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Modigliani's 1944 Wage Rigidity Assumption and the Construction of the Neoclassical Synthesis

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Abstract

Modigliani's 1944 "Econometrica" article is considered one of the most important efforts to reconcile Keynes with classical economic thinking. The aim of this paper is to reconstruct the genesis of Modigliani's article and to reexamine its place in the construction of Neoclassical Synthesis. Modigliani introduced the wage rigidity hypothesis to show how monetary factors influence real variables such as the employment level and the interest rate. Modigliani's attention to the monetary origin of and solution to unemployment is in stark contrast to the neglect in Neoclassical Synthesis of the monetary side of the system and its inclination towards fiscal policy.

Preface

More than 40 years ago, when Modigliani was only 25, he wrote
a seminal article setting Model-T Keynesianism on its modern
evolutionary path and probing its microfoundations in rigid,
nonmarket clearing prices (SAMUELSON 1987, 29)

In his influential textbook, *Economics*, Samuelson announced the truce between Keynesian and anti-Keynesian economists through the construction of the Neoclassical Synthesis, a term he labeled in the 1952 edition[1], which placed J. M. Keynes's revolution in line with mainstream economics.

The attempt to make Keynes' economics consistent with a general equilibrium system of equations originated with Hicks (1937) and was carried out especially in the U.S. over the forties and fifties by Hansen (1949, 1953), Klein (1947), Lange (1938, 1944), Modigliani (1944), Patinkin (1948-1956), Tobin (1941) among others. The IS-LM model became the canonical reading of Keynes' General Theory[2].

According to the literature, one of the most important efforts to reconcile Keynes with

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[1] I mainly refer to Blanchard's entry *Neoclassical Synthesis* in the New Palgrave (Blanchard 1987).

[2] See De Vroey M., 2000 and the HOPE Supplement devoted to the IS-LM model (n. 36, 2004).

traditional economic thinking was that of Franco Modigliani[3]. In his «Liquidity Preference and the Theory of Interest and Money» (*Econometrica*, 1944), Modigliani suggested that the only difference between Keynes and classical economics was that, in Keynes' system, money wages did not fall as unemployment rose; rather than falling to bring demand for labor in line with supply—which is what the classical economists theorized would happen—wages remained "rigid" or "sticky." Thus, involuntary unemployment, in Modigliani's interpretation of Keynes, was still consistent with classical theory: it was simply brought about by workers who were unwilling to accept a pay cut in order to remain employed.

Through its integration of Hicks's IS-LM model with the labor market, Modigliani's article represented a fundamental contribution to the construction of Neoclassical Synthesis (Blanchard 1987; Howitt 1987, Samuelson 1987, 2007, Snowdon, Vane 1999) and a first step towards a restoration of the pre-Keynesian view (Roncaglia, Torvernachi, 1985, De Vroey, 2000). Modigliani himself in his autobiography recalled that his article was read by the academic world as a refutation of Keynes' revolution and a defense of the classical system (2001, 55).

But did Modigliani introduce wage rigidity to reconcile classical and Keynesian economics? Was the relation between wage rigidity and unemployment the original focus of Modigliani's article as his interpreters would have it? The aim of my paper is twofold: to reconstruct the genesis of Modigliani's 1944 *Econometrica* article, and to reexamine its place in the foundation of Neoclassical Synthesis, especially regarding his assumption of wage rigidity. My suggestion is that Modigliani introduced this hypothesis not to reconcile the two systems rather as a convenient analytical device, as well as a realistic assumption, to show the working of a monetary economy in which every economic variable (including level of employment and interest rate) depends on the quantity of money, and to demonstrate the consistency of unemployment with a stable equilibrium position –defined as a situation of rest- to avoid an indefinite deflation process. In other words, Modigliani's focus was not merely on the relation between involuntary unemployment and the labor market conditions, rather on the crucial role of money in the determination of real variables and the explanation of unemployment equilibrium. Modigliani's attention to the monetary origin of and solution to unemployment is, however, in stark contrast to the neglect in the Neoclassical Synthesis of the monetary side of the system and its inclination towards fiscal policy.

[3] See Blaug 1996, Colander 1986, Leijonhufvud 1968, McCallum 1987 among others.

Furthermore, the standard reading of Modigliani's contribution to Neoclassical Synthesis assumes a link between wage stickiness and short run disequilibrium/long run equilibrium (the so-called "schizophrenia" in Neoclassical Synthesis) - a link not discussed by Modigliani. On the contrary, in his subsequent reading of his paper he will refer to unemployment as a systematic feature of an economy relying on money to carry out transactions (Barnett and Solow 2000, 229)[4].

To show the difference between Modigliani's use of wage rigidity in his 1944 paper and the view prevailing in the literature, I also refer to Modigliani's PhD dissertation, and to Modigliani's correspondence, especially with Patinkin, in which he clarified the significance of his Keynesian model with respect to Patinkin's interpretation of it.

The paper is organized as follows. Sections 1 and 2 are devoted to the intellectual context in which Modigliani developed the ideas of «The Liquidity Preference» article and his PhD dissertation (an extension of the former). This context is of particular relevance to reconstruct Modigliani's early aims. Section 3 makes it explicit that the significance Modigliani attached to wage rigidity was different from that assigned by Patinkin, which reflects the canonical reading of the 1944 paper. Points of difference between them are revealed in their correspondence. Section 4 ends.

1 The New School background: The genesis of Modigliani's 1944 paper

Modigliani's famous "Liquidity preference" was part of his PhD dissertation on Keynesian and classical economics he defended at the New School for Social Research in June 1944, after the publication of the paper[5]. He first approached Keynes' *General Theory* (*GT*) thanks to seminars organized by Oskar Lange, to long discussions with Abba Lerner, and especially to Jacob Marschak's teachings, an intellectual debt Modigliani honored in his Nobel lecture. All of them were very familiar with Keynes' theory. Lerner was at Cambridge in 1934-35, where he came in contact with Keynes' Cambridge Circus. Marschak, who had arrived in the US in 1938, was up at Oxford when Oxford University

[4] «Modigliani (1944) had shown how Keynesian results could be derived from an otherwise classical model if the money wage rate were fixed. Since it was widely believed that wages were less than fully flexible in the short run, it seemed natural to see Keynesian theory as applying to short-run fluctuations and general equilibrium as applying to long-run questions in which adjustment problems could safely be ignored. This view came to be known as the 'neoclassical synthesis'» (Howitt, 1987, 274).

[5] Modigliani received a scholarship from the *New School for Social Research* principally thanks to the renowned antifascist refugee Max Ascoli (Barnett and Solow, 2000, 223; Pasinetti, 2005, 25, fn). Modigliani was Marschak's student at the Graduate School from 1939 to 1942. Regarding Marschak's influence: «Jasha Marschak was my mentor, we studied Keynes and the *GT* in classes with Marschak…In addition [I] received a lot of advice and support from him. He suggested me readings and persuaded me of the importance of mathematical tools …» (Barnett and Solow, 2000, 225).

hosted the famous Econometric Society symposium where Hicks presented his IS-LM model[6]. Lange's *Economica* paper (1938) at the time (1936 to 1948) was the most cited article, second only to Keynes's *GT* (Moggridge 2000, 232).

