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Three essays on disequilibrium dynamics and the evolution of macroeconomics in the '50s and '60s

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Contents

Introduction

Before the publication of Keynes' *General Theory* (Keynes 1936), the spontaneous tendency to full employment of a competitive economic system was never explicitly questioned. By that time, the marginalist theory of value and distribution was dominant throughout the academia. It comes as no surprise, therefore, that is rare to find in traditional authors' works a detailed and explicit discussion of the disequilibrium dynamics behind the tendency toward the equilibrium in the market for productive factors. After Keynes, equally unsurprisingly, the problem of full employment was in the spotlight of the academic debate. Almost simultaneously the marginalist school begun a transition of method after Hicks' publication of *Value and Capital* (Hicks 1939). From the method of long period positions, on which traditional authors developed their general equilibrium analysis, to the Neo-Walrasian equilibrium method. As a result, the theoretical efforts to reconcile Keynes' criticism with the marginalist theory were conducted by adopting a methodological framework substantially different from the one adopted by traditional marginalist authors and Keynes himself. Later non-marginalist critical literature, after the beginning of the so-called capital controversy, stressed how the far-reaching consequences of the marginalist change of method seriously questioned the theoretical validity of both the 'Neoclassical Synthesis'[1] of Keynes and the Neo-Walrasian equilibrium analysis. The present work is thought as a further contribution to this debate. Although the three chapters are structured as potentially stand-alone academic papers, they compose an organic discussion of the disequilibrium dynamics behind the marginalist idea that market economies tend to full employment.

The first chapter attempts the non-easy task of reconstructing a theoretically con-

[1]The term was firstly introduced by Samuelson (Samuelson 1955).

sistent disequilibrium dynamics explaining the tendency toward full employment in traditional marginalist authors. To do so, we firstly clarify the notion of equilibrium implied in the method of long-period positions. Not differently from classical authors as Smith or Ricardo, traditional marginalist authors conceived the *normal* equilibrium position as the centre of gravity of the economy. The defining properties of such a position were its persistence and stability. The persistence ensured that the equilibrium was fundamentally insensitive to the unpredictable and accidental disequilibrium states. The stability ensured that the dominant market forces set in motion disequilibrium adjustments directed toward the persistent normal position. The normal equilibrium relative prices were indeed considered to give a fair approximation of the average of day-by-day market prices[2]. There was neither the presupposition that it was possible to determine the effective position of the economy at each point in time nor the belief that the normal position could ever be effectively achieved and observed in reality.

If one understands this notion of equilibrium as the relatively constant point of attraction of an economic system, it then becomes possible to give a meaningful interpretation to traditional authors' stationary state and stationary conditions. For their primary interest was in isolating and exalting the dominant market forces from the accidental causes that affect the day-by-day position of an economic system, the stationary state was thought as the preliminary methodological tool best suited for the task. The condition for traditional authors' stationary state was the permanence of the arbitrary set of data determining the normal equilibrium position. This was meant as a simplifying assumption that allowed them to describe the working of the dominant market forces *alone* and to abstract from those phenomena –for example, demographic changes or technological progress– that in real economies are always and simultaneously operating with the dominant market forces[3]. The stability implied by

[2]To provide an example, in Clark (1908) we read that: "Dominant forces [...] do not keep values exactly at the natural standards, but they keep them fluctuating about those standards; and the keep real wages and interest always comparatively near to the natural rates." (Clark 1908, p. 30). See also Chapter 1, Section 1.1.

[3]Traditional authors' concept of stationary state has been the source of great misunderstanding in contemporary equilibrium theory. As remarked by Garegnani (Garegnani 2012) and Petri (Petri 2014), the traditional stationary state was a *static* stationary state whose scope was that of simplifying the presentation of the dominant market forces. The only condition (and traditional authors'

the notion of equilibrium as the centre of gravity and the condition of *static* stationariness also deserves to be clarified. The stability required by traditional authors was *static* stability[4]. Given the equilibrium position's persistence, stability required that the *direction* of the disequilibrium adjustment processes set in motion by the dominant market forces was indeed toward the equilibrium position. It is, therefore, within this methodological framework that we must investigate traditional authors' disequilibrium dynamics. Namely, their presupposition that, independently of the particular and accidental disequilibrium position the economic system may find itself in, the dominant market forces would move –or at least always tend to move– the economy toward its normal position. In our first chapter, as anticipated, we attempt to reconstruct the disequilibrium dynamics behind the tendency to full employment. The difficulty relies in the fact that the disequilibrium dynamics able to explain the stability of the equilibrium in the factors market was often *implicit* and a pre-condition in traditional authors' discussion of the normal equilibrium. However, even if implicitly, a theoretical and consistent justification for the tendency toward full employment had to exist.

The definition of equilibrium as conceived by the method of long-period positions that we described so far, in fact, does not allow us to infer that the equilibrium position is a full-employment position. Conversely, full employment was a *theoretical* result deriving from the marginalist explanation of value and distribution in terms of demand and supply forces. To understand the disequilibrium dynamics justifying the tendency toward full employment, therefore, we must evidence the marginalist dominant market forces and check *how* traditional authors could claim that those

concern) was the persistence of the data determining the equilibrium, and, for the equilibrium to be determined (cf. Wicksell (1935 [1901]), p. 202), the economy's capital endowment had to be among them. Conversely, since Hicks' (Hicks 1939) definition of traditional authors' ('the economists of the past') stationary state as the position "where the incentive to net savings has disappeared" (Garegnani 2012, p. 1426), the traditional stationary state started being identified with a *secular* stationary state (Petri 2014, p. 463). The 'amount' of capital became an endogenous result to be determined by the condition of zero net-savings and the stationary position begun to be intended as the position of *rest* where no incentive to change the 'amount' of capital existed. The distinction between secular and static stationariness was already made clear by Robbins (Robbins 1930).

[4]Static stability only incorporates the "directional provision" (Hicks 1965, p. 19) of the adjustment processes. Nothing is said about the "speeds of reaction" or about the "patterns of reaction" (Hicks 1965, p. 18). See also Clark (1908), pp. 74-75.

would set in motion adjustment process *directed* to a full-employment distribution. To do that, we examine one of the rare explicit traditional discussion of disequilibrium in a factor's market. This is Hicks' disequilibrium analysis of the labour market that we find in his *Theory of Wages* (Hicks [1932] 1963). We find that the marginalist dominant market forces are indeed at the basis of his disequilibrium dynamics ensuring the market tendency toward full employment. Those are the marginalist principle of factor substitution and what in this work we label as *vertical* competition. The notion of vertical competition is largely unmentioned both in marginalist and non-marginalist literature. Its necessity for traditional authors' justification of the tendency toward full employment was firstly remarked by Garegnani (Garegnani 1990, p. 7). If on the one hand the *correct* working of the factor substitution mechanism justifies the shape of a factor *employment* curve –downward-sloping and fairly elastic–, on the other hand it is only the additional assumption of vertical competition which allowed traditional authors to consider those curves as factor *demand* curves. Namely, to argue that, like any other market, a factor market would be responsive to demand-and-supply pressures. For example, it is the vertical competition assumption that gives plausibility to traditional authors' claim that involuntarily unemployed workers should bid wages down and, symmetrically, that a firm should exert upward pressure on the wage rate whenever it has an unsatisfied demand for labour.

We show how the plausibility of Hicks disequilibrium analysis fundamentally rested on the possibility of specifying the capital endowment as a single *value* magnitude whose equilibrium composition can be endogenously determined. On the one hand, it was required to ensure the determinateness and persistence of the normal equilibrium position[5]. To take as a datum the endowments of heterogeneous capital goods would have undermined the persistence of the equilibrium. Any disequilibrium adjustment would have altered the composition of capital and, thereby, the equilibrium position itself. It was, therefore, a total value-quantity of capital that was taken as a datum[6]. On the other hand, the specification of the capital endowment as single value factor with *variable form* gave plausibility to the correct working of the fundamental

[5]This is what is currently identified as the supply-side role of capital. Cf. Petri (2004).

[6]To introduce the total quantity of capital was necessary to close the system of equations that determined the equilibrium. Without it, the theory would have faced an *indeterminateness* problem. The point was already made clear by Wicksell (Wicksell 1935 [1901], p. 202).

marginalist forces – i.e., the factor substitution mechanism and vertical competition[7]. We remark how Hicks' disequilibrium dynamics of labour unemployment assumes that the market for capital is always in equilibrium (i.e, fully-employed). Such equilibrium is maintained through the traditional equilibrating mechanism in the investment-savings market. That is, according to the well-behaved interest-elastic demand for capital, throughout Hicks' discussion of the labour market's disequilibrium, investment is assumed to fully adjust to changes in the level of savings through variations in the interest rate.

We introduce Keynes' critique in the *General Theory* to show how it could undermine the validity of Hicks' analysis. Namely, we stress how Keynes' proposition that the interest rate is not the equilibrating variable in the market for 'loanable funds' would break the necessary assumption, in Hicks' disequilibrium dynamics, of maintaining capital at its full-employment level throughout the disequilibrium adjustment toward labour's full employment. Our comparison of Hicks' traditional justification of the tendency to full employment and Keynes' critique allows us to draw two fundamental conclusions that, in the following chapters, are further explored and supported. First, that the validity of Keynes' critique is not contingent on the assumption of rigid money wages. Our application of Keynes' insights to Hicks' analysis considers flexible money wages. Secondly, to confirm Garegnani' s claim that Keynes' theory was an "inherently unstable compromise" (Garegnani 1983, p. 58)[8]. Keynes did not fundamentally depart from traditional authors' theory of distribution. By accepting traditional factor *employment* schedules (marginal productivity of labour, marginal efficiency of capital), Keynes' criticism was easily re-incorporated into the marginalist theoretical apparatus.

The second chapter is a critical reappraisal of Clower's influential Dual Decision Hypothesis (Clower 1965). The purpose of the chapter is threefold. Firstly, we show that Clower's discussion of involuntary unemployment is an *explicit* example of the current misunderstanding of traditional authors' notion of equilibrium and disequi-

[7]This is the demand-side role of capital. The fact that capital was variable in its form also guaranteed the fair degree of substitution between capital and labour. The endogenous adaptation of the physical composition of capital was intended as a long-period adjustment (cf. Hicks [1932] 1963, pp. 18–21).

[8]See also Milgate (1982).

librium dynamics that we presented in the first chapter. Our discussion confirms Garegnani's belief (Garegnani 1979) that post-Keynes authors mistakenly assumed that pre-Keynesian traditional authors' equilibrium analysis did not admit out-of-equilibrium transactions. Conversely, as we argue in the first chapter, the equilibrium was considered the stable and persistent centre of gravity of the economic system which was sufficiently insensitive to the disequilibrium transactions and production. To support our argument, we show how Clower's Dual Decision Hypothesis represented no novelty relative to the traditional disequilibrium dynamics that we find in Hicks' *Theory of Wages*. Specifically, we show how Clower's *income*-constrained demands enter into Hicks' discussion of involuntary unemployment. Further, that the adjustment toward full employment, which according to marginalist theory follows from a decrease in real wages, was entailed by involuntarily unemployed workers' downward pressure on money wages and not, as Clower claimed, by an increase in the price level due to the presence of an excess demand for output.

Secondly, we show how Clower's Dual Decision Hypothesis was not able to capture the root of Keynes' 'theoretical attack'. On the one hand, Clower's considered an economy where labour is the only factor of production. Therefore, by construction, he left out from the picture Keynes' critique to traditional authors' theory of investment. On the other hand, and consequentially, Clower anchored Keynes' contribution to the assumption of rigid money wages. Besides the fact that this did not reflect Keynes' intentions (cf. Ch 19, Keynes (1936)), it also provided no theoretical ground to dismiss traditional authors' belief in the tendency toward full employment. Hicks' himself recognised that, were money wages to be "artificially kept at a level inconsistent with normal employment" (Hicks [1932] 1963, p. 198), the market tendency to full employment could be persistently hampered[9]. However, this would leave unquestioned that, in principle, marginalist dominant market forces in a competitive economic system would set in motion adjustment process directed toward full employment. Clower's critique, therefore, represents merely an example of what have been

[9]We read in Pigou: "The classicals, if pressed, would not have denied that, should wage-earners not act competitively, but contrive, by means of combination or otherwise, to set the real wage 'too high', the stationary state would not be one of full employment" (Pigou 1943, p. 343). Namely, that the economy might not tend to the normal equilibrium position if the competitive dominant forces are largely hindered.

later termed *imperfectionist* critiques (Eatwell and Milgate 1983, pp. 11–12), which did not fundamentally question the marginalist explanation of value and distribution in terms of demand and supply forces.

