revalue their estimation of the marginal efficiency of capital. By extension, the capital budget instrument aims at controlling the state of long-term expectations held by private actors.

Conversely, financial markets, due to their functioning, do not supplement the deficiencies resulting from market failures. That is, the interest rate as it is determined in financial markets is an (inverse) index of the degree of confidence placed in those long-term expectations: the higher the liquidity risk perceived, the higher the interest rate. Monetary policy à la Keynes then involves managing the decision-making process of private agents, and crucially of investors, in encouraging them to follow the Treasury in their commitment to implement a downward tendency in interest rates, and especially in the long-term interest rates. In the theoretical language of the *General Theory*, this means convincing private agents to ask for even lower liquidity premiums.

If there is one central lesson that emerges from Keynes's overall thinking, it is that "our destiny is in our own hands" (Keynes 1973c, p. 344). While this statement was made by Keynes at the middle of the Great Depression and definitely applies to public authorities' ability to improve the economic climate, a more complex interpretation of this statement could be made. For, as stated by Bradley Bateman (1996):

> There is [a] fine irony, of course, in Keynes becoming an advocate of the use of rules and conventions to help create a better world. Whereas as a young man he had devoted himself to the study of probability in order to disprove G. E. Moore's argument for the importance of established rules and conventions, he now found himself as an old man arguing in favour of rules and conventions as the necessary means to maintaining liberal civilizations. As a young man he had constructed an objective theory of probability to help establish the individual's right to ignore society's rules and make an independent judgement of the right course of action; as an old man he found it necessary to argue in favour of rules because of the "uncontrollable and disobedient" psychology of businessmen. Objective probabilities had made it possible to *ignore rules*; intersubjective probabilities made it necessary to *follow rules.* (Bateman 1996, p. 162)

To properly understand this critical point in Keynes's advice, the specificities of Keynes's understanding of capitalism should be kept in mind. As argued by Roger Backhouse and Bateman (2009, p. 651), "for Keynes, capitalism was based around institutions that had evolved over a long period." If the attention is focused at the economic level, as we did in this paper, there is little doubt that in Keynes's perspective, "the market ought not to lay down the rules of right and reasonable action, but our own judgment, based on the real, albeit partial, knowledge that we have" (Carabelli 2003, p. 226). In particular, it proves crucial that, in uncertain times, the basic duty of public authorities should be to identify perspectives for the remote future.

Because Keynes "held this view of capitalism as an imperfect machine that needed to be maintained and updated if it were to continue to work to meet society's needs" (Backhouse and Bateman 2009, p. 653), Keynes's plans for an economic policy framed in a long-run perspective means helping private agents, and crucially wealth owners, to make their forecasts regarding the prospective returns of the assets they hold in considering a state of full employment—thanks in particular to the capital budget scheme erected for the economy as a whole. That means also compelling these private agents to hold their forecasts with a strong weight. Basically, such a policy framework amounts to substituting harmful conventions regarding the remote future by a stable and optimistic convention in terms of a remaining full-employment equilibrium.

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