However, Modigliani's earliest interests were in monopoly and welfare economics, as evidenced by his student notes and his correspondence with Marschak, his PhD supervisor. Marschak encouraged the young Modigliani to carry on his studies: «I should like to know whether you are making some progress with your thesis. Your future will very much depend on your ability to concentrate and publish something really new. I am sure you <u>can do it</u>» (Marschak to Modigliani, January 22, 1941, in Modigliani Papers henceforth MP)[7].

Marschak and Modigliani were to maintain a very close relationship even after Marschak left the New School to join, in January 1943, the University of Chicago and the Cowles Commission. Marschak insisted on having Modigliani join him.

Marschak was replaced by Lerner in 1942. It emerges from the correspondence, and is recalled by Modigliani, that his attention shift from welfare to Keynesian economics was in part related to his lengthy discussion and correspondence with Lerner on classical and Keynesian economics, which represented the departure point for his *Econometrica* article. In fact, the paper was intended as Modigliani's answer to Lerner's purely monetary theory of interest, his focus on the investment function and his support to fiscal policy (the so-called Lerner's functional finance)[8].

Modigliani's and Lerner's early discussions revolved around the role played by the interest rate and by liquidity preference in the self-adjusting mechanism. Modigliani rejected Lerner's idea that a change in the propensity to save did not affect the rate of interest[9].

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[6] During the 1930s Marschak was also part of a very active movement: the Kiel-Heidelberg group, against the wage cut policies, which had a leading role in the Weimar debate. According to Marschak, 1930 wage cuts at first implied no reduction but a reallocation of purchasing power from workers to entrepreneurs: «Such a reallocation of purchasing power naturally is associated with a change in the structural composition of production… a reallocation of purchasing power in favor of workers, which is associated with higher wages, will stimulate production since the goods consumed by workers are subjected to the law of mass production at higher degree than those goods consumed by the capitalist» (quoted from Hagemann, 2005, pp. 16-17).

[7] A few months later Marschak asked Modigliani to write a joint report for the general seminar of Faculty members: «we might (you and I) present a joint report on monopoly and welfare which would give an outline of all our 4 (or 8) sub-problems» (Marschak to Modigliani: June 25, 1942, MP).

[8] In a letter to Marschak, Modigliani wrote about his relationship with Lerner: «we have been talking much about you with all our common friends, Lange, Halasi, Loewe and especially Lerner. There seems to be a good deal of understanding between me and Lerner and genuine friendship is gradually developing with him of which I am very happy. I think more and more that Lerner is an exceptionally good economist and I am often amazed at what he manages to do without using calculus. I have the impression that he is very often too extreme in his theories or rather too 'logically extreme' but this very fact makes discussion with him very fruitful because one always knows what one is talking about» (July 16, 1943). See also Barnett and Solow (2000), and Modigliani (2001).

[9] According to Lerner, an increase in the propensity to save did not increase aggregate saving and investment, unless someone else would be forced contemporaneously to reduce his saving and, thus, the amount of loanable funds would be unchanged (in Modigliani and Lerner correspondence, MP).

According to Modigliani, for any increase in saving there was a corresponding increase in the investment schedule through a reduction in the interest rate - under the hypothesis of a classical demand for money (i.e. only function of money income). Following Hicks' IS-LM model, Modigliani distinguishes between classical and Keynesian economics only on the basis of interest rate elasticity of liquidity preference, rather than the shape of labor supply, as he did in his 1944 paper. High levels of interest are in line with classical theory (the price of liquidity is too high) thus, any small shift in the propensity to save will cause the interest rate to fall in order to induce borrowers to borrow more, leaving income and employment unchanged. Nonetheless, if in the relevant range the LM curve were moderately bent, then an increase in the propensity to save requires some adjustment to money wages to maintain full employment:

> Even though [the classical economists] did not foresee that a change in the propensity to consume might require a cut in money wage, they were perfectly right in maintaining that a cut in wage would lead to full employment. And this continues to hold true until the range of 'low' interest rate is reached where the LL curve becomes perpendicular to the interest rate axis. It is at this point that Keynes's analysis becomes really relevant …I don't deny of course that troubles may arise somewhere during the developments especially when the shift is unforeseen, but this is not the argument … you wanted to deny that any change in investments could occur unless people changed their desire to hold cash (Modigliani to Lerner: June 2nd 1943, MP).

In his reply Lerner pointed out that Modigliani was ascribing to the Classical Keynes' reasoning based on the effect of a fall in income on interest rates, through a reduction in the need for cash, «so that the investors have a signal that they should increase investments» (Lerner to Modigliani, June 2nd 1943, MP). Lerner also specified that the classical conclusions did not hold «whenever the liquidity preference is less than infinite but only when this elasticity is zero» (ibid). In this case an infinitesimal decrease in employment is sufficient to bring about any necessary fall in the rate of interest.

When (the) liquidity preference is not vertical:

> <u>It is possible for investments to fill the gap made by the increased propensity to save only when wages and prices have fallen as much as is necessary to reduce the rate of interest. I deny that this is the classical argument, because it differs from it not only in the mechanism but also in the conclusion</u>. … The similarity [among the two systems] is only in that both arguments finally show full employment with less consumption and more investment. The differences are that the classical theory did not indicate any necessity for wages and prices to fall while it is essential (except for the limiting cases) and that the classical theory did say that the real wage must be less, which is not necessary at all … Some minor points…when you say the classical

economists are perfectly right in saying that a cut in money wages would lead to full employment, you are disregarding the reasons they gave for it but notice that the conclusions are right for reasons given by Keynes. Is this kind of "super functional theory of knowledge", by which one could argue that medieval monks were right when they said that ground bones of saints in hot water is good for bellyache because we now know that hot water is good for bellyache? … (ibid, emphasis added).

Despite their different interpretations of Keynes and classical systems, they both believed in the theoretical equivalence of wage deflation and expansionary monetary policies, around which the first part of Modigliani's article was constructed: «finally and to make my position perfectly clear I repeat that I agree with you that under certain conditions a change in the propensity to save will require a fall in money wages or an increase in the quantity of money …» (Modigliani to Lerner, June 2nd 1943, MP). Both also denied any practical efficacy of wage cut once its effects on income distribution and expectations were taken into consideration, as discussed in Lerner (1939) and in Modigliani's PhD dissertation.

That Modigliani's early studies on Keynes's *GT* were especially devoted to monetary and interest theory is apparent also from his correspondence with Marschak and Lange. In a letter to Marschak dated July 1943, Modigliani wrote:

I have just finished to write an article on the theory of the rate of interest which, you may perhaps remember had been in my mind for a long time. I don't believe it is any great achievement but it may help to clarify a few points; in any event it is very important for me because it is the first time since I am in this country that I manage to carry a research to the end … I would like to mail you a copy of the manuscript and to ask you for your advice on one or two mathematical points which I would like to include in the paper but of which I am not sure (July 16, 1943, emphasis added).

A few months later, Oskar Lange asked Modigliani – probably at Marschak's suggestion - to send «one or more articles for *Econometrica* [of which he was the Acting Editor]… I know you have been working on several subjects like consumer surplus, the Hotelling theory, Says's law, interest, etc» (October 5, 1943)[10].