Thirdly, we investigate the consequences of Clower's Dual Decision Hypothesis in the context of a Neo-Walrasian equilibrium setting. We remark that one of the far-reaching consequences of the shift from the method of long-period positions to the Neo-Walrasian approach was the change in the set of data from which the equilibrium was determined. Specifically, the introduction of a vectorial specification of the several capital goods among the data undermined the necessary independence of the equilibrium position to disequilibrium transactions. The introduction of tâtonnement processes which assume that transactions –and production– can only take place as the equilibrium vector of relative price is determined and *instantaneously* imposed by the fictitious auctioneer[10] is what allows Noe-Walrasian theorists to preserve the persistence of their vectorial specification of capital. Without the tâtonnement hypothesis, the Neo-Walrasian method would bear what critical literature now terms as the *impermanence* problem (Garegnani 2012; Petri 2017). Namely, a path-dependency problem that would made the determination of the equilibrium position from an initial set of data irrelevant[11]. We argue that Clower's Dual Decision Hypothesis represents, on closer inspection, a modified tâtonnement process where out-of equilibrium transactions (or better, trading arrangements and contracts) are allowed. As

[10]In Hicks' (Hicks 1939) temporary equilibrium method trade at 'false prices' is avoided through the Monday-week device. The aim is the same: to avoid that out-of-equilibrium transactions alter the set of data determining the equilibrium position. If changes in the data were allowed, the equilibrium position itself would also change.

[11]We note that, however, tâtonnement adjustments are not a satisfactory solution. The relevance of the equilibrium relative prices determined through the auctioneer re-contracting process is questionable as long as the theory cannot provide a real disequilibrium analysis. As Fisher later observed: "What matters is the equilibrium that the economy will reach from given initial endowments, not the equilibrium that it would have been in, given initial endowments, had prices happened to be just right" (Fisher 1983, p. 14). That is, the tâtonnement must be imagined as an instantaneous adjustment. It cannot provide a satisfactory explanation of what happens when the economy is not at equilibrium and of the *real* disequilibrium process that will be set in motion to supposedly move the economy toward the tâtonnement-determined equilibrium. Cf. also Dvoskin and Petri (2017), where the authors suggest the "continuing belief" (p. 628) in traditional mechanisms of adjustment as the only possible defence of the explanatory power of Neo-Walrasian equilibrium theory. The plausibility of these adjustments, as we remind in Chapter 1, directly rests on the possibility to specify the capital endowment as a value-quantity in variable form.

a result, Clower's model determines a path-dependent equilibrium with involuntary unemployment. Furthermore, involuntary unemployment is a plausible end of his Dual-Decision Hypothesis adjustment mechanism only because Clower assumed rigid money wages and, thereby, denied the correct working of the adjustment process in the factor's markets (i.e., 'vertical competition').

In the third chapter we focus on Patinkin's disequilibrium analysis of involuntary unemployment in his influential *Money, Interest, and Prices* (Patinkin [1956] 1965). As Clower, Patinkin's identified involuntary unemployment as a disequilibrium state. However, conversely to Clower, Patinkin's aim is reconciliatory. Patinkin's book is considered even by recent literature as the "landmark of the neoclassical synthesis" (Rubin 2011, p. 16). Further, as the first attempt to discuss Keynes' involuntary unemployment within a Neo-Walrasian equilibrium setting (Boianovsky 2002) and to unify "Walrasian general equilibrium theory and macroeconomics"(De Vroey 2014, p. 11). Our analysis' conclusions do not support a successful accomplishment in either of these two attempts.

First, we present Patinkin's equilibrating process toward full employment. We evidence how this disequilibrium dynamics, in principle, replicates the results of traditional disequilibrium analyses, as for example Hicks' one we discussed in Chapter 1. The main difference is in the introduction of the real-balance effects to accommodate for Keynes' critique that a reduction in consumption demand, and hence an increase in savings, does not automatically translate into an increase in investment. Admittedly, an initial decrease in consumption demand may result in an increased demand for money with no off-setting effect whatsoever in the level of investment. However, Patinkin argued that there would have come at play deflationary pressures sufficient to stimulate consumption (*direct* real-balance effect) and investment (*indirect* real-balance effect) back to their full-employment level. We remark how this indirect real-balance effect supposedly sets in motion adjustments in investment that are fundamentally traditional in their nature (i.e. marginal-efficiency-of-capital schedule)[12].

Secondly, we stress why, conversely to Hicks', Patinkin's disequilibrium analysis

[12]This confirms Keynes' acceptance of traditional marginalist factor schedule as the "Achilles' heel" of his critique (Garegnani 1983, p. 60).

has limited theoretical plausibility. The discussion is divided into two main arguments. On the one hand, Patinkin worked with a set of data that, in traditional analyses, would have allowed short-period considerations only. Specifically, Patinkin worked with a fixed composition of the capital stock. To consider as a datum the given several capital goods of the economy, according to traditional authors, left no scope for the working of the labour-capital substitution, which was instead a long-period adjustment where the total value-quantity was taken as given and not its *form*[13]. On the other hand, we show how the persistence and stability of Patinkin's Neo-Walrasian equilibrium are preserved through the author's several 'simplifying' assumptions. In the light of the results of the capital controversies and the later development of the critique of capital, we show how the persistence of Patinkin's equilibrium can be defended by the assumption that the economy is endowed with a single kind of capital good. By construction, this verifies the condition of a uniform rate of return on the supply price of capital (URRSP). However, we argue that this simple specification of the capital endowment's composition is not sufficient to also warrant the stability of the equilibrium. In Patinkin's model there are, in principle, two kinds of goods. A homogeneous consumption good and the capital good. Due to what is termed as the Wicksell price-effect, if the two goods require different capital-labour ratios for their respective production, it could be the case that the demand for capital is not well-behaved –i.e., downward sloping. Namely, that changes in income distribution (i.e., in the real wage or interest rate) set in motion adjustments in the *wrong* direction thereby invalidating the correct working of marginalist factor substitution[14]. We note how Patinkin's disequilibrium analysis did not encounter this problem because the

[13]Patinkin considered an elastic demand curve for labour. Such elasticity of the labour demand curve was implausible if this demand was derived by taking as given the composition of the capital stock. Just to make an example, we read in Clark: "*If capital is freely transmutable in form*, labor becomes freely transferable and able to count as an indefinitely *elastic* field of employment." (Clark 1908, p. 115) (emphases added).

[14]As we see in Chapter 1, the correct working of the factor substitution is necessary to give plausibility to the additional assumption of vertical competition. If a fall in interest rate *decreases* firms demand for capital and an increase in real wages *increase* firms' demand for labour, the marginalist belief that the downward flexibility of real wages warrants the tendency to a full-employment equilibrium position loses its theoretical foundation. There is no longer a theoretical justification to the claim that involuntarily unemployed workers should bid wages down or that a fall in interest rate automatically induces firms to invest more (i.e., to demand more capital).

author made the further assumption that the consumption good and the capital good are homogeneous. Basically, they require the same capital-labour proportion. Hence, Patinkin's economy is, on closed inspection, behaving as if there was a single homogeneous good. We cannot ascertain whether Patinkin, when he made this assumption, was implicitly aware of its crucial implications. Our intention is to show how, nevertheless, it was this assumption that allowed him to preserve both the persistence and stability of an equilibrium position he determined through the tâtonnement and to conduct a disequilibrium analysis that led to conclusions that are, *prima facie*, identical with those of traditional analyses. Hence, we conclude that Patinkin's disequilibrium dynamics lacks generalisability and once we relax the previous –highly restrictive– assumptions, a disequilibrium analysis that is sufficiently general to give, at least, the *direction of change* of actual variable cannot be provided. Furthermore, even if we accepted these restrictive assumptions, Patinkin considered as fixed the physical composition of the economy's capital stock. Such a specification of capital deprives of theoretical plausibility the mechanism of adjustments –capital-labour substitution– that his disequilibrium dynamics requires.

Finally, we argue that Patinkin's treatment of the real-balance effect did not provide a valid and consistent theoretical answer to a criticism that already surrounded this concept in traditional analyses. The problem at stake is whether a sustained deflation can have permanent redistributive effects that could compromise the economy's tendency to full employment. A prolonged decline of the price level increases the real value of individuals' outstanding debts, thereby undermining the extent by which this fall in price exerts both a direct and indirect stimulus on aggregate demand. The problem was already envisaged by Keynes (1936) and later pointed out by Kalecki (1944) in his critique to Pigou (1943). Patinkin acknowledged the possibility of this "real-indebtedness effect" (Patinkin [1956] 1965, p. 71) but neglected it throughout his book. Especially, we find no mention of it in his disequilibrium interpretation of Keynes' involuntary unemployment where, we saw, the real-balance effect is the crucial channel through which full employment is supposedly restablished.

The first accomplishment of this dissertation, we believe, is to clarify the –often implicit but– relevant presuppositions of the disequilibrium dynamics underpinning the tendency toward full employment in traditional marginalist analyses. As we noted

at the beginning, before Keynes' *General Theory*, traditional authors' disequilibrium dynamics was largely implicit but nonetheless necessary for the static stability of their normal equilibrium position. The rare explicit discussion that we find in Hicks' *Theory of Wages* is of valuable relevance. On the one hand, it allows us to provide a detailed and exhaustive reconstruction of traditional authors' disequilibrium dynamics. On the other hand, and consequentially, it permits us to evidence and clarify some later, and current, misunderstandings relative to the long-period notion of equilibrium as a centre of gravity. First, it helps us to understand the inherent theoretical limits of Clower's Dual Decision Hypothesis. Clower's interpretation of traditional analyses is indeed grounded on the belief that traditional authors considered an economy 'always' in equilibrium. Conversely, this constraint is specific to the later Neo-Walrasian reformulation of the general equilibrium analysis. Traditional authors' adherence to the method of long-period position never forced them to introduce tâtonnement-like adjustment 'processes'[15].

However, traditional authors' notion of equilibrium seems to have been readily forgotten (or neglected) in the academic practice of the '50s and '60s. This might explain why Clower's Dual Decision Hypothesis had a surprisingly large impact on the later academic debate and was the theoretical inspiration of the so called "disequilibrium approach" (Backhouse and Boianovsky 2012; De Vroey 2004), where wages and prices rigidities are the anchoring assumptions of models discussing involuntary unemployment[16].

Secondly, our first chapter allows us to critically reappraise Patinkin's influential *Money, Interest, and Prices*. Although recent literature (De Vroey 1999; De Vroey 2004; Rubin 2014), has already pointed out the inherent incompatibility be-

[15]The tâtonnement is a thought as an *instantaneous* price-adjustment. Thus, to call it a 'process' is self-contradictory since, by definition, a process is time-consuming.

[16]For example, see Barro and Grossman (1971), Benassy (1984), and Drèze (1975). The problems underlying the disequilibrium tradition are multiple. The fundamental issue is in the usefulness of having a theory of disequilibrium. The definition of disequilibrium implicitly requires a definition of equilibrium, which is thereby logically anterior –and pre-condition– to a theory of disequilibrium. Further, those authors over-impose rigidities to the normal competitive functioning of the economic system. Hence, they do not fundamentally questions the belief that, if the economic system were perfectly competitive, the neoclassical full employment would obtain. The disequilibrist approach, therefore, besides being of doubtful practical relevance, is also another example of *imperfectionist* criticism to the marginalist theory of value and distribution. Cf. Eatwell and Milgate (1983).

tween Patinkin's disequilibrium dynamics of involuntary unemployment with his Neo-Walrasian determination of the full-employment equilibrium, we believe that none of those critiques completely hits the point. As we argue, Patinkin's disequilibrium analysis, on closer inspection, preserves the persistence and stability of his Neo-Walrasian equilibrium. The point is that this is directly contingent on several crucial assumptions that, intentionally or not intentionally, underline Patinkin's entire explanation of the equilibrating process to full employment. Patinkin's so influential Neoclassical Synthesis of Keynes, therefore, rests on a largely fragile theoretical basis. Once we relax these assumptions, Patinkin's disequilibrium analysis no longer applies and there remain only two possible theoretical justifications to the tendency toward full employment. Either one still assumes the validity of traditional adjustment mechanisms –that would imply the implicit survival of traditional authors' notion of equilibrium– or one has to conclude that full employment is tautological in a Neo-Walrasian equilibrium setting. However, both options lead to an impasse. As we attempt to show throughout these three essays, the critique of capital invalidates the former, and the latter, without the former, reduces full employment to an assumption.

Chapter 1

Traditional disequilibrium dynamics and Keynes' attack

Abstract

We attempt to consistently reconstruct traditional marginalist authors' theoretical justification to the tendency toward a full-employment equilibrium position. We introduce a rare example of stability analysis that we find in Hicks' *Theory of Wages* (Hicks [1932] 1963). Then, we inquiry whether and how Keynes' attack in *The General Theory* (Keynes 1936) undermines the theoretical validity and plausibility of traditional authors' argument for stability by applying Keynes' critique to Hicks' analysis. Our findings outline both the merits (the principle of effective demand) and the inherent theoretical limits (factor demand schedules) of Keynes' attempt to break with traditional marginalist theory. Furthermore, our discussion confirms that the validity of Keynes' critique is not contingent on the assumption of money wage rigidity. Finally, we argue that traditional authors' long-period equilibrium analysis is fundamentally invalidated by the theoretical results of the capital controversy. Hicks' analysis of involuntary unemployment, we show, necessarily requires the value-specification of the capital endowment in order to plausibly preserve both the persistence and the stability of the full-employment equilibrium position.