Contrary to later writing based on Modigliani's 1944 article, which concentrated on the relation between wage rigidity and Keynesian unemployment, Modigliani considered the last section of his paper devoted to the construction of a «general theory of the rate of interest and money» his original and most relevant contribution. In sending the manuscript

[10] One of Modigliani's article referees was Leonid Hurwicz who at that time was Lange's research assistant at the University of Chicago. From 1942 he was at the Cowles Commission working with Marschak and Koopmans.

to *Econometrica* he «recommend[ed] especially … attention [in the editing of the English parts] to the last chapter of the paper, *which I feel is the most important of all*» (Letter to Mr. Leavens, Managing Editor of *Econometrica*: December 14, 1943)[11].

He did not equally emphasize the wage rigidity assumption probably because he knew that the interpretation of Keynes's unemployment equilibrium in terms of a perfect elastic labor supply was not new to the literature.

Finally, that a mere discussion on the relation between wage behavior and involuntary unemployment as such did not represent Modigliani's main object of investigation is also suggested by his decision to omit, from the overly long draft of the article, the section devoted to the analysis of wage cutting and unemployment policies since «the chapter is not necessary for the main argument. If Prof. Lange and the referee feel it is worthwhile, it could be published in some future issue of Econometrica» (Modigliani's correspondence with Mr. Leavens: December 14, 20, 29, 1943, MP).

2 The Liquidity Preference and the Theory of Interest and Money

The intellectual context in which Modigliani developed his *Econometrica* article – under Lange's, Lerner's and Marschak's influence - clearly explains how 'natural' it was for him to read Keynes' economics within a general equilibrium system of equations[12].

The article is organized in two parts. The first one is devoted to a «brief reexamination» of Keynesian theory, to determine the role in it of liquidity preference and of the infinitely elastic labor supply, and to specify the properties of systems in which one or both Keynesian hypothesis are abandoned. Finally, the classical theory of money and the dichotomy of real and monetary economics were tested for logical consistency.

Modigliani's major aim was to derive from this analysis his «general theory of interest and money» (in the second part of the paper)[13]. In particular he rejected Hicks' (1939) and

[11] Solow recalls that «the 1944 article was … mostly about Keynes's theory of interest … it is interesting then, that the main influence of the paper lay elsewhere» (2005, 12).

[12] However, in his unpublished reply to Hahn's (1955) criticisms to his general system of equations and to his defense of the classical dichotomization (under the hypothesis of flexible wages), Modigliani explained that his model was not stated in general equilibrium language «as it become fashionable since that time of its appearance» (MP). Modigliani restated the 1944 model in Walrasian form in 1963 to reply to the so-called Patinkin controversy. Modigliani had clarified his methodological approach at the beginning of his 1944 paper: «As first step … we must set up a system of equations … In doing this we are at once confronted with a difficult choice between rigor and convenience; the only rigorous procedure is to set up a complete 'Walrasian' system…but this system is cumbersome…The alternative is to work with a reduced system» (1944, 46).

[13] «THE AIM OF this paper is to reconsider critically some of the most important old and recent theories of the rate of interest and money and to formulate, eventually, a more general theory that will take into account…the part played by different basic hypotheses» (1944, 45).

Lerner's attempts to reduce the interest rate to a purely monetary phenomenon with no (indirect) influence of real factors such as the propensity to save and the marginal efficiency of investment. Modigliani's crucial point was that its monetary explanation was entirely due to the fact that under wages rigidity every economic variable, including level of employment and interest rate, depends on the quantity of money (1944, 86-88).

From a general system of equations, taken in part from Hicks (1937) and Lange (1938) Modigliani developed three different macro-models: the «Keynesian» model characterized by liquidity preference and wage rigidity; the «crude classical system» that included the quantity theory of money and wage flexibility; and a «general classical model» with liquidity preference and classical labor supply.

According to Modigliani, a classical supply of labor differed from the Keynesian supply since the former represented only the maximum amount of full employment corresponding to any real wage rate. Following Lange's definition (1938, 31), he considered the wage rigidity hypothesis as equivalent to a perfectly elastic labor supply as long as the demand is less than full employment.

Despite Modigliani's use of the IS-LM framework for the determination of the equilibrium level of nominal income and interest, his analysis differs from Hicks' under various aspects. The first part of Modigliani's paper was in fact devoted to extend the validity of Keynes' economics in respect to the so-called Keynesian case (the liquidity trap), shifting the attention from the role played by liquidity preference to wage rigidity, considered a more general and realistic hypothesis. Thus, while Hicks assumed exogenously fixed nominal wage in both systems (classical and Keynesian), Modigliani explicitly introduced the labor market and confronted the real and monetary mechanisms underlying respectively the classical and Keynesian systems as a result of different wage behavior. However, Modigliani's focus on wage rigidity versus classical flexibility did not mean an attempt to reconcile the two systems. On the contrary, Modigliani intended to make clear the working of a monetary economy[14] in respect to the economy analyzed by classical theory: «Systems with rigid wages share the common property that the equilibrium value of the 'real variables' is determined essentially by monetary conditions rather than by 'real' factors» (1944, 65). From the mere counting of the number of unknowns and equations, he demonstrated that under flexible wages the classical dichotomy holds, thus, the rate of

[14] For «monetary economy» Modigliani intended an economy in which money is used for transactions and speculative motives and wages are rigid.

interest and the level of employment do not depend on the quantity of money. Under this hypothesis, the desire to hold money as an asset only determines the price level[15].

On the contrary, under wage rigidity the classical dichotomy breaks down and the monetary side of the system - formed by liquidity preference, the supply and demand for saving schedules, and its equilibrium condition - determines the equilibrium level of money income and the rate of interest, on which output and employment and all other real variables depend[16]. As in Keynes, Modigliani defines the equilibrium in terms of a position of rest (neither prices nor quantity tend to change), thus it is consistent with involuntary unemployment since, under wage rigidity and fixed money supply, there are no economic forces that move to full employment (1944, 66).

To show the mechanism by which monetary conditions influence real factors, Modigliani focused on the effects of a reduction in the marginal efficiency of investment – followed by a reduction in the equilibrium rate of interest - upon liquidity preference and monetary equilibrium. According to Modigliani, a fall in the rate of interest leads to excess demand for money as an asset. If the supply of money is not properly increased money income has to fall (to decrease the transaction demand for money) to restore the equilibrium in the money market. Under condition of flexible wages, this means a fall in money wages and prices without affecting the real variables. Under wage rigidity instead:

> The reduction in money income made necessary by the fall in the rate of interest becomes a reduction in real income and employment as well. The effect of a shift of the investment schedule is now to start a typical process of contraction so frequently described in Keynesian literature. As producers of investment goods make losses, they have no other choice than to dismiss workers, even though their physical productivity is unchanged … The fall in money income increases the supply of money to hold; the fall in real income decreases saving and rises its marginal efficiency above the level r_1 … this double set of reactions leads finally to a new equilibrium, with a smaller money and real income, less employment, high real wages and a rate of interest somewhere below r_0 and above the new "full employment" interest r_1 … (1944, 73)[17].