Introduction

We attempt to consistently reconstruct a theoretical justification to the tendency toward a full-employment equilibrium position in traditional marginalist authors before the publication of Keynes' *General Theory* (Keynes 1936). Before Keynes, such a tendency is never seriously questioned and, not surprisingly, is seldom explicitly treated by traditional marginalist authors. We present a rare exception which can be found in Hicks (Hicks [1932] 1963) and we ask how it is theoretically challenged by Keynes' theory. In Section 1.1, we briefly recall the fundamental properties of equilibrium as it is conceived in the method of long-period positions. Then, we show how the marginalist theory of value of distribution can argue that this equilibrium is a full-employment position. To do so, we recall the data from which it determines the equilibrium and the dominant market forces (free competition and principle of factor substitution). In Section 1.2, we provide a rare explicit treatment of factor market's stability which we find in Hicks' *Theory of Wages* (Hicks [1932] 1963). In Hicks' analysis, involuntary unemployment is a disequilibrium state and the adjustment toward equilibrium rests on the value-specification of the capital endowment and the traditional mechanism of full-adjustment of the level of investment (i.e. the demand for capital) to the supply of savings. In Section 1.3, we illustrate how the value-specification of the capital endowment is necessary to guarantee the persistence of the equilibrium position and to allow the correct working of the factorial substitution mechanism. The latter, we argue, is crucial for Hicks' explanation of the tendency toward full employment. In Section 1.4, we study whether and how Keynes' critique represents an attempt to invalidate the persistence of the full-employment equilibrium and, consequently, the traditional authors' claim that there exists a spontaneous market tendency toward it. We stress how the theoretical roots of Keynes' attack are found in his alternative determination of the interest rate, which is no longer the equilibrating variable in the market for investment-savings. From here, we illustrate how Keynes' critique fundamentally undermines the validity of Hicks' stability analysis and how this validity is not contingent on the assumption of rigid money wages. In Section 1.5, we stress how the theoretical results of the capital controversy are relevant to rigorously understand both the merits (i.e. the Principle of Effective Demand) and the limits (factor

demand schedules) of Keynes' own critique. In Section 1.6, conclusive remarks and future directions of the present research follow.

1.1 The method of long-period positions

Traditional authors argue that the marginalist theory of value and distribution can determine the long-period normal equilibrium position of an economic system. This position is intended as the 'centre of gravity' of the economy (Dvoskin 2016; Eatwell 1983). What traditional authors determine are the 'natural' (normal) equilibrium relative prices. These are conceived as nominal magnitudes around which day-by-day market prices constantly oscillate and which would be eventually established if the persistent market forces at the basis of the marginalist approach to value and distribution were to be freely allowed to work out the adjustments they are assumed to set in motion[1]. Indeed, these notions of long-period position and normal or competitive relative prices allow traditional authors to both i) claim that their equilibrium position can give a satisfactory indication of how real economies work and ii) maintain that disequilibrium phenomena do neither change the equilibrium position nor prevent the tendency toward it[2].

[1]For example, in Marshall's *Economics of Industry*, we read that a normal equilibrium value "does not tell us what will be the wages of a certain work, or the price of a certain thing at any particular time. We cannot discover the Market value of a thing without allowing for the fluctuations of supply and demand, and for the resistance which local obstacles oppose to the free movement of the stream of competition. But on the other hand we can make no progress in explaining the movements of wages and prices, unless we first understand which of them are due to local or transitional causes, and which to the Normal-action of free competition." (A. Marshall and M. Marshall 1879 II.XIII.§3, p. 149). Later, in his *Principles* we read that: "[...]the normal, or "natural", value of a commodity is that which economic forces tend to bring about in the long run: it is the average- value which economic forces would bring about if the general conditions of life were stationary for a run of time long enough to enable them all to work out their full effect."(A. Marshall [1890] 2013, V.III.§7, p.347).

[2]As Milgate clarifies: "Normal results are those which would be brought about by competition if it acted freely, and always had time to cause those effects which it has a tendency to cause. [...] Like sea-level, the natural, or long-period normal position of the system had an objective meaning, even though at any given moment it might be disturbed by innumerable cross-currents" (Milgate 1982, pp. 25–26). Thus, we must remark that this notion of equilibrium does not need to carry with itself the belief that the normal position of the economy can ever be effectively achieved and observed in real economies. Instead, it only implies the less constraining idea that the normal equilibrium plausibly represents the position towards which the dominant market forces constantly *tend* to move

To act as centre of gravity the equilibrium position must simultaneously satisfy two requirements: it must be persistent and stable. The persistence ensures the insensitivity of an equilibrium position relative to the process of convergence toward it. Namely, persistence avoids a path-dependency problem and guarantees that the equilibrium position can be safely determined from any arbitrary position (Garegnani 2012). Given the persistence, the stability ensures that there indeed exists a tendency toward it. Stability without persistence, as mentioned, would imply a system with a tendency toward one or more equilibrium positions which, however, would not correspond to the equilibrium position the theory determines from any arbitrary position and set of data. If those two requirements hold, then the equilibrium is that position where, if established, approximately nothing would tend to change because of the simultaneous balancing of all dominant market forces. In Clark's words, at such position "motion is prevented not by friction, but by an equilibrium of the forces that press each particle in different directions" (Clark 1908, p. 64). The kind of stability traditional authors are concerned with is *static* stability. What do matter is that traditional authors' dominant economic market forces can be argued to set motion equilibrating adjustments *directed* towards the normal equilibrium position their theory determines[3]. Conversely to *dynamic* stability, the disequilibrium dynamics that we will discuss here focuses on the study of the *direction* of the self-correcting adjustment that a disequilibrium in the labour market sets in motion. The conclusions we draw from the disequilibrium dynamics in the static stability context will be independent of the speed or magnitude and of the pattern –trajectory– of the disequilibrium adjustment process[4].

Traditional neoclassical authors, also, argue that the normal position of the economic system is a full-employment state. What interest us here is to underline how

the economy despite the inevitable day-by-day disequilibrium accidents.

[3]See Hicks' notion of "directional provision of the rule of adjustments" (Hicks 1965, p. 18). A discussion of the Hicks-Samuelson debate on stability is beyond our scope. However, it is worth to mention that the static *vs* dynamic stability is at the centre of this debate (Hicks 1939; Hicks 1965; Samuelson 1944; Samuelson 1955).

[4]Certainly, what does matter is that the dominant market forces set in motion corrections toward the equilibrium that are fast enough relative to the –slow– rate of change of the data determining the normal position. This is what entitle traditional authors to assume that these data are sufficiently persistent.

full employment is not an *a priori* assumption they make to define what an equilibrium state is. Rather, given the notion of equilibrium as the centre of gravity, they argue that such an equilibrium is indeed a full-employment position. This is something that results specifically from the marginalist *theory* of value and distribution and not from the *method* of long-period positions. Let us inquire about the theory and check how full employment can be sustained as the 'natural' point of attraction of an economic system.

Firstly, the *data* from which the theory determines the equilibrium position (i.e. the equilibrium relative prices) are:

- consumer tastes and preferences
- prevailing methods of production
- endowments of productive factors (land, labour, and capital)

The persistence of these data is a necessary condition for the persistence of the equilibrium position itself. For example, during the process of adjustment toward the equilibrium, if the population was to be suddenly halved because of a global pandemic, then the new 'normal' position would be different from the one that was inferred from the pre-pandemic data thereby making the original prediction irrelevant.

The equilibrium analysis which keeps these data as given and persistent is a study of a stationary economic system. Stationarity must not be confused with the absence of any dynamics. Conversely, the stationary method allows to isolate the dominant market forces. These forces act even in a more dynamic scenario where one or more data are subjected to changes (e.g. increase in population, technological process, etc.). To borrow again Clark's words:

> The forces that would work in a world that should be held in a fixed shape and made to act forever in a fixed manner still operate in the changing world of reality. We can always see them working in connection with other forces, but we have to imagine them working alone. (Clark 1908, p. 30)

> A knowledge of the static law is universally needed as a preliminary to a knowledge of dynamic law. (Clark 1908, p. 35)

According to the marginalist theory, those dominant market forces are essentially two:

1. Mechanisms of factor substitution (direct and indirect)

2. Free competition (horizontal and vertical)

As we will see later, those are at the basis of traditional authors' stability analysis. Now we must first focus on how these different, but related, forces together provide the theoretical ground to conceive traditional factor *demand* curves as downward-sloping (well-behaved) and fairly elastic.

1.1.1 From employment curves to factor demand curves

The substitution mechanism constantly operates, according to traditional authors, both directly and indirectly. The direct factor substitution mechanism consists on the technical substitution undertaken by cost-minimising firms whenever a change in distribution (i.e. a change in the rental price of one factor) occurs. For example, if the rental price of labour falls, firms adopt more-labour intensive techniques since the labour factor has now become cheaper relative to the other factors of production (e.g., land, capital). The indirect substitution mechanism operates through consumers' consumption choices[5]. Let us assume, for simplicity, that only one production method is available in the economy and that only two goods are produced: one labour-intensive and the other capital-intensive. A fall in the wage rate makes the labour-intensive good cheaper relative to the capital-intensive good. Consumers' demand of the now cheaper good increases. As a result, a higher proportion of the 'quantity' of capital will be addressed to the production of the labour-intensive good. Assuming only one method of production, a unit of capital requires more labour when it is employed in the production of the labour-intensive good than it requires in the production of the capital-intensive good. Hence, more labour will now be employed. As the technical substitution, the indirect principle of substitution also predicts that the employed quantity of a factor increases if its rental price falls. Thus, in both its versions, the

[5]This is the reason why consumers' preferences and tastes must be one of the persistent *data* determining the equilibrium.

substitution mechanism provides a theoretical justification for the *downward*-sloping shape of a factor employment curve. As we will see in a moment, only if we introduce the additional assumption of vertical competition we can consider those employment curves as factors' *demand* curves[6].

What we may label as *horizontal* competition implies that there is a tendency toward a uniform rate of remuneration of similar factors of production. For example, this horizontality of competition implies that, for example, equally able workers tend to be employed at the same wage rate. Granted this, the *vertical* competition assumption states that, given the employment of the other factors, a factor rental price reacts to supply and demand forces in its market. For example, this assumption allows traditional authors to state that the wage rate falls/rises in presence of an excess supply/demand of labour and that, as a result, there exists a an equilibrium rental price at which the entire labour supply just finds employment[7].

The plausibility of the vertical competition assumption, as it is evident, directly depends on the correct working of the principle of factor substitution which determines the shape of factor's employment curve. Only if a lower rental price of a factor, say labour, effectively induces firms to employ more labour we can accept the theoretical implication of vertical competition (Garegnani 1990, p. 7). Namely, that an unemployed worker willing to find a job should exert competitive downward pressure on the wage level or, symmetrically, that firms with unsatisfied labour demand should bid wages up[8]. Furthermore, that the already employed workers should accept a re-

[6]Garegnani was among the first authors to remark the importance of distinguishing between employment curves and factor demand curves. See Garegnani (1990), pp. 7-8.

[7]The distinction between horizontal and vertical free competition is widely unmentioned both in marginalist and non-marginalist literature. However, it is in the notion of vertical competition that we find the theoretical root of the tendency toward full employment. It is, in fact, specific to the marginalist explanation of value and distribution. Although we encounter the horizontal competition assumption in classical non-marginalist authors (e.g. Ricardo), we do not find there any theoretical presupposition equal or in accordance to the marginalist notion of vertical competition and to its fundamental implication (i.e. the natural tendency toward full employment of productive factors).

[8]In Wicksell we read:"So long as wages are materially lower than the marginal product of the sixteenth labourer [the last labourer employed], it will be to the advantage of every landowner to employ more than sixteen labourers [the optimal employment level]. But all the landowners cannot simultaneously succeed in this object, and consequently their endeavour must result in a rise of wages. Again, if wages are *higher* than the marginal product, each of the landowners will content himself with less than sixteen workers, which will result in unemployment and a fall in wages through the competition of the unemployed [...]. The final wage must therefore lie somewhere between the

duction in the wage level since, if for some reason they refuse to work a the new wage rate, the employer could readily dismiss them and employ the previously unemployed workers who instead are more than willing to work at the new wage rate.