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[15] Modigliani defended the classical dichotomy on the basis of wage flexibility rather than the Say's Law, whose validity he rejected (see Modigliani, 1944, 67-68 and 70-72).

[16] In opposing Keynes' monetary economy to the classical dichotomy on the basis of wage rigidity, Modigliani also ascribed a different significance to the intersection of the IS-LM curves with respect to Hicks (1937). While in Hicks the intersection represented the simultaneous equilibrium of real and money markets, in Modigliani both curves belong to the money market, representing respectively the money stocks and flows of saving and net borrowing and the short (the LM) and long run (the IS) monetary equilibrium (see 1944, 61). This particular interpretation is especially discussed in Rubin (2004). According to Rubin «the "monetary equilibrium" was not the simultaneous equilibrium of two different markets (goods and money), but the equilibrium of a single market (money) in the short run and in the long run» (194-195).

[17] Modigliani did not explain the possible reasons for a fall in the marginal efficiency of investment – whose factors are technological and psychological, such as expectations (1944, 59 fn17). In his handwritten notes on Keynes's *GT* Modigliani argues that «the marginal efficiency of capital depends on expected value of money and on expected rate of technical progress etc.». And in his comments on Ch. 21 of the *GT* about *Incentive to*

In Modigliani's model the disequilibrium in the money market (due to a fall in the interest rate and a corresponding increases in the demand for money as an asset) was the factor that starts the «typical» Keynesian process: a reduction in real income and employment to clear the money market[18].

Modigliani's focus on the excess in the demand for money was also functional to reject the «commonplace» that explained unemployment as due to lack of investment, an explanation valid only in the Keynesian case. According to Modigliani, unemployment originated in the money market: he was convinced that a change in the marginal efficiency of investment «has no direct influence on aggregate employment», as shown by the fact that in the classical case (when the demand for money is zero) the above change affects the rate of interest but not the level of employment. Therefore, the reduced level of employment and investment are «not the result of causal relationship» but «a symptom of monetary disturbances» (1944, 77). Modigliani concluded that «what is required to improve the situation is an increase in the quantity of money» then employment will increase in «every field of production including investment» (ibid)[19].

Modigliani's emphasis on unemployment as the equilibrating mechanism of the money market, under the hypothesis of wage rigidity, was also useful to demonstrate the theoretical equivalence between monetary and wage policy, an argument he omitted from the paper and he later developed in his PhD dissertation on: «The general theory of employment, interest and money under the assumption of flexible prices and fixed prices», where he better clarified the role of money supply with respect to wage rigidity.

Despite the crucial role he ascribed to this hypothesis, it was not supported by a rigorous explanation. He simply defines nominal wages as the result of history or economic policy or both. Consequently, the rigidity assumption entered the literature as an *ad hoc* hypothesis (see Patinkin 1948, 1956; Solow 1984; Tobin 1971, among others)[20].

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liquidity, Modigliani underlined that: «the difficulty of full employment follows 'from the association of a conventional and fairly stable long-run rate of interest with a … highly unstable marginal efficiency of capital'» (in *Keynes –General Theory, Notes and Remarks*, MP).

[18] In his interview with Barnett and Solow (2000) Modigliani explains as follows the mechanism he had in mind: «Keynes' unique achievement consisted not only in showing that unemployment is the variable that clears the money market; he also elaborated the mechanism by which an excess demand for money causes a decline of output and thus in the demand for money, until the demand matches the given nominal money supply … And this starts the chain leading to lower output through a fall in investment, a fall in saving, and thus in income and employment. It is this fall, together with the rise in interest rates, that reduces the demand for money till it matches the supply (228).

[19] «When the over-all level of employment is low there will be a reduced level of investment as well as reduced level of consumption. And the level of investment is low because employment is low and not the other way around …» (1944, 77).

[20] Modigliani was aware that the distinction between the Keynesian and the classical systems on the basis of

2.1 Modigliani's PhD dissertation: monetary vs wage policy

In his PhD dissertation (which was an extended version of his 1944 article) Modigliani introduced a section on fiscal policy and a final section on the efficacy of wage cuts and monetary policies (probably the parts omitted from the original version of the paper). These sections help to clarify the central role of the monetary sector and the instrumental use of the wage rigidity hypothesis: «in stressing so much the monetary aspect of the unemployment problem we are not only interested in a more correct theoretical formulation, for this formulation has also important implications concerning the concrete forms of economic policies indicated to relieve unemployment» (PhD, 52).

In «Some Considerations on Unemployment Problem» Modigliani criticized public investment programs since unemployment was explained by the scarcity of money in relation to the schedule of liquidity preferences. Programs financed by borrowed money tend to increase the rate of interest and therefore «Government expenditure will be partly offset by a fall in private investments» (PhD, 53). And in the concluding section of the thesis, «Notes on the Effect of Wage Cuts and Changes in the Quantity of Money on the Level of Employment and on the Distribution of Income», which was accompanied by a mathematical appendix, Modigliani discussed the consequences of cuts in money wages compared to the effect of an expansionary monetary policy. In spite of their theoretical equivalence, Modigliani endorsed the latter and rejected the former whose efficacy – in a macro-static approach and under conditions of perfect competition - depended on the elasticity of demand for money to hold with respect to the rate of interest. He also pointed out that the relevance of this analysis concerns especially the effects of wage deflation on income distribution and expectations. In particular, its effect on profits leads to «the most interesting conclusion»: if the fall in the price level «is considerable, entrepreneurs may very well find that having deducted the fixed interest payments, their real net profits are actually reduced»[21]. Thus, the class that asked for a wage cut as the «only sound way of reducing

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wage rigidity was a simplification of Keynes's *GT*: «We should add that, even in the 'Keynesian' system, it is admitted that the wage will begin to be flexible downward before employment has reached the zero level: but in order not to complicate equation 9 [the supply of labor] still further we can, without serious harm, leave the hypothesis in its most stringent form» (1944, 48).

[21] «The likelihood of this outcome depends on the relation between the production function, the share of income going to fixed income receivers and the elasticity of the demand for money to hold … the likelihood of losses is increased and approaches certainty as $L_r \to \infty$ [the demand for money as an asset tends to infinite]» (PhD, 74). Regarding workers, Modigliani argued that the real wage bill would not necessarily fall as employment increased, on the contrary, when there is much unused plant and organization capacity, the marginal product of labor will be high and will be not greatly affected by a small increase in employment. As long as the level of employment remains rather low the increase in employment will be accompanied by an

unemployment» would be the only one to lose out. According to Modigliani, the negative effect on profit is even worsened by expectations: wage cuts may become a dangerous source of entrepreneurial losses and thus lead to further contractions: «Realized losses are sure to create a mood of pessimistic expectation and thus adversely affect the level of economic activity ... » (PhD, 75-76). Thus Modigliani was among the first who recognized the negative distribution and expectations effects of wage deflation[22]. He considered expectations as the most important argument against wage cuts: «a fall in the price level may lead to the expectation of a further fall and thus create a speculative demand for money. If this happens, a cut in money wages is likely to cause a fall rather than an increase in employment» (ibid). Nonetheless, he did not develop the argument since, being dynamic, it was excluded by his simplifying assumption of unity elasticity of expectations.
Few years later, in his classes on mathematical economics, discussing the classical (Pigou) and Keynesian systems, he explained that wage rigidity was most important with respect to downward movements. However, a wage deflation policy would worsen the situation since a corresponding decline in consumption and thus in the entrepreneurs' expectations:

> If changes in the wage rate are allowed … you can have full employment. Let wages fall. Then income will fall and less money will be needed for transaction. More money will then be available for investment, the interest rate will fall, and investment will increase. The proposal that might be made on the basis of the preceding paragraph is that wages should be lowered in the time of downturn. This lowering of wages, however, cause a decline in consumption which may affect the expectations of potential investors … A policy of lowering wages to fight deflation must be seriously questioned (1952, «Notes in Mathematical Economics III», by W. Hartigan, W. Holter, MP).