If, for example, the employment curve of labour was not well-behaved, then the vertical competition assumption would no longer be confirmed and, hence, justifiable. Hence, we could not consider this curve as a labour demand curve since it is only the "*additional* assumption" (Garegnani 1990, p. 6) of vertical competition that legitimises us to consider the labour employment curve as the *demand* curve of labour.

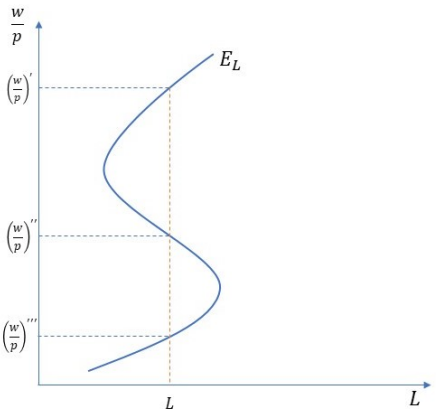

Figure 1.1: 'Badly'-behaved labour –employment– curve

As in Figure 1.1[9], there are traits of the curve where a higher wage rate is associated with higher employment of labour. Such a 'bad' behaviour of the curve signals an incorrect working of the factor substitution mechanism. The curve is therefore, on closer inspection, only an employment curve indicating the level of labour employment associated with each possible level of wages. To consider this curve as a labour *demand* curve requires to *add* the assumption of vertical competition. However, to assume vertical competition would be hardly justifiable since, in this case, firms' reaction to a change in the wage rate is ambiguous. Why should unemployed workers be willing to accept a fall in the wage rate to be absorbed into the labour market?

marginal product of the sixteenth and that of an imaginary seventeenth labourer." (Wicksell 1934 [1901], pp. 113-114, original emphasis).

[9]All graphs in this work are the author's own elaboration.

The possibility to answer the previous question unambiguously is contingent on the well-behaviour of traditional factor demand curves (Figure 1.2). Namely, on the well-behavior of a demand curve constructed from an employment curve whose negative slope confirms the correct working of the factor substitution mechanism and makes the necessary additional assumption of vertical competition acceptable. In other words, vertical competition is a necessary condition to have a factor demand curve but, in turn, it is a plausible assumption only provided that the employment curve from which it is constructed behaves accordingly to the principle of substitution (i.e. that it is negatively sloped).

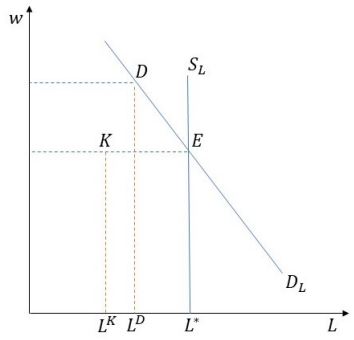

Figure 1.2: Traditional labour demand curve

Given such a well-behaved demand curve and the total endowment of a factor, traditional authors argue that is possible to determine the equilibrium value (the normal rental price) of this factor. This is the position at which the whole endowment of this factor finds employment. For example, in Figure 1.2, the normal wage rate is the one associated to point E. At this point the whole supply of labour finds employment and any competitive pressure to change the position of the system ceases. Namely, being everyone employed, everyone is satisfied and the downward pressure on the wage level coming from unemployed workers stops[10].

[10]The reverse reasoning applies to competition among employers. In this case, vertical competition ensures that the equilibrium wage is not excessively low. If an employer offers to pay to his workers an excessively low wage, other employers could easily attract those workers by offering them a slightly higher wage. Together with the downward pressure coming from workers' competition, there is, therefore, also an upward pressure on the wage level generated by the firms' side of competition, which simultaneously pushes the economy toward point E.

A necessary condition to derive a factor demand curve is that the other factor(s)' employment is considered as given. For instance, let us assume that our economy is a land-labour economy. The employment of the land is given at $\bar{T}$. We want to derive the labour demand curve to determine the equilibrium wage rate. If at the current wage rate w a portion of the labour supply $(L^* - L)$ remains unemployed (i.e. not demanded by landowners), it means that the ruling labour-land ratio, $L/\bar{T}$, is not optimal from the workers' standpoint since it leaves some of them unemployed. As the theory predicts, there comes at play a downward pressure from unemployed workers that eventually lowers the wage rate from w to w^*. The only reason to sustain that at this equilibrium wage w^* the entire labour supply finds employment is that the change in the wage level induces a change (an increase, in our case) in the labour-land ratio from $L/\bar{T}$ to $L^*/\bar{T}$. This increase in the demand for labour, however, can be uniquely predicted by the theory only in so far as the employment of land (i.e. the denominator of the factors' ratio) is maintained at $\bar{T}$ throughout the process. This condition, in other words, is what guarantees that we remain *on* the labour demand curve and that, conversely, a reduction in the wage level does not drive the economy toward a position *off* the curve (e.g. point K in Figure 1.2). Then, since this reasoning can be applied to each factor of production[11] and, for each factor, it can be separately shown that there exists a tendency toward its full employment, it can be safely maintained that the situation described by a factor demand curve is one in which the other factor of production has already realised its equilibrium full-employment state. Namely, the demand curve of, say, labour, assumes not only that the amount of land employed is given $(\bar{T})$ but also that it is fully-employed (T^*).

As the later discussion aims to stress, this reasoning encounters crucial theoretical difficulties once we introduce capital among the factors of production.

1.1.2 Positions *off* the demand curve

Up to now, we discussed the derivation of a factor demand curve (labour, in our example) under the condition that the other factor's employment is given and fully-employed. However, it remains to be explained how traditional authors can claim that

[11] We can consider as given the labour employment $\bar{L}$ and equally determine the equilibrium rental price of land.

all factors tend to be fully employed to give an exhaustive theoretical plausibility to factor demand curves derived on such condition.

For simplicity, let us begin with a land-labour economy. Suppose a situation where both labour and land are partially and simultaneously unemployed so that workers and landlords bid down their rental prices. As a consequence of these downward pressures, the economy finds itself in a particular state where a proportional decrease in the rental price of both factors, the money wage and the rent, leaves substantially unchanged the optimal labour-land ratio so that, for a given level of output, entrepreneurs are unwilling to change their desired demand of labour and land. As a consequence, both factors remain partially unemployed. Hence, why should the economy move toward a position depicted by traditional authors' factor demand curve which assumes that the other factors have already reached their full employment? Firstly, one can assume, as Wicksell does (Wicksell 1934 [1901], p. 103), that landlords have no interest in leaving their land property unexploited. If none is willing to rent their land, then they will personally assume the role of entrepreneur and begin to productively employ their land. The same may hold from the unemployed worker's standpoint. This expansion of employment and output, therefore, is brought about without the necessity to alter neither the money wage nor the rental price of land. The only condition, plausible in a land-labour economy, is that the entire product is absorbed by the market (i.e. all incomes are spent on the product). Secondly, a possible explanation can be found in the influence of monetary factors[12]. The decrease in the rental price of both factors, under competitive conditions, induces a fall in money prices. The deflationary tendency, given the available supply of money in the economy, increases individuals' (real) cash balances. Therefore, they attempt to reduce their increased cash balances by increasing their expenditure. This stimulus directly affects firms' incentive to augment their level of output through an expansion of employment of both factors up to the point where labour and land are fully employed and thus there is no longer a downward pressure on the rental price of factors. Hence, it becomes plausible to assert that, in the case that the full employment of land is achieved before the one of labour, then the labour's tendency toward

[12]We will see a modern version of this explanation in Chapter 3 as we analyse Patinkin's discussion of involuntary unemployment (Patinkin [1956] 1965, Ch. XXXIII).

full employment can be guaranteed by traditional authors' downward-sloping labour demand curve, and *viceversa*. In this process of adjustment, therefore, an increase in aggregate demand caused by the fall in the price level without changes in firms' optimal labour-land ratio, justifies firms' expansion of total output. This, gradually, moves the economy toward the position where effectual aggregate demand eventually coincides with full-employment aggregate demand. In this way, the persistence of traditional authors' factor demand curves can be confirmed. Those are the factor demand curves which prevail when aggregate demand is at its full-employment level and, being the latter the centre of gravity of the economic system, they also bear the same persistence. This line of reasoning must also apply to the case of a capitalistic economy. Especially, it must apply to Hicks' stability analysis that we will introduce in the next section.

1.2 Hicks' stability analysis of the full-employment equilibrium

In Hicks' *Theory of Wages* (Hicks [1932] 1963) we find a rare explicit treatment of traditional stability analysis of a factor market. That is, a theoretical explanation of the tendency toward full employment which is consistent with the marginalist theory of value and distribution.

Hicks considers a labour-capital economy and presents a particular case of disequilibrium analysis where only one market, the labour market, is in disequilibrium. It is worth to stress once again that the element of 'disequilibrium' is not in the non-market-clearing of the labour market but in the fact that, in this situation, there are workers who are *involuntarily* unemployed and thereby there are market forces which come about to change the current *status quo* of the economic system[13].

Assume, begins Hicks, that in our economy "the general level of real wages is raised, and maintained, at a height inconsistent with normal employment" (Hicks [1932] 1963, p. 198). The situation considered, therefore, corresponds to an economy

[13]Involuntary unemployment means that those workers who are not finding employment are both searching for employment and willing to work at the current wage rate.

which, because of non-economic reasons (e.g. wage level is imposed by trade unions), is displaced from point E to point D in Figure 1.3.

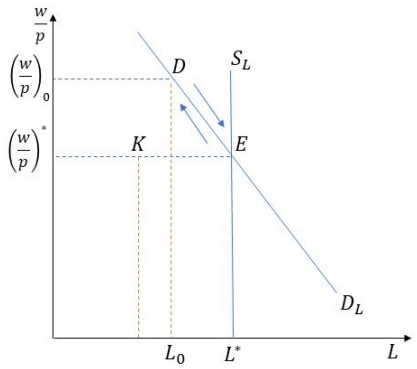

Figure 1.3: Hicks' analysis of involuntary unemployment

The economy, after the externally induced increase in the wage rate, reaches a position D on the aggregate demand curve of labour. As explained before, we are entitled to remain *on* this curve only in so far as the other factor –here, capital– is given and maintained at its full-employment level. The working of traditional factor substitution set in motion by the general change in the wage rate is, in Hicks, explicitly contingent to the maintenance of capital's full employment:

> there will thus be a tendency for capital to shift – from the less capitalistic to the more capitalistic trades [...] The wages of labour are higher and the rate of interest is lower than they would have been in a free market; so that more capitalistic methods of production which would have not been profitable then become profitable now. But the adoption of these methods lowers still further the amount of labour which is required with a *given volume of capital*; and so increases unemployment. (Hicks [1932] 1963, p.188 Emphasis added)

> [...] (provided there is *no wastage of capital* in the process) capital will be transferred to the more capitalistic industries and to more capitalistic processes within the same industries; and that this must go on so long as there is any possibility of increasing profits by such transformations. (Hicks [1932] 1963, X.I., p.198. Emphasis added)

The equilibrium in the capital market, therefore, must not be disturbed by the disequilibrium in the labour market if we aim to study movements *along* the labour demand curve. The same is true for the product market that is in equilibrium although there exists a quantity of the labour supply that is involuntarily unemployed, $(L^* - L_0)$. Following Hicks, after a wage rate above the normal level has been imposed:

> [A] final position must be reached which is precisely the same as that which would have occurred if there had been *a direct reduction in the number of labourers available*, and a consequent rise in their marginal product on account of the increased capital per head available for them. [...] The final position thus reached is one of *equilibrium, if the existence of the unemployed is left out of account.* (Hicks [1932] 1963, X.I., p.198-199. Emphasis added)

At the new real wage $(\frac{w}{p})_0$ and given the full employment of capital, the economy reaches a position like point D in Figure 1.3. At this point, firms are optimising and do not have any incentive to change prices nor to change their labour demand and, hence, their level of output[14]. They produce precisely the level of output that the market can absorb at the new prevailing conditions. The theoretical implication of this proposition is that, at any point other than the equilibrium position, the aggregate output demand must be derived from the income receipts of *employed* factors only and not from total endowments (i.e. full-employment level of income). As Hicks explains, unemployed workers are "left out of account" in the determination of final output demand. At point D, their earnings are zero and they cannot participate in the composition of aggregate demand. There is, therefore, no element of excess demand in the product market acting as a corrective market force able to solve the disequilibrium in the labour market[15].

Point D, however, is not *persistent*. Eventually, the free –vertical– competition and the traditional factorial substitution set in motion market pressures and a process of

[14] "As far as the entrepreneur is concerned the market for the good is in equilibrium and there is no incentive to increase output and hence demand more labour; and equally there is no pressure to change the good price. But labour is unemployed." (Eatwell 1983, p. 112).