3 The disequilibrium approach *vs.* the wage rigidity interpretation of Keynes's unemployment (Patinkin-Modigliani correspondence)

Since the beginning Modigliani's article was read as a reassessment of the importance of Keynes' revolution. In fact, the comparison of classical and Keynesian models on the basis

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expansion in the real wage bill. Modigliani also refers to Tarshis's «Changes in real and money wages», in the *Economic Journal* (1939).

22 The role of fixed money supply and wages in the determination of the employment level, the theoretical equivalence of an increase in the supply of money and a decrease in money wage, as well as the role of expectations, had already been discussed by Meade (1937). However, Modigliani did not mention Meade's work neither in the paper nor in the PhD dissertation. It is possible that Modigliani knew Meade's work but, as he wrote to the Managing editor in submitting the paper to Econometrica: «the quotations are in general not sufficient. I am well aware of this fact but I don't have a Library well supplied at my disposal and so I did as well as I could" (December 20, 1943).

of different wage behavior especially capture the attention of neoclassical economists, who read it as an attempt to bring Keynes' theory in line with mainstream economics.

Leontief, in a letter to Modigliani, defined the paper as «one of the best expositions of the Keynesian theory in its relation to a Classical theory»: «… You might be interested that in his answer to my discussion of the homogeneity assumption in 1936 *QJE* Mr. Keynes acknowledged the existence of his non-homogeneity assumption» (July 3th, 1944, MP).

Haberler as well, referred to Modigliani's analysis as a «remarkable demonstration of the crucial role of wage rigidity», to deny the novelty of Keynes's theory (1946, 190, fn11)[23].

Schumpeter *even* considered the paper as one of the highest examples of anti-Keynesianism:

> It is really an injustice to Keynes's achievement to reduce it to the bare bones of its logical structure and then to reason on these bones as if they were all. Nevertheless, great interest attaches to the attempts that have been made to cast his system into exact form. I want in particular to mention: W. B. Reddaway's review … 1936; R. F. Harrod … 1937, J.E. Maeade … 1937, J.R. Hicks … 1937; O. Lange … 1938; P.A. Lerner 1938… In the hand of economists less in sympathy with the spirit of Keynesian economics, some of the result presented in these papers might have been turned into serious criticisms. This is still more true of F. Modigliani "Liquidity Preference … (1946, pp. 510-11 fn 26).

On the other hand, the main developments of Keynesian economics during the 1940s and 1950s were essentially devoted to investigate the effects of aggregate demand on real output and employment[24]. Klein (1947), Hansen (1946, 1949, 1952), Samuelson (1948) did not refer to Modigliani's monetary analysis or to his wage rigidity assumption as being the origin of unemployment equilibrium. Hansen (1946, 186, fn10) rejected the possibility that an orderly reduction in wages, «which are relatively rigid», could promote an increase in employment via a fall in the interest rate (rejecting Pigou's and Haberler's positions) criticizing, in a short footnote, Modigliani's excessive emphasis on expansionary monetary policy and focusing instead on the limited investment opportunities.

In his *Economics* – probably the main vehicle of diffusion of Keynes's theory (in the Neoclassical Synthesis's version) Samuelson focused on the crucial role of investments: «ALL modern economists are agreed that the important factor in causing income and employment to fluctuate is investment» (1952, 224). Thus, his representation of Keynesian theory, trough the income-expenditure model, concentrated on the effective demand and the multiplier, he supported fiscal policy and never refers to Modigliani's labor supply

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[23] It is interesting to know that in some handwritten notes on Haberler's «Prosperity and Depression» (1939) Modigliani rejects Haberler's support of wage deflation policy to increase employment, arguing that «all argument is a non-sense» (in MP).

[24] Although Modigliani's 1944 article entered the literature as a fundamental step in the construction of the Neoclassical Synthesis, it initially received little attention from scholars: Modigliani's «Liquidity preference» was not among the most cited of the articles published between 1936 and 1948 (ten or more citations, in Moggridge 2000, 232).

curve and its monetary implications.

Klein, in his famous «The Keynesian Revolution» (1947) - even accepting Keynes's interpretation of unemployment in terms of a perfectly elastic labor supply (1947, 74) - denied that wage rigidity was necessary to explain involuntary unemployment: «with the assumption of various frictions, imperfections, and rigidities of the real word, an explanation of unemployment is not difficult, either in the classical or the Keynesian system … the numerous remarks throughout the recent literature that Keynes relied upon wage inflexibilities to obtain his result are entirely unsubstantiated» (1966(1947) 83, 87-90)[25]. In order to show that full employment is not automatic in a world subject to Keynesian conditions, it is sufficient to make plausible assumptions about «the interest-elasticity of certain basic relationships» (ibid). Klein shifted his attention from the mere counting of equations and variables to the shapes of the functions. He then adopted the IS-LM scheme to reject wage cuts as «an easy-money policy» (1947, 88): if the liquidity preference schedule was elastic and/or the marginal efficiency schedule inelastic, wage cuts will not raise the level of output and thus employment via the production function.

However, Klein distinguishes between the origin of unemployment and the unemployment equilibrium, maintaining the necessity of wage rigidity to explain the consistency of unemployment with an equilibrium position, to avoid a cumulative depression process.

Klein's approach was especially developed by Patinkin[26]. Despite Patinkin, as Modigliani, had Marshack as supervisor of his PhD dissertation («On the consistency of Econometric Models: A Theory of involuntary Unemployment», 1947) he was one of the major critics of Modigliani's 1944 paper, both of his defense of the classical dichotomy and his explanation of Keynes' involuntary unemployment, considering the wage rigidity hypothesis too trivial.

Patinkin's departure point was Lange's alternative representation of Keynes's unemployment theory in terms of an equilibrium (Lange 1938) and a disequilibrium phenomenon, i.e. an excess of labor supply that implies an excess of demand in some other markets (Lange 1944). However, while Lange considered the two definitions equivalents - «the choice is merely a matter of convenience» (Lange 1944, 6fn4), Patinkin, whose framework was Walras' general equilibrium, rejected the former (adopted by Modigliani) and endorsed the latter (see Boianovsky, 2006, 204)[27].

[25] Klein never referred to Modigliani's 1944 paper.

[26] Regarding Klein's influence on Patinkin, see Patinkin (1956, 234 fn.4); see also Rubin (2002, 205-225) and Boianovsky (2006, 193-249).

[27] In his 1944 Cowles Commission monograph Lange defined unemployment as «an equilibrium position obtained by the intersection of a demand and supply curve, the supply curve of labor, however, being infinitely elastic over a wide range with respect to money wages ... » (1944, 6 fn4). Then he also introduced an alternative definition of unemployment – with respect to the perfect elastic labor supply - consistent with the

Following Marschak's suggestion, Patinkin embarked on a correspondence with Modigliani on March 18, 1947 asking for a copy of the «Liquidity Preference» article, since he was concluding a «theoretical study on unemployment which will appear in Econometrica». After reading Patinkin's work, sent to him by the Cowles Commission, Modigliani replied to his criticisms. First, he agreed with Patinkin's rejection of his homogeneity assumption: «I had already found out for myself that there was some inconsistency in the homogeneity assumption made by myself, Lange, as well as by practically all writers», since «I had worked on the subject for sometime and have a half completed manuscript dealing with partly overlapping topics» (August 8th, 1947, MP)[28].

In January 1948 Patinkin wrote again to Modigliani asking for the references in the *GT* from which he – as well as Lange - had taken the perfectly elastic labor supply function, «because I have never been successful in finding an explicit statement in the *General Theory*» (January 22, 1948, MP).

Modigliani's first answer was quite vague: «my labor supply function was based on the general impression left from the *General Theory*. The stickiness of money wages, if not their absolute rigidity seemed to me to be essential in the Keynesian system. However, I agree with you that I should be able to justify my contention a little better. I promise I will look into the *General Theory* … and I give you a fuller report» (February 6, 1948).

A month later, in March 1948, Modigliani gives the references: pp. 14 and 15 [*GT* Ch. 2, Section III for downward rigidity, the same reference quoted by Lange, 1938], p. 303 [Ch. 21, Section IV for upward flexibility] that he considered precisely equivalent to his formulation. Modigliani also explained that it was not necessary for his model to assume complete rigidity: «I admit and I have admitted in my paper, that we need not assume that the wage rate will be absolutely rigid upward and downward as employment fluctuate below full employment (Modigliani to Patinkin: March 1st, 1948):

As employment falls below N_0 the money wage rate will not tend to be cut, even though the price level falls and the number of people willing to work at the new real wage rate is not less, but presumably more than N_0 (assuming the forward rising classical supply of labor schedule). … Even if wage may fall, to some extent, as unemployment become widespread, they do not fall sufficiently to make the real wage rate equal to the marginal disutility of the existing level of employment. I know that, at this point, you might say that it may, in fact, be impossible for worker to reduce the real wage rate to this extent, operating through money wage.

general equilibrium framework defining underemployment as the excess supply of labor which implied an excess of demand in some other markets (1944, 6, fn 4); see also Boianovsky (2006, 202-204).

28 In a letter to Marschak Modigliani expressed his interest on Patinkin's study: «I have some bad conscience for not having yet found time to write to Patinkin my contents on his paper … but I have had no chance to do it» (October 6th, 1947).

This is of course an entirely different argument, which I have already discussed in my paper (Keynesian case) and you have discussed in yours» (ibid).

Patinkin was not satisfied by Modigliani's references and explanation, arguing that the statements he quoted were «ambiguous» and insufficient to support his formulation, which appears «very artificial»[29]. In fact: «If the supply curve has even the slightest elasticity before N^0 then N^0 can no longer function as the definition of full employment, for then you will no longer be able to say that at the prevailing money wage rate less people are working than desire to …» (April 7, 1948).

From their correspondence, the different use Modigliani and Patinkin made of the wage rigidity assumption, with respect to Keynes' involuntary unemployment equilibrium/disequilibrium, emerges. Modigliani was in fact less interested in explaining involuntary unemployment per se rather than investigating the effects of the monetary side of the system on the real one, using the wage rigidity as a link, and in demonstrating the consistency of involuntary unemployment with a situation of equilibrium, defined as a position of rest[30]. Therefore his approach was essentially static: according to him, in a Keynesian world there was no dynamic towards full employment. He moved to dynamics only to discuss the policy implications of his model (in his PhD dissertation), rejecting the efficacy of wage cuts if the effects of expectations and distribution changes were taken into account.

On the other hand, Patinkin's departure point was the study of the genesis of unemployment and the dynamic path towards full employment, assuming the classical definition of equilibrium: «equilibrium means full employment, or equivalently, unemployment means disequilibrium» (1956, 224). Therefore, Patinkin opposed to Modigliani's quotes, taken exclusively from Ch. 2 - on the resistance of workers to money wage cuts - and 21 of the *GT*, the famous Ch. 19 and the policy implications of Keynes' system:

[29] Patinkin claimed that «the passages on page 14 and 15 of Keynes' General Theory state primarily that the labor supply function is not homogeneous. In other words, if we let N^S represent the amount of labor supplied, then the function is not $N^S= F(W/P)$, but $N^S=G(W,P)$. … It is very difficult for me to accept these statements as equivalent to your formulation that the supply of labor is perfectly elastic at the ruling wage until full employment, N_0…» (April 7th, 1948).

[30] At the beginning of his paper Modigliani specified that «all theories we examine or formulate in this paper are concerned with the determinants of equilibrium» (1944, 46). In section 18, he explains that «In the *GT* Keynes does of course recognize the fundamental importance of the relation between money wages and the quantity of money as is shown by his device of the wage units. This very fact, on other hands, has had the effect of obscuring the part played by wage rigidities in the determination of economic equilibrium» (1944, 76).

… *It is hard for me to believe that wage rigidity is the essence of the Keynesian system* when one of his major points seems to be that the amount of unemployment and the real wage rate is determined completely apart from the actions of workers (cf. p. 13 and Chapter 19) … It seems to me obvious that we cannot have a situation of unemployment equilibrium unless there are rigid wages. Here I agree with your statement of section 12 ["Underemployment equilibrium and Liquidity Preference] of your paper … However, I do not think it is necessary to prove this by an elaborate exposition. One need merely point out that if there is flexibility of wages then by definition the wage rate will change unless there is full employment. *Hence, there cannot be equilibrium if there is unemployment.* Now, if the whole purpose of Keynes is to say that with rigid wages we can have unemployment 'equilibrium', I really do not see his contribution … The position I would like to take now … is that the major contribution of Keynesian economics is not in pointing out that there may be an unemployment equilibrium but in stressing the dangers of unemployment *dis*equilibrium. In other word, *Keynes emphasized that the policies advocated by the Classical school (flexibility of all kinds of prices and wages) might work very slowly … This seems to me essentially his argument in chapter 19.* And this argument can be maintained without assuming any type of wage rigidity (Patinkin to Modigliani: April 7, 1948, italics added).