[15] As we will see in a moment, the variable which can adjust for the labour market' disequilibrium is precisely only the one which is kept at its non-optimal level, i.e. the wage rate.

re-adjustment that moves the economy back to point E, thereby ultimately correcting for temporary disequilibrium in the labour market[16]. The maintenance of an artificially high wage is not sustainable in the long run. On the one hand, we know that involuntarily unemployed workers will exert downward pressure on the wage level, on the other hand, that this pressure will be welcomed by those firms whose production consists of consumption goods[17] and(or) adopt labour-intensive techniques. In the end, Hicks argues, "their wages will therefore fall, and the pressure of unemployment will be thereby somewhat relieved" (Hicks [1932] 1963, p. 190).

Hicks considers that the fall in the wage rate is *sufficient* to move the economy back toward full employment. This must necessarily imply that, as the wage falls, firms do have the incentive to demand more labour and, by doing so, increase their volume of output. As before, this confirms as the only plausible theoretical explanation for such an 'incentive' that firms, at any point on the aggregate demand curve of labour, produce a level of output whose value corresponds to the incomes of *employed* factors only. Namely, although the fall in the wage level decreases real wages from $(\frac{w}{p})_0$ to $(\frac{w}{p})^*$, firms expect that their augmented output will still find purchasers, more or less, at unchanged prices. Since capital is always fully employed at any point of the labour demand curve, the increase in output will be exclusively attributable to the expansion of labour employment. Those workers who, at point D, were 'left out of account' are now income-receivers and can *effectively* participate in the composition of output demand. At point E, where the adjusting process stops, the general level of income will be restored to its full-employment level. Therefore, it is here at point E –and only here– that the prevailing demand conditions of the product market can be described by an aggregate demand corresponding to the full-employment income level.

[16] As Hicks remarks: "the labour market is not a perfect market; the equalising forces do not act quickly and easily, but nevertheless they do act" (Hicks [1932] 1963, V., p.76).

[17] The redistribution of purchasing power in favour of profit-earners directly and negatively affects the demand for consumption goods which almost entirely composes the demand of wage-earners.

1.3 Persistence of the equilibrium as contingent to the value-specification of the capital endowment

Hicks' stability analysis can help us now to understand how Keynes' critique of the Classics (Keynes 1936) represents an attempt to invalidate the spontaneous tendency of a competitive economic system toward a full-employment equilibrium position. We saw how Hicks' discussion of the labour market disequilibrium and of the corrective market forces that come at play to restore the equilibrium position crucially rests on the presupposition that, at any moment, the capital (the other factor) is *given* and fully-employed[18]. This is the condition which entitles Hicks to focus on adjustments that take place *along* the labour demand curve and, moreover, to preserve the persistence of the equilibrium position that remains the undisturbed centre of gravity of the economic system throughout the adjustment process. We also saw how those movements on the curve depict variations of the level of output followed by equivalent variations in aggregate demand.

If we go back to our labour-land economy, Hicks' analysis of labour unemployment does not encounter serious theoretical limits. Given the full employment of land (here the other factor), a fall in the wage rate and an increase of labour employment both yield an expansion of final output (e.g. corn) which will be entirely absorbed by the new wage-receipts that the expansion of labour employment creates. Conversely, this line of reasoning is no longer straightforward if, as in Hicks' case, we consider an economy where capital enters explicitly among the factors of production. Namely, the theory must now provide a theoretical justification to the mechanism that, in this case, is responsible for keeping capital at its full-employment level throughout the adjustment process (i.e. the movement along the labour demand curve). This mechanism is directly related to the marginalist theory of investment and, as we will see, is crucial to understand the theoretical roots of Keynes' critique.

As it is well known, traditional authors specify the economy's total endowment of

[18]As Hicks remarks: "[W]e made the tacit assumption that the transference of capital to new uses, the principal way in which the economic system reacts to a change in wages, *could take place without affecting the total supply of capital*" (Hicks [1932] 1963, p. 192) (emphasis added).

capital as a *quantity of value* (Garegnani 1990). This amount of total value-capital is among the data that the theory requires to be persistent so to plausibly preserve the persistence of the equilibrium position itself. The physical composition of the value-capital is, however, variable and endogenously determined to guarantee the correct working of the traditional factor substitution mechanisms. Different quantities of labour realistically require to be combined with different and physically heterogeneous capital goods and not, as in the case of land, with different proportion of homogeneous units of land. If firms were not allowed to endogenously adapt the composition of their capital endowment, a fall in the wage rate would no longer be a sufficient market-induced incentive to increase their demand of labour. It can be sufficient only inasmuch they can adapt their capital goods depending on the different levels of labour employment that different levels of real wage respectively call for. It is such a value specification of the capital endowment which, therefore, on the one hand ensures the persistence of the equilibrium and, on the other hand, by allowing for the endogenous determination of the physical composition of the capital endowment, gives theoretical plausibility to the degree of substitutability among factors of production which the marginalist theory requires[19]. A fair degree of substitutability is necessary for the marginalist theory to sustain that there exists a spontaneous tendency towards the full employment of factors of production. And this substitutability is acceptable only provided the capital endowment is specified as a total value-quantity whose form, however, is variable. As we read in Clark (1908):

> There are farms, gardens, mines, sailing crafts, etc., to which the bringing of one more workman would mean an excessive uneconomical supply of labour[20]; but there is no such limit to the number who can work with a fixed amount of capital, *if the forms of it can be varied to suit the number of men.* [...] If, therefore, capital is not limited in its forms, the labor that it can use is not limited in quantity. (Clark 1908, p. 114) (original

[19]We already noted that traditional well-behaved factor demand curves must also be fairly elastic. If the degree of substitutability is seriously limited, then the theory could yield highly implausible results. For example, a close-to-zero equilibrium wage. A rigid labour demand curve implies that for very small changes in the quantity of labour demanded enormous variations in the wage rate should be undertaken.

[20]Note, Clark refers to *employed* supply of labour.

emphasis)

That is, given the "permanence" of the value-capital (Clark 1908, p. 117) and the heterogeneity of capital goods, a competitive economic system can absorb the entire labour supply, no matter how large it may be[21]. To provide further evidence of traditional authors' general agreement relative to the specification of the capital endowment, we finally recall this passage by Wicksell:

> all productive factors, and consequently capital too, could be considered approximately as constant magnitudes. Though in this case the forms of the latter change, its total value remains unchanged, since in place of the consumed capital goods new ones of equivalent value enter successively. (Wicksell [1893] 1970, p. 103)

Once we have clarified traditional authors' specification of the capital endowment, we must see how they can derive a demand curve for capital which, as for any other factor of production, must be downward-sloping and fairly elastic. The interest rate is for capital what the wage rate is for labour. Namely, it is the variable of adjustment which grounds the market tendency toward the full employment of capital. It must be noted that the demand for capital refers to the demand for capital as a 'stock'. Given the durability of capital goods, however, it would be implausible to assume that variations in the interest rate induce all firms to change at once their entire capital equipment. In reality, the demand for capital manifests itself as a succession of demands for investment, i.e., the demand for capital as a *flow*[22]. This is the demand for new capital goods which will "over a period of time" (Garegnani 1983, p. 35) adapt the capital endowment to the appropriate form for different combinations with other factors. In the case of Hicks' analysis, for instance, this would be the demand for capital which allows the endogenous determination of the physical composition of capital so to plausibly combine it with the two different levels of labour employment, L_0 and L^* (Figure 1.3). The close link between demand for investment and for capital as stock provides the justification to consider investment as an interest-elastic

[21] The demand for labour becomes "indefinitely elastic": "If capital is freely transmutable in form, labor becomes freely transferable and able to count as an indefinitely elastic field of employment." (Clark 1908, p. 115).

[22] On the issue, see Dvoskin and Petri (2017) and Garegnani (1983).

function. In other words, the negative interest-elasticity of investment reflects the negative interest-elasticity of demand for capital as a stock (Garegnani 1983). This link allows traditional authors to sustain that the interest rate is determined in the investment-saving market, i.e, the market for that quantity of capital in its "free and uninvested form" (Wicksell 1935 [1901], p. 195). Further, to consider the normal equilibrium interest rate as the one for which "the *demand for loan capital and the supply of savings exactly agree*" (Wicksell 1935 [1901], p. 193) (original emphasis)[23]. This is the traditional theory of loanable funds.

Let us assume that in our labour-capital economy we have managed to achieve the full employment of labour. The general level of income is now greater than in prior times of labour unemployment. The general level of savings, therefore, will be also greater. If the prevailing interest rate is higher than the 'natural' one, the level of investment might not be sufficient to absorb the full-employment supply of savings. The discrepancy between investment and savings sets in motion a downward pressure on the interest rate. Given the negative elasticity of investment relative to variations in the interest rate, this competitive pressure eventually comes at a stop when the demand for investment (demand for 'loan-capital') will be equal to the full-employment supply of savings. Until, namely, the equilibrium is achieved in the market for investment-savings.

In Hicks' stability analysis, where the opposite case is considered –labour market is in disequilibrium–, we saw how the full employment of capital is throughout necessary. Hicks assumes, therefore, that this mechanism of investment's full adjustment to savings is constantly operating. If this was not the case, then we would no longer be entitled to focus on positions along the aggregate demand curve of labour. Namely, there would be no theoretical ground to argue that a disturbance such a higher non-optimal wage-setting shifts the economy to point D (Figure 1.3) and not to points *off* the curve (e.g. point K). Furthermore, the maintenance of the equilibrium in the investment-savings market is what allows Hicks to argue that variations of the level of output are constantly accompanied by equivalent variations in aggregate demand.

[23]As Keynes lucidly describes it: "Investment represents the demand for investible resources and saving represents the supply, whilst the rate of interest is the 'price' of investible resources at which the two are equated." (Keynes 1936, p. 175).

In a closed capitalistic economy with no government, aggregate demand is composed of consumption and investment demand. Only provided the latter is in equilibrium, Hicks can argue that the transition from point D to the equilibrium state E[24] (Figure 1.3) yields an increase in the consumption demand due to *newly created incomes* deriving from the expansion of labour employment and that this is sufficient to entail an effective aggregate demand able to absorb the entire full-employment output. In other words, that a fall in nominal wages is sufficient to cause a fall in real wages and hence to correct for labour market's disequilibrium and eventually achieve a full-employment position ($w \downarrow \rightarrow \frac{w}{p} \downarrow \rightarrow D_L \uparrow \rightarrow L \uparrow$).

1.4 Keynes' attack on the "classical doctrine"

In *The General Theory*, Keynes (1936) attempts to invalidate the traditional adjustment mechanism behind the equilibrium in the investment-savings market. Keynes begins by rejecting Say's Law ('supply creates its demand'). According to him, it is only the acceptance of Say's Law that allows traditional authors to state that the value of aggregate demand always increases/decreases *pari passu* with the value of total output. In a closed economy with no government, aggregate demand is given by $AD = I + C$. Namely, it is composed by investment demand and consumption demand. By Say's Law, then, $AD = Y$ (value of aggregate demand equal to value of total output) and at any variation in the value of total output always corresponds an equivalent variation in aggregate demand ($\Delta Y = \Delta AD$). However, this holds only in so far as "there is no obstacle to full employment"[25]:

[24] Investment fully-adjusts, at point E, to *full-employment* savings.

[25] Critical literature already argues that Keynes' reading of Say's Law is mistaken (Garegnani 1983; Milgate 1982; Mongiovi 1990). Keynes refers to both classical authors and traditional marginalist authors as the 'Classics'. However, although they share the method of long period positions, they advance substantially alternative theories of value and distribution. Classical authors' theory does not imply that there exists a tendency to full employment. As Mongiovi (1990) remarks, classical authors do not provided a theory of output and "Say's Law reflects the assumption that [...] equilibrium condition will be met at any level of output" (Mongiovi 1990, p. 77). The equilibrium condition being that *any* long-period level of output could be sustainable due to the identity between savings and investment, and hence of total expenditure and value of output. In the absence of a theory of output, they need this assumption to plausibly claim that their long-period normal relative prices indicate the position towards which the economic system gravitates. Conversely, as we turn to marginalist authors, we find that "the marginalists' version of 'Say's Law' carries along with it the

> Thus Say's law, that the aggregate demand price of output as a whole is equal to its aggregate supply price for all volumes of output, is equivalent to the proposition that there is no obstacle to full employment. (Keynes 1936, p. 26).

More specifically, only in so far as one assumes the traditional adjusting mechanism where investment fully-adjusts to the level of savings:

> When employment increases, aggregate real income is increased. [...] When aggregate real income is increased aggregate consumption is increased, but not by so much as income. Hence employers would make a loss if the whole of the increased employment were to be devoted to satisfying the increased demand for immediate consumption. Thus, *to justify any given amount of employment there must be an amount of current investment sufficient to absorb the excess of total output over what the community chooses to consume when employment is at the given level.* For unless there is this amount of investment, the receipts of the entrepreneurs will be less than is required to induce them to offer the given amount of employment. (Keynes 1936, p. 27) (emphasis added).

As we saw before, traditional authors' theory of loanable funds argues that the level of investment can be 'sufficient to absorb the excess of total output' which is not demanded for immediate consumption. Investment fully adjusts to savings (i.e. the

implication that under long-period normal conditions there will be full-employment" (Milgate 1982, p. 46) (cf. Samuelson's erroneous association of Say's Law with full employment in classical authors, Samuelson (1978, p. 1421)). However, Say's Law *per se* is not responsible for the marginalist theory's proposition that the long-period position of an economic market system is a full employment state. Full employment is the result of marginalist mechanisms of adjustment, which, we argued, depend fundamentally on the factor substitution mechanism and vertical competition. In this context, Say's Law should be interpreted merely as indicating the marginalist mechanism according to which the interest rate adjusts so to bring investment into equality with savings. As Mongiovi writes: "Say's Law, as it was understood by the classicals, plays no part in marginalist theory. What the Law means in this setting, if it can be said to mean anything, is that, whatever the full employment level of income happens to be, total expenditure will (in equilibrium) be sufficient to support it. But *marginalist theory does not require a special doctrine to arrive at this result: the outcome is ensured by the theory which is presumed to describe the determination of prices, outputs and incomes.* It might therefore be appropriate to discontinue the tradition, *begun in error by Keynes*, of imputing Say's Law to the neoclassicals." (Mongiovi 1990, p. 79) (emphases added).

share of incomes that are not spent on immediate consumption) through variations in the interest rate, the adjustment variable in the investment-savings market. We saw how this mechanism of adjustment is necessary for Hicks' analysis of labour market disequilibrium and how it allows the author to focus on positions *along* the labour demand curve – where the capital factor is constantly maintained at its full-employment level– and to argue that a fall in money wage is sufficient to achieve the full-employment equilibrium.

Conversely, in Keynes the level of investment does no longer adjust to the supply of savings through variations in the interest rate[26]. Keynes' theory of the interest rate aims to disprove the existence of a tendency toward full employment and to show that, as a consequence of such a non-tendency, money wages are in general rigid. According to Keynes, the interest rate is not determined by the supply-and-demand forces in the market for flow capital- savings, but rather in the market for money[27]. This is indeed the message of Keynes' liquidity preference, which states that people have a desire to hold money also for *speculative* motives (Keynes 1936, p. 170). Such a desire (i.e. the demand for money as a store of value) is greater the lower is the interest rate and *viceversa*. Thus, for a given supply of money, the interest rate is now the one equalising the demand for money and the available supply of money[28]. The level of investment becomes *autonomous* in the sense that, although still responding to variations of the interest rate (i.e. the marginal efficiency of capital), the latter is no longer determined by supply-and-demand forces acting in the market for loanable funds. The interest rate determined in the money market will induce a *given* level of investment. For such a given level of investment, Keynes' principle of effective

[26] As we read: "[...] the notion that the rate of interest is the balancing factor which brings the demand for saving in the shape of new investment forthcoming at a given rate of interest into equality with the supply of saving which results at that rate of interest from the community's psychological propensity to save, breaks down as soon as we perceive that it is impossible to deduce the rate of interest merely from a knowledge of these two factors." (Keynes 1936, p. 165).

[27] "The rate of interest is not the 'price' which brings into equilibrium the demand for resources to invest with the readiness to abstain from present consumption. It is the 'price' which equilibrates the desire to hold wealth in the form of cash with the available quantity of cash." (Keynes 1936, p. 167).

[28] "All that the propensity of the public towards hoarding can achieve is to determine the rate of interest at which the aggregate desire to hoard becomes equal to the available cash." (Keynes 1936, p. 174).

demand then states that it is now the level of savings which will adjust to investment through variations in real output/income. The equilibrium level of real output is the one at which savings are equal to the given level of investment. In Keynes' theory, full employment, therefore, is no longer the unequivocal *result* of an 'equilibrating' process. It is only by a fluke that the given level of investment is the one associated to full-employment savings. On this basis, Keynes can argue that "the postulates of the classical theory are applicable to a special case only and not to the general case" (Keynes 1936, p. 3).

Let us apply Keynes' theory of the interest rate to Hicks' analysis and see how it indeed undermines the persistence and stability of the full-employment equilibrium position. Before, let us recall how Hicks' adjustment works and the investment-savings market equilibrium that this adjustment requires to be plausible. The stimulus to the demand for labour able to correct for transitional involuntary unemployment comes from a reduction in money wages. We saw, in Hicks' discussion, how this fall in money wages, by succeeding in reducing real wages, would induce an expansion of employment and, hence, of output that is accompanied by an equivalent increase in aggregate demand under the condition that there is "no wastage of capital in the process" (Hicks [1932] 1963, p. 198). That is, provided that the traditional mechanism of adjustment in the investment-savings market is constantly in act. This means that unemployed workers' downward pressure on money wages eventually suffices –and succeeds – to increase firms' demand for labour to its full-employment level (i.e. from L^0 to L^*). The necessary condition is that, at the full-employment level of output Y^*, but also throughout the adjustment process toward full employment, the equilibrium in the investment-savings market is maintained. Namely, that the level of investment constantly adjusts to changes in the level of savings through variations in the interest rate, the 'balancing variable' in this market. An increase in the level of output from to Y^0 to Y^* generates an increase in consumption from C^0 to C^* (e.g. previously unemployed workers begin to perceive an income and to participate to the composition of aggregate demand for output) but, also, an increase in the level of savings, say, from S^0 to S^*. Only if investment fully adjusts to savings (in our special example, only if eventually $I^* = S^*$) the achieved level of output is sustainable (i.e. $Y^* = AD^*$). The graph that follows illustrates the necessary link between the traditional adjustment in

the labour market (i.e. to one depicted by Hicks) and the investment-savings market's equilibrium.

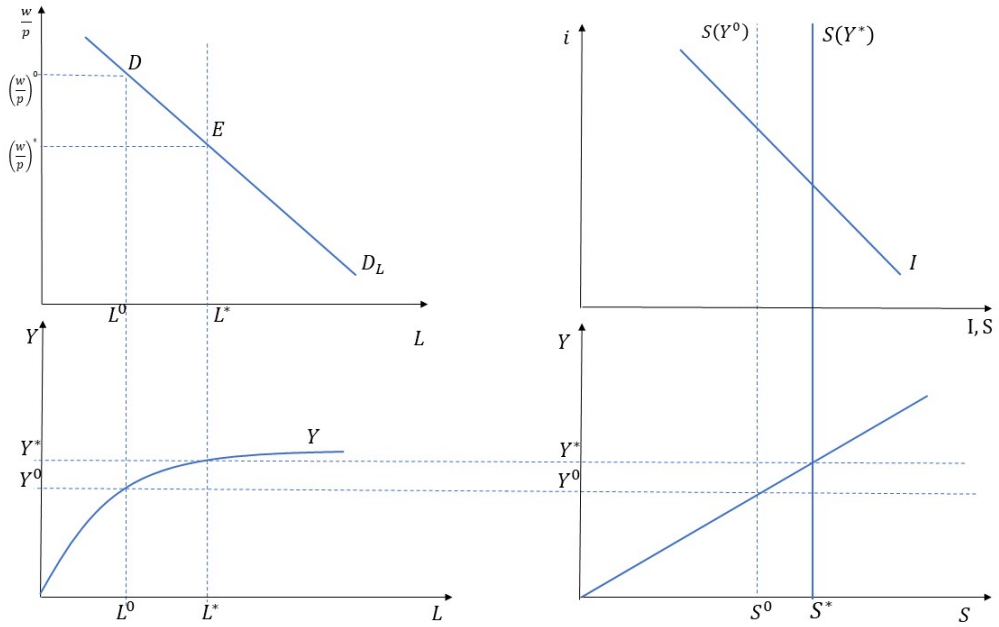

Figure 1.4: Hicks' complete disequilibrium dynamics

Let us now consider, as in Keynes' theory, that the level of investment ($\bar{I}$) is a given and autonomous component of aggregate demand. As before, we assume that the economy finds itself in a position of involuntary unemployment as the the one depicted by point D in Figure 1.3. The other markets, are, however, in equilibrium. The output market's equilibrium is not disturbed by the presence of involuntary unemployment since, at this point, the demand for output is derived from an income distribution corresponding to the amount of employed factors only. The investment-savings market is also in equilibrium *à la* Keynes: at point D savings have adjusted to given level of investment $\bar{I}$ through the multiplier effect. Formally:

$$Y^0 = AD^0 = C^0 + \bar{I} \tag{1.1}$$

where

$$S^0 = \bar{I} \tag{1.2}$$

Now, a fall in money wage is not necessarily sufficient to guarantee that at variations in output there will correspond equivalent variations in aggregate demand and, consequently, nothing legitimates us to exclude point D as a possible persistent and stable equilibrium position of the economic system. A fall in money wages alone no longer justifies, from firms' standpoint, an increase in the level of output from Y^0 to Y^*. A greater level of output, together with an increase in consumption, generates an increase savings from S^0 to S^*. Since the inducement to invest remains at $\bar{I}$[29], the demand for investment goods (i.e. new capital goods), conversely to what Hicks' analysis requires, is no longer spontaneously equalised to the increased supply of savings through variations in the interest rate. If firms were to expand employment and output up to the full-employment level Y^*, there would be an excess of savings, $\Delta S = S^* - S^0$, which is not automatically absorbed by the market through an increase in investment, that is here given and autonomous at $\bar{I}$. Graphically, the adjustment along the investment schedule which, in Figure 1.4, spontaneously follows a change in the supply of savings from $S(Y^0)$ to $S(Y^*)$, does no longer hold. In other words, now there is no theoretical legitimacy to the proposition that, after a fall in money wages, the new level of aggregate effective demand will be sufficient to absorb (and hence make sustainable) the full-employment level of output Y^*. As Keynes observes:

> the effective demand, being the sum of the expected consumption and the expected investment, *cannot change*, if the propensity to consume, the schedule of marginal efficiency of capital and the rate of interest are all unchanged. If, without any change in these factors, the entrepreneurs were to increase employment as a whole, their proceeds will necessarily fall short of their supply-price. (Keynes 1936, pp. 260, 261) (emphasis added)

Thus, if we incorporate Keynes' theory of the interest rate and the related determination of the level of investment, Hicks' analysis of involuntary unemployment loses

[29]Other things unchanged. Namely, propensity to consume, marginal efficiency of capital and interest rate. Those are the forces and data underlying Keynes' equilibrium.

its theoretical plausibility. Unless investment's full-adjustment to savings applies, traditional marginalist theory can no longer provide a theoretical justification to the persistence and stability of the full-employment equilibrium. Conversely, the economy may plausibly find itself in a *equilibrium* position of involuntary unemployment as point D in Figure 1.3, which is characterised by an equilibrium output level Y^0 where the level of savings S^0 has finally adjusted to the given level investment $\bar{I}$.

As a result, for the economy to gravitate toward a full-employment position, variations in the money wage rate are necessary but not sufficient. Sufficiency requires that level of investment adjusts to the level of savings, through variations in the interest rate. An adjustment that Keynes precisely attempts to invalidate. This widely neglected point is firstly stressed by Garegnani (Garegnani 1983):

> [...] the marginalist notion of a demand for labour elastic with respect to the real wage rate does not suffice to support the conclusion that competition among workers will lead to full employment. The *further* condition that investment adjusts to the changes in savings consequent on changes in employment is also required. (Garegnani 1983, p. 31) (original emphasis)

Our discussion of Hicks' stability analysis provides an explicit confirmation to Garegnani's claim. We saw how a fall in money wages suffices to decrease real wages in so far as the economy's *given amount* of capital is constantly maintained at its full-employment level. This is a requirement that must be met in the adjustment process moving the economy from position D to the equilibrium E in Figure 1.3. This movement *along* the curve implies an expansion of labour employment and, thereby, an increase in the level of savings. Unless investment fully and constantly adjusts to the level of savings, Hicks' argument collapses.

Furthermore, by applying Keynes' alternative theory of the interest rate and the related determination of investment (Keynes 1936, Ch. 14) to Hicks' stability analysis we can also confirm how the validity of Keynes' theory is not contingent to the assumption of *rigid* money wages (Garegnani 1983, p. 50).