In his reply Modigliani clarified that he did not consider the wage rigidity hypothesis as such the novelty of Keynes's theory, but rather the workings of a monetary economy as a whole and its influence on real variables, through a combination of liquidity preference - whose role is more explicitly recognized in their correspondence – and wage rigidity. Modigliani also pointed out the theoretical equivalence between monetary and wage policy that followed from his analysis. In Modigliani's words:

All I tried to do was to schematize what appeared to me the basic system underlying most of the reasoning of The General Theory. *I do not maintain that my supply of labor equation, as such, is "the essence of the Keynesian system". Indeed, on the one hand, I have stated that this equation does over simplify the matter and on the other hand I have laid great stress on the liquidity preference.*

Nonetheless, the "hypothesis" that workers bargain primarily for money and not for real wages, that they will resist money wage cuts even if there is unemployment … all these seem to me an essential part of the reasoning of the General Theory. And, I must add, a highly valuable one, since it is both realistic and fruitful … It would be perfectly possible to introduce into my system the hypothesis that wages tend to fall when there is much unemployment, and to rise as unemployment falls; and to define then unemployment as the point beyond which wages rise in full proportion to prices … But while this would complicate the system … it would not change the conclusions in any fundamental sense … *It was, by no means, my intention to show that the purpose of Keynes is to say that with rigid wages we can have unemployment equilibrium. What I tried to show was that all the essential conclusions of the General Theory follow from a combination … about the nature of the wage bargain and about liquidity preference. It follows from this primarily that wage policy (under unity elasticity of expectations) is strictly equivalent to monetary policy* … (Modigliani to Patinkin: July 2, 1948, italics added)[31].

[31] Modigliani's and Patinkin's different readings of the wage rigidity assumption reflect their different attitudes to economic analysis. Where there was a choice between rigor and convenience, Modigliani chose

Patinkin finally rejected Modigliani's definition of unemployment equilibrium in the Keynesian case «… you state that in the Keynesian case there could be unemployment equilibrium. This is not correct … What would be true … is that the unemployment disequilibrium would continue for an indefinitely long time. What I mean by unemployment disequilibrium is that the amount of unemployment, the wage rate, and other variables in the system would continuously be changing» (Patinkin to Modigliani: April 7, 1948). Modigliani once again insists that even if not necessary for the emergence of unemployment, the wage rigidity assumption has to be introduced to describe «a reality … which does not know processes of infinity deflation … As I would like to put it, *this assumption must be introduced to explain the stability of the price level* not under employment of factors» (Modigliani to Patinkin: July 2, 1948)[32].

Thus, the main difference between Patinkin and Modigliani rests on their interpretation of wage rigidity in the Keynesian system, due to their divergent definition of equilibrium in terms of the traditional market-clearing prices and a position of rest, respectively. While Patinkin defined wage rigidity as a failure preventing equilibrium; for Modigliani it was an historical or institutional fact and involuntary unemployment the equilibrating mechanism: it is through a fall in output and employment, to offset the excess demand for money, that monetary equilibrium can be restored.

In *Money, Interests and Prices* (*MIP*, 1956) – a summa of his previous studies - Patinkin discussed the corrective market forces automatically generated by the presence of involuntary unemployment. He justified his definition of Keynesian economics as the economics of unemployment disequilibrium by both the interest inelastic assumption, which leads to the inefficacy of expansionary monetary policy, and the effects of wage cuts on distribution and expectations.

In spite of his interest in monetary theory, Patinkin failed to apply the notion of non-neutrality of money in his study of Keynes' economics and concentrated his attention on the role played by effective demand on real output and employment. This led him to

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the latter (see for example 1944, 46), thus he introduced wage rigidity since it «oversimplified the matter», while Patinkin, chose analytical rigor. On different approaches to macroeconomic analysis see Mankiw 2006. I wish to thank Nicola Giocoli who called my attention to this point.

According to Rubin (2004) Modigliani and Patinkin pursued a different research programs: «The program derived from Modigliani aimed to extend the scope of IS-LM …. The emphasis was put on the pragmatic applications of IS-LM. Instead, Patinkin's method called for a synthesis between the macroeconomics inspired by the *General Theory* and the Walrasian theory of price, with the emphasis put on the logical consistency of the general apparatus». (211)

[32] Modigliani also explained that in the Keynesian case the wage rigidity hypothesis is necessary to avoid over-determinacy of the system, «to which you refer on p. 51 of your Cowles Commission manuscript and which you treat at great length in Ch. 6 and 7…» (ibid).

overlook the monetary implications of Modigliani's wage rigidity hypothesis in order to highlight the originality of his own unemployment disequilibrium approach[33].

Patinkin introduced the case of absolute wage rigidity «which has special importance for monetary theory» only in regards to Keynes' theory of interest, repeating Modigliani's conclusions. According to Patinkin, in fact, this assumption «carry us into a Keynesian world of unemployment in which monetary changes express themselves primarily in changes in the level of real national income and the rate of interest and only secondarily - if at all – in changes in the level of prices» (1956, 229-230) Nonetheless, he pointed out the «merely heuristic nature» of the argument. His focal point (in Chs. XIII and XIV) remained the relation between the commodity and the labor markets to explain unemployment[34]. An interpretation that, according to him, opens up another «more vital one»: «it makes unmistakably clear … that involuntary unemployment of the *General Theory* need *not* have its origin in wage rigidities … we have shown that reductions in this rate are neither necessary nor a sufficient condition for the rapid reestablishment of full employment equilibrium» (1956, 237-238). He introduced the perfectly elastic labor supply — quoting Modigliani and Lange — to reject their explanation of involuntary unemployment, coming back to the same arguments discussed in their correspondence: «once we recognize that the essence of involuntary unemployment is … being off this curve, the necessity for positing any special shape of the labor supply curve in order to speak of involuntary unemployment disappears» (1956, 239).

Modigliani returned to his 1944 paper only at the beginning of the 1960s (with the 1963 *REStat*'s paper: «The Monetary Mechanism and Its Interaction with Real Phenomena») to reply to the so-called Patinkin controversy. The paper represents a summary of Modigliani's extensive notes: «The Theory of Money and Interest in the Framework of General Equilibrium Analysis», where he discussed the role of money in a general equilibrium framework under static and dynamic conditions, flexible and rigid wages and prices[35].

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33 Regarding Patinkin's effort to differentiate his own approach from Modigliani's, see Boianovsky (2006, 217).

34 Discussing the case of wage rigidity Patinkin referred to Hicks' (1937) and Modigliani's (1944) system of equations without further comments. Patinkin had already discussed several aspects of Modigliani's monetary theory in his 1949 paper, especially with reference to Modigliani's defense of the classical dichotomy, while he did not refer to Modigliani's interpretation of Keynes's system in terms of a monetary economy. According to Boianovsky, Patinkin's (1956) aim was the search for a connection between firm's production decisions at a microeconomic level and the aggregate demand for output at the macroeconomic level (2006, 241). Differently from Modigliani, who analyzed the effects of monetary variables on the real sector, and connected his 'general theory of interest' with his unemployment equilibrium theory, Patinkin distinguished between Keynes' monetary theory of interest and Keynes' theory of involuntary unemployment.

35 As explained in his correspondence to Jacques Drèze, these notes were motivated by critics of his 1944

Despite the different context in which the paper was written - with major debate on the real balance effect, the introduction of real wage rigidity and the mark-up theory, and initial discussions on the relationship between inflation and employment (the Phillips curve) - Modigliani's early emphasis on the crucial role of money and his interpretation of unemployment as the equilibrating mechanism of the money market, were reaffirmed. Furthermore, in successive interviews on Keynesian economics, Modigliani explains that unemployment was (and is) not a «transitory disease» but a «variable that clears the money market… It seems like a dysfunction since we think that full employment is what an economy should produce. But unemployment is a systematic feature of an economy relying on money to carry out transactions» (Barnett, Solow, 2000, 229).

Looking back at his 1944 paper Modigliani argued that, in retrospect, he would revise completely its presentation (but not content) to make his position more clear. He did so in his autobiography (2001) where he still emphasized the importance of wage rigidity in the Keynesian system since it leads to «a redefinition of the notion of market equilibrium» (2001, 3). On the other hand, he points to the relevance of liquidity preference «in the transmission mechanism from money to employment» (ibid). He defines the classical model a special case in which wages are assumed to be flexible with respect to the Keynesian general model and added: «the difference between rigidity and perfect flexibility turns out to make an enormous difference in the 'monetary mechanism' – the mechanism that ensures the clearing of the money market – and the role of unemployment» (ibid, 20)[36]. Thus, Modigliani's emphasis on the role of money and Patinkin's on aggregate demand in the determination of unemployment should, contrary to the standard literature, draw Patinkin closer and Modigliani further away to subsequent developments of Neoclassical Synthesis.

4 Conclusion

Patinkin's discussion of Modigliani's wage rigidity as the mere explanation of involuntary unemployment, with no reference to his monetary analysis, reflects a reading of his 1944

paper from Hahn (1955) and Patinkin (1949 (48), 1950-51): «My latest absorbing occupation has been monetary theory and the famous Patinkin's controversy. The whole issue was kindled by three factors: 1) a very sharp attack on my liquidity preference paper written by Hahn …; visit and lecture here [at Carnegie Tech] by Patinkin who is visiting professor at John Hopkins …; the preparation of my course in monetary theory… I have made some very remarkable progress and have finally established the result that the whole Patinkin's controversy in which all people have made a large number of mistakes, and I, myself, am by no means above blame…. (Modigliani to Drèze, January 30, 1956, MP).

[36] I only mention Modigliani's later remarks on Keynesian unemployment with respect to his 1944 article since discussion of his successive reading of the paper is beyond the scope of the present paper.

paper that prevailed in the literature. Leijonhufvud, in his influential book on Keynesian economics, denounced that the main interpretations of Keynes's theory (he referred to Modigliani among others) - based on the interest insensitive investment hypothesis or on the assumption of wage rigidity - lost the monetary origin of and solution to unemployment (1968, 335). He concluded that: «Ironically, the income-expenditure theorists are often, though not always, in accord with the 'Classical' diagnosis: unemployment shows that wages are too high and it would be well if they were lower …» (1968, 335)[37].

Divergent approaches of a same text and theory are common in the history of ideas. Nonetheless, possible explanations of the reductive reading of Modigliani's analysis - with its shift of attention from the monetary to the labor market conditions - are of particular interest since they make evident the process by which macroeconomics evolved and the history of economics is constructed[38].

Specifically, the reading of Modigliani's paper has been probably supported by increasing controversies between classical and Keynesian economists on the correct interpretation of the *GT* over the 1950s and 1960s, which led to fit each interpretation within one or another school of thought[39].

Moreover Historians of economic thought, tended to associate different uses of the wage rigidity hypothesis. Blaug (1986), discussing the different reading of Keynes's *GT*, puts Modigliani and Patinkin together on the basis of their focus on Ch. XIX to which, however, Modigliani never referred. Blaug also considered Hansen one of the main interpreters of Keynes's system in terms of a redefinition of the labor supply function, spurred by Modigliani's 1944 paper, and ascribes to Hansen-Modigliani the popularization of the wage rigidity interpretation of Keynesian unemployment even though they adopted different explanations (lack of investment opportunities *vs.* scarcity of money supply) and

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[37] In an interview conducted by Snowdon and Vane, Leijonhufvud 'admitted' that his criticisms of the neoclassical synthesis were addressed to Modigliani's 1944 article but since he had «so much respect and affection for Modigliani» his book avoided challenging Modigliani directly (2004, 124). Leijonhufvud had been Modigliani's student at the Northwestern University in 1960-62 and he ascribes his decision to concentrate his graduate studies in the field of monetary theory to the influence of Modigliani's and J. G. Witte's teaching.

[38] A deepen investigations on these possible explanations goes beyond the aim of the present paper.

[39] The Neoclassical Synthesis represented an important example in this direction. According to Pasinetti, (a long-lasting friend data of Modigliani), it was «a kind of umbrella, general enough as to be able to cover *all* economic theories, including also Keynes's theories», where, however, Modigliani hardly finds a place: «Franco may not have not explicitly objected to such formulations. But my feeling most definitely is that that was not his approach. Keynes's theories are not an essential component of Samuelson's 'neoclassical synthesis' ... Modigliani's theoretical framework would be inconceivable without Keynes's *General Theory"* (Pasinetti, 2005, 28).

solutions (fiscal *vs.* monetary policy)[40].

The reductive interpretation of Modigliani's paper is also representative of a way of doing macroeconomics that prevailed since the schematizations of Keynes' GT onwards, devoted to level out every position. This can be read as the result of two opposite trends in economics: on one side the increasing formalization of the discipline with its need of reducing complex phenomena to simple ones in order to make the mathematics manageable and, on the other, the popularization of economics teaching and the diffusion of elementary textbooks[41]. Different causes, which have different weights in the explanation of a specific phenomena, are considered identical without taking into account their feedbacks on the whole system, as in Modigliani's case. In his analysis the causal relations did not move merely from wage rigidity to involuntary unemployment but from the money market to the real one. Furthermore, even if the fixed money supply and wage rigidity both explained unemployment, they cannot be considered equivalent in terms of adjustment mechanisms because of the negative effects wages cuts have on expectations and income distribution.

Thus, the rediscovery of the original aims of the author (to discuss the relation between monetary and real variables on the basis of different wage behavior) helps not just to set the record straight, regarding Modigliani's contribution to the Neoclassical Synthesis, but also to appreciate the complexity of his vision – accordingly to the historical context in which it developed - in respect to a mechanical reading of his model[42].

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[40] See also Colander (1996, 29). According to him Keynes's reference to the existence of two opposing schools is less in evidence in the modern literature where «the contrasts take the form - initially prompted by Hansen, Klein, Modigliani and others early proponents of the 'rigid wage version' of Keynesian economics, that the economic system would be self-adjusting if (contrary to experience) wages and prices would adjust rapidly» (Colander 1996, 29).

[41] See Weintraub 1991, who argued that the mathematization of economics, which occurred between the late 1930s and the early 1950s «were not merely cosmetic: The mathematical *forms* of the arguments significantly altered the *substance* of the arguments» (1991,1).

[42] I thank the anonymous referee for suggesting me to reflect on the kind of contribution my paper wish to adduce to the history of economic thought. The standard interpretation of Modigliani's paper also shows how easily a same assumption (wage rigidity) and model (the IS-LL) can be manipulated according to different purposes (the description of the working of monetary and real economy *vs* the synthesis between micro and macroeconomics relations, classical and Keynesian theories. On the 'flexible' use of models in economics see Morgan (2012).

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