Firstly, Keynes himself argues that the rigidity of money wages is not a *necessary* assumption for the validity of his critique. Keynes entirely devotes Ch. 19 (Keynes 1936) to illustrate the possible effects of a fall in money wages and to show how,

by no chance, this fall *alone* can induce a *lasting* self-adjusting market process toward full employment. As Keynes argues, a cut in money wages alone, without an adjustment mechanism able to balance the inducement to invest to changes in the level of savings, does not set in motion a transition toward (i.e. in the direction of) a full-employment position. Keynes' claim is confirmed by Hicks' stability analysis, where, as we remarked, this mechanism must be throughout assumed to be at work. Conversely, in Keynes' theory, this self-adjusting mechanism able to accommodate for Say's Law –i.e., aggregate demand equal to the value of total output– is no longer there. As a result, a fall in money wages most likely would yield a fall in prices –firms can produce more cheaply–, thereby leaving both the real wages and the level of employment substantially unchanged[30]. This is why, in real economies, money wages are indeed quite *rigid*[31]. Hence, as Garegnani stresses, in Keynes:

> the hypothesis of money wage rigidity would appear to be a *consequence* rather than a premise of thesis that there exists no tendency to the full employment of factors. (Garegnani 1983, pp. 50, 51) (emphasis added)

Secondly, and consequently, to anchor Keynes' contribution to the rigidity of money wages reduces *The General Theory* to a non-critique or, as it is sometime termed, to an 'imperfectionist' critique of marginalist theory of value and distribution (Eatwell and Milgate 1983). *Frictions*[32] as the inflexibility (or stickiness) of money wages in no way suffice to theoretically invalidate the persistent and stable

[30]A fall of money wages from w to w' yields a fall in the price level from p to p' which leaves the real wage level unaffected, $(w/p) = (w'/p')$. As we saw in Hicks' stability analysis, this does not change firms' optimal position. If the real wages do not change, they have no inducement to change their labour demand and, hence, their level of output. Although the wage level is perfectly flexible, the economy would be persistently stuck at point D in Figure 1.3.

[31]The possible adverse effects of a deflationary process initiated by the fall in money wage are enlisted by Keynes throughout Chapter 19 of his *General Theory*. In particular, possible disturbing redistributive effects due the fact that a consistent decline in prices could increase the real value of individuals' outstanding debts. For example, if firms are net borrowers in the economy, Keynes notes that: "[...] if the fall of wages and prices goes far, the embarrassment of those entrepreneurs who are heavily indebted may soon reach the point of insolvency, –with severely adverse effects on investment." (Keynes 1936, p. 264). In Chapter 3 we will see how this problem is later neglected by Patinkin in his disequilibrium dynamics of involuntary unemployment (Patinkin [1956] 1965, Ch. XIII).

[32]The same holds for frictions such as uncertainty and the role of expectations. Traditional authors' normal equilibrium position describes a position toward which real economies tend through a trial-and-error process. Expectations are endogenously adjusted during the disequilibrium adjust-

full-employment equilibrium that traditional authors argue to be the centre of gravity of an economic system[33]. Namely, that position which would be ultimately established if the dominant market forces were to be freely allowed to work out their effect (i.e., if we lived in a frictionless market economy)[34]. A position toward which, however, traditional authors argue, real economies persistently tend despite the unavoidable presence of hampering disturbances.

1.5 Merits and limits of Keynes' theory: the marginalist inheritance

As we repeatedly remarked, so far as the *method* of long-period positions is concerned, the equilibrium state is exclusively defined, and individuated, by its persistence and stability. It is only when this method is applied to the marginalist *theory* of value and distribution that we find the proposition that the equilibrium state is indeed a full-employment position. It is, therefore, at the level of *theory* that the roots of Keynes' attack must be anchored[35].

However, according to Garegnani, Keynes' attempt to break with the marginalist theory is an "inherently unstable compromise" (Garegnani 1983, p. 58). Keynes aims

ment processes. They play no role in the determination of the equilibrium position and do not have irrevocable disturbing effects on the tendency toward it. To anchor Keynes' novelty to uncertainty and expectation is, therefore, reductive. Nonetheless, it must be noted, this is a point shared also by explicitly non-marginalist authors who are now called *Keynesian Fundamentalists* (Coddington 1976), e.g. Shackle (1972). For a more detailed discussion, see Magnani (1983).

[33]This is perfectly acknowledged by Keynes: "For the classical theory has been accustomed to rest the supposedly self-adjusting character of the economic system on an assumed fluidity of money-wages; and, when there is rigidity, to lay on this rigidity the blame of maladjustment." (Keynes 1936, p. 257).

[34]That a *normal* equilibrium describes a position that is never observed or realised in real economies, rather than a problem, is a proposition which confirms the importance of adopting the method of long-period positions. It allows i) to isolate the dominant market forces and ii) to individuate what would be, in such a hardly realistic system, the centre of gravity of the economy. For example, relative to the free competition assumption, in Clark we read: "A natural price is a competitive price. It can be realized only where competition goes on in ideal perfection –and that is *nowhere*." (Clark 1908, p. 77).

[35]As Milgate observes: "Keynes made no fundamental departure from his predecessors at the level of method but [...] he broke away radically from the orthodox marginalist theory." (Milgate 1982, p. 8).

to invalidate traditional authors' proposition that the economic system has a natural spontaneous tendency toward full employment. He does so by *rejecting* the traditional proposition that a full-employment equilibrium in the market for the factors of production can be competitively achieved through variations in their respective adjusting variable. Namely, the money wage in the labour market (Keynes 1936, Ch. 19), and the interest rate in the investment-savings market (Keynes 1936, p. 14). Nevertheless, Keynes himself does not fundamentally depart from traditional marginalist theory of distribution. By referring to our previous distinction between employment and factor demand curves, it is possible to give a clear presentation of the limits of Keynes' attack to marginalist theory. Keynes attempts to reject traditional authors' determination of factor demand curves. More precisely, Keynes refuses traditional authors' *vertical competition*, that is, the idea that the equilibrium in the factors market, just like any other market, is determined by demand-and-supply forces and that, thereby, there exists a natural tendency to full employment. However, Keynes ignores that the plausibility of vertical competition, and hence of traditional factor demand curves, rests on the well-behaviour of factors' employment curves. The well-behaviour of employment curves, in turn, rests on the correct working of the factor substitution mechanisms. Keynes accepts the marginalist principle that, given the quantity employed of the other factors, the employment of a factor varies inversely with its real rental price (marginal productivity of labour, marginal efficiency of capital). Thus, he accepts and works with well-behaved employment curves. But, we saw, this is exactly what makes vertical competition an *acceptable* assumption and gives plausibility to marginalist factor *demand* curves, responsible for the tendency to full employment[36] that Keynes attempts to deny.

On the one hand, this has paved the way to the almost immediate marginalist reinterpretation and incorporation of Keynes' theory which is today commonly termed as the Neoclassical Synthesis[37] (Hicks 1937; Lange 1942; Lange 1944; Ohlin 1937; Patinkin [1956] 1965). Namely, Keynes' neglect of the fact that marginalist factor

[36]Factor *demand* curves, in fact, carry with themselves the idea that there is a tendency toward a real rental price of a factor at which the quantity demanded of a factor is equal to the quantity supplied. As we discussed, the role of vertical competition here is crucial. For it is this market force that, when full employment is achieved, is finally 'balanced' and put at rest.

[37]The term is firstly introduced by Samuelson (Samuelson 1955).

demand curves depend on – or are a consequence of– the well-behaviour of factor employment curves that Keynes himself accepts[38]. Post-Keynes marginalist literature could then readily reduce Keynes' involuntary unemployment to a, more or less severe, short-period phenomenon where emphasis is almost exclusively posed on the rigidity (or stickiness) of money wages. As we discussed earlier, to anchor the validity of Keynes' critique of traditional theory to the assumption of money wage rigidity does not reflect Keynes' intention (Keynes 1936, Ch. 19).

On the other hand, and this is the last point we aim to make, Keynes' theoretical limits indirectly confirm the ever-lasting relevance of the later capital controversy. The crucial result of the controversy, started in the '60s with Sraffa's publication of *Production of commodities by means of commodities* (Sraffa 1960), is to have proved traditional authors' notion of equilibrium to be untenable. Both reswitching of techniques and reverse capital deepening question the theoretical legitimacy of deriving the demand curve for capital as a decreasing function of the interest rate.

In this chapter, we saw how both the persistence and the stability of the full-employment normal position directly rest on the possibility to specify capital as a homogeneous factor of production as land or labour. More recent critical literature identifies the necessity to specify the capital endowment as a value magnitude to guarantee the persistence of the equilibrium as the supply-side role of capital (for example, see Petri (2004)). The capital endowment needs to be specified among the persistent data determining the equilibrium, otherwise the equilibrium would be indeterminate[39]. However, to specify an endowment of heterogeneous capital goods would deprive the equilibrium of its gravitational properties (i.e., of its persistence).

[38]As Garegnani remarks: "[...] On can distinguish successive logical stages in traditional analysis of distribution [...]. In the first, from the marginalist premises concerning production and consumption one derives the idea that, given the quantity employed of all factors but one, the quantity employed of this latter factor increases as its real rate of remuneration falls. In the next step, it is maintained that, as a result of competition both amongst entrepreneurs and amongst the owners of factors, there will be a tendency towards rates of remuneration at which the quantity employed will equal the quantity supplied for each factor. Now, in his critique, Keynes accepts the first stage of the argument [...]. His critique has then to turn exclusively on the second stage of the argument. And at the second stage–with the conclusions from the first stage having already been admitted– the capacity of traditional theory to resist attack proved to be greater than Keynes had thought." (Garegnani 1983, p. 59).

[39]Already Wicksell is aware of the risk of "indeterminateness" (Wicksell 1935 [1901], p. 202) of equilibrium in the absence of an equation specifying the total endowment of capital.

From here, the necessity to specify capital as a total value-quantity whose equilibrium physical composition –form– can be endogenously determined. For only so, traditional authors can plausibly argue that the equilibrium is both determinate and persistent. The supply-side role of capital is logically anterior to its *demand-side* role[40]. The demand-side role of capital is necessary to explain the stability of the normal equilibrium position. And, as we argued earlier, stability without persistence would deprive the theory of any possible explanatory power. Namely, a stable equilibrium which is not persistent implies that there exists a tendency towards an equilibrium position that, however, is not the one that the theory determines from its arbitrary set of data. Thus, the equilibrium position determined by the theory would be irrelevant. The demand-side role of capital gives theoretical plausibility to the working of those marginalist market forces that ground the adjustments toward full employment. First, to consider capital as a homogeneous factor of production as much as land and labour allows traditional authors to determine a well-behaved *demand* curve for capital. This ensures that the factor substitution mechanism works correctly –i.e., in the right *direction*. Namely that the demand for capital varies inversely with its rental price, the interest rate. Secondly, the specification of capital as a value-magnitude also ensures that the well-behaved demand curve for capital is *fairly elastic*. For different quantities of, say, labour, plausibly require to be combined with different capital goods, the specification of capital as a value magnitude guarantees that there is sufficiently substitutability between capital and the other factors of production[41].

Our reappraisal of Hicks' disequilibrium dynamics in *The Theory Wages* (Section 2) offers an explicit confirmation of the traditional authors' necessity to specify the

[40]However, it must be noted that the former is not discussed during the earlier capital controversies. Reswitching of techniques and reverse capital deepening, in fact, concern the theoretical deficiencies embodied in traditional authors' demand-side role of capital.

[41]Vertical competition is acceptable only if this substitutability among factors of production can be defended. For example, in Hicks' disequilibrium analysis, in the absence of substitutability between capital and labour a fall in money wages would no longer be a sufficient incentive for firms to demand more labour and expand their output. This adjustment implies that firms must be able to adjust their physical capital stock to a different quantity of labour. If this endogenous adaptation of capital was prevented, the adjustment would be strongly limited. Hicks himself recognises the need for sufficient substitutability (Hicks [1932] 1963, pp. 18–21), which, in the case of capital, becomes a plausible supposition only as one adopts traditional authors' specification of capital.

capital endowment as total value-quantity. A theoretical necessity that emerges in both the supply-side role (persistence) and demand-side role (stability) of capital.

1.6 Conclusive remarks

We discussed a rare explicit example of traditional stability's analysis. Especially, of the tendency toward the full employment of factors of production. We showed how the value-specification of the capital endowment and the well-behaved demand curve for capital as a flow (i.e. the investment schedule) are necessary to warrant the persistence and stability of the full-employment position as the center toward which the economy gravitates.

Later, we argued how Keynes' attack represents an attempt to invalidate the investment-savings market adjustment and how, as we adopt Keynes' alternative theory of interest and investment determination, Hicks' stability analysis would indeed collapse. On the one hand, our discussion confirms that the validity of Keynes' critique is not conditional to the assumption of money wage rigidity. However, on the other hand, it illustrates how Keynes' own departure from marginalist theory of value and distribution is incomplete.

This chapter exclusively focused on a direct confront between traditional authors (i.e. those marginalist authors working within the method of long-period positions) and Keynes' attack. As we said at the beginning, factor market's stability analysis is seldom explicitly treated before Keynes' *General Theory*. The exception we find in Hicks' *Theory of Wages*, thus, offers us the opportunity to reconsider the theoretical roots of Keynes' critique. Furthermore (as we aim to discuss in the following chapters) Hicks' discussion of involuntary unemployment allows us to provide a complete traditional theoretical explanation of the tendency toward full employment. In particular, we saw how in this disequilibrium analysis at positions other than the full-employment equilibrium firms' output demands are determined from an income distribution corresponding to employed factors only. Hence, at those positions there is no effective element of excess demand exerting a corrective pressure toward full employment and the output market is in equilibrium although the labour supply is partially involuntarily unemployed. In a nutshell, we saw how traditional stability

analysis is not based on demand functions corresponding to initial endowments (i.e. full-employment incomes). On the one hand, this confirms how traditional authors' stability analysis is today often misunderstood. We will show how Clower's Dual Decision Hypothesis (Clower 1965) is not a sufficient condition to invalidate traditional authors' stability analysis[42]. On the other hand, our present discussion is a preliminary requirement to argue how the persistence and stability of the full-employment equilibrium are fundamentally undermined when we turn to a Neo-Walrasian setting. There, in the stability analysis itself – tâtonnement price-adjustment process – the fairy-tale auctioneer must necessarily, although illegitimately, rely on output demands derived from full-employment incomes and, from those, derive the market excess demands which are the basis of the equilibrating adjustment process. This type of adjustment, as this chapter attempted to prove, finds no theoretical ground in traditional marginalist long-period stability analyses.

[42]Rather, and conversely to the author's intentions, this hypothesis precisely illustrates the process of adjustment we encounter in Hicks' analysis based on effective output demands that, only when equilibrium is achieved, correspond to full-incomes output demands.

Chapter 2

Notes on Clower's Dual Decision Hypothesis

Abstract

We suggest a critical reconsideration of Clower's Dual Decision Hypothesis (Clower 1965). Our analysis allows individuating the inherent theoretical limits that ultimately weaken Clower's attack on the Neoclassical Synthesis of Keynes' theory. Firstly, we argue that the Dual Decision Hypothesis is theoretically harmless to the traditional marginalist authors' equilibrium analysis. Moreover, it cannot evidence the real novelty of the *General Theory* and the roots of Keynes' attack to the 'Classics'. Secondly, we stress that the Dual Decision Hypothesis departs from a necessary but illegitimate assumption that Neo-Walrasian theorists have to make to avoid the theoretical inconsistency of traditional authors' value specification of the capital endowment. The costs to pay for the abandonment of this assumption are, nonetheless, extreme. In the end, Clower's model is a modified tâtonnement adjustment and determines a path-dependent 'equilibrium' position with involuntary unemployment. We argue that this path-dependency is precisely the problem that the introduction of standard tâtonnements permits to avoid in Neo-Walrasian equilibrium analyses.

Introduction

Clower's Dual Decision theory (Clower 1965)[1] is an attempt to break with the "established equilibrium theory" (Clower 1965) due to its theoretical incompatibility with the message of Keynes' *General Theory* (Keynes 1936). By established equilibrium theory, Clower means the Neo-Walrasian method[2], whose first version is introduced by Hicks in his *Value and Capital* (Hicks 1939) and which, by the time Clower is writing, had become the dominant and commonly accepted version of neoclassical general equilibrium theory.

Plassard (2018) considers this article as Clower's "Volte-Face regarding the 'Keynesian Revolution' ". Although, as said, we acknowledge the path-breaking intention of Clower's 1965 article[3], with this work we suggest that a careful reappraisal of the Dual Decision theory can shed further light on the real nature of such 'volte-face' and, at the same time, show its inherent theoretical limits. This means that for a complete assessment of Clower's Dual Decision theory we must inquiry whether it successfully accomplishes its primary purpose, that is to invalidate what he provocatively terms the "Keynesian Counterrevolution" (Clower 1965, p. 104). This is what Samuelson (1955) firstly defined as the Neoclassical Synthesis and which is commonly considered as the consistent integration of Keynes' theory as a special case of the orthodox theory (Hicks 1937; Hicks 1939; Lange 1942; Lange 1944; Modigliani 1944; Ohlin 1937; Patinkin 1959; Patinkin [1956] 1965). The presumed 'counter revolution', following Clower, can be proved untenable:

> I shall attempt to show that the same highly special theoretical presuppositions which led Keynes' original attack on *orthodox economics* continue to pervade *contemporary price theory* and that the Keynesian counter-

[1]Clower presents the article already in 1962. However, the article is published in 1965 in *The theory of Interest rates*, edited by F. H. Hahn and F. Brechling.

[2]See Plassard (2018): "Clower referred to Hicks's Walrasian framework when using labels such as 'established general equilibrium theory' or 'standard microeconomics' [...]. " (Plassard 2018, 268, fn. 14).

[3]The 1965 article (i.e. the Dual Decision theory) is considered by recent literature as the crucial contribution of Clower (Backhouse and Boianovsky 2012; De Vroey 2004). This article, it is argued, is one of the works from which it originates the subsequent literature on the microfoundations of disequilibrium macroeconomics initiated by Barro and Grossman (1971).

revolution would collapse without them. (Clower 1965, p. 104) (Emphases added)

We have to inquire, hence, what are those 'theoretical presuppositions' which Clower individuates as the core of Keynes's *General Theory* (Keynes 1936) and which he claims to be 'pervading' indistinctly the theory of the 'Classics' attacked by Keynes (what henceforth we will refer to as traditional authors[4]) and "contemporary price theory" (i.e. Neo-Walrasian equilibrium method).

In Section 2.1, we briefly present Clower's interpretation of Keynes' message before the Dual Decision Hypothesis's article (DDH henceforth) (Clower 1965) to underline the elements of continuity and rupture with the 'established theory'. In Section 2.2, we recall the main lines of Clower's argument and present his DDH. In Section 2.3, we inquire whether the DDH is sufficient to invalidate traditional authors' argument for the tendency toward full employment. By recalling Hicks' stability analysis from Chapter 1, we show that it is not. In Section 2.4, we turn to question whether, in the end, the DDH does effectively capture the novelty of Keynes' theory and, thereby, to what extent it represents a theoretical departure from the Neoclassical Synthesis of Keynes that he attacks. Again, we show that, despite the intention, it does not. Finally, in Section 2.5, we consider the theoretical implications of the DDH in a Neo-Walrasian context. As we argue, Clower's DDH breaks with a necessary, although nowhere justified, specific assumption that tâtonnement economics requires to avoid a path-dependency problem in the determination of the equilibrium position. Clower's own DDH indeed gives a path-dependent solution, whose both theoretical scope and utility rest, therefore, unclear. Concluding remarks follow in Section 2.6.

2.1 Clower before the Dual Decision Theory

Clower's contributions preceding his 1965 article are in the spirit of the Neoclassical Synthesis. Plassard (2018) shows how the early research (1949-1958) undertaken by Clower aims towards a consistent integration of macroeconomic Keynesian concepts

[4]Conversely to Keynes, we only refer to traditional *marginalist* authors.

and Neo-Walrasian equilibrium theory[5]. In 1949 Clower begins to work on his doctoral thesis under the supervision of Hicks. He is, therefore, trained in Neo-Walrasian equilibrium theory and, following his supervisor, considers such a version of general equilibrium theory as a consistent theoretical development of traditional analysis[6]. This is confirmed in "Keynes and the Classics: A Dynamical Perspective" (Clower 1960). In this work, we can already find Clower's interpretation of Keynes' involuntary unemployment which will also be on the background of his later Dual Decision Hypothesis' article (Clower 1965). Let us consider it in more detail.

Clower begins from a a graphical representation of the labour market. Point $E((\frac{w}{p})^*, N^*)$ in Figure 2.1[7] corresponds to what Clower defines as the "classical (and Keynesian) state of full employment" (Clower 1960, p. 320). Point $D((\frac{w}{p})^*, N^*)$, conversely, depicts Keynes' involuntary unemployment state. At the real wage $(\frac{w}{p})_0$ and, hence, by employing N_0 workers, firms are at their optimum. Workers, on the other hand, are not. At that real wage, the quantity $(N^* - N_0)$ of labour supply remains unemployed and thereby "*households alone* have an incentive to expand employment" (Clower 1960, p. 320). This is equivalent to admit that the product market, despite the presence of unemployment, is in equilibrium and that, if the real wage is –for whatever reason– never supposed to change, the firms' demand for labour will stay unaltered at N_0. In line with Hicks (1937) and, more generally, with the neoclassical interpretation of Keynes, Clower describes this point D as depicting an economy of "depression" (Clower 1960, p. 320)[8].

Now, Clower's graphical analysis is a comparative statics exercise. As he states,

[5]Most of the works are unpublished and currently collected in the Rubinstein Rare Book and Manuscript Library (Duke University). Our access to them is indirect, that is limited to those parts we can read in Plassard. We believe that, nonetheless, this is sufficient to confirm our point. See also Rubin's review of Backhouse and Boianovsky (2012) (Rubin 2014, p. 9).

[6]We read in Plassard (2018): "In his first manuscript, Clower claimed that his 'general theory of price determination' was the result of an extension of the 'traditional' general equilibrium theory [...] The extension concerned the dynamic procedure of the revision of prices implied by the tâtonnement hypothesis." (Plassard 2018, p. 274)

[7]All figures in this work are the author's personal elaboration.

[8]Conversely, points on the supply curve but on the left of the demand curve are defined by Clower as state of "*involuntary underproduction*" (Clower 1960, p. 321). Here firms have idle excess capacity (i.e. they are not optimising) whereas workers, although some of them still unemployed, are not 'involuntarily' unemployed since the real wage is lower than the marginal product of labour (i.e. those who remain unemployed, at that level of real wage, prefer not to work).

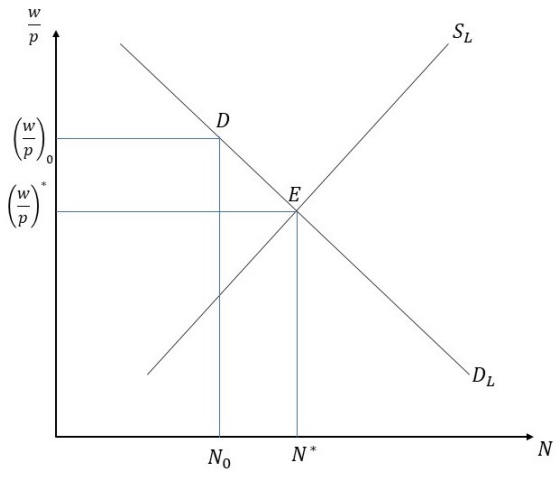

Figure 2.1: Clower's analysis of the labour market in Clower (1960)

the discussion "is based on the assumption that probable employment states are distributed more or less symmetrically about a mean position of full employment equilibrium" (Clower 1960, p. 321). That is, any point to the left of N^* (i.e. the maximum number of employable workers) depicts an employment situation which is, in principle, possible. No assumption is made regarding its "probability of occurrence" (Clower 1960, p. 321) nor any process of dynamic adjustment[9]. At this point, Clower individuates the crucial difference between the 'classical' theory and Keynes's theory in the assumption they make relative to this probability of occurrence:

> the general tenor of classical thought to admit that other than full employment positions are possible, but to assert that the equilibrium state of full employment is *stable* and so *heavily damped* that the probability of observing a nonequilibrium employment situation is almost negligible. [...] The Keynesian assignment of "probabilities of occurrence" is motivated by the conviction that "depression" states are the rule rather than the exception [...] (Clower 1960, pp. 321–322) (emphases added)

Thus, he concludes:

[9]Clower only tells us that if by any chance we happen to be at point E, then it is likely that we will remain there (Clower 1960, p. 320), that is different, nevertheless, from the proposition that there is a tendency towards point E whenever we happen not to begin from there.

> Keynes dealt with *disequilibrium states*; with states which, if recognized at all by classical writers, were never systematically analyzed. (Clower 1960, p. 322)

Therefore, i) traditional theory is depicted by Clower as an essentially static theory which only focuses on the full-employment equilibrium position on the *assumption* that such a position is stable and persistent (i.e., 'heavily damped'); ii) the merit of the *General Theory* would be that of pointing out the necessity of a "shift from statical to dynamical habits of thought" (Clower 1960, p. 323); iii) a task which, in 1960, Clower still believes to be possibly accomplished by Neo-Walrasian equilibrium theory[10]. It is on this latter point that Clower changes his mind in the 1962, when he first presents his DDH and attempts a break with the 'established equilibrium theory'.

2.2 Clower's Dual Decision Theory

As mentioned, in Clower (1965) we find that Clower, although still accepting propositions i) and ii), drastically rejects the possibility of a happy marriage between neoclassical theory –the 'orthodoxy'– and Keynes' theoretical message in the *General Theory* (i.e., iii)). The aim of the Dual Decision theory is to prove such a theoretical incompatibility.

2.2.1 The tacit assumption in Walras' Law

The entire argument is constructed on the rejection's of Walras' Law as the necessary condition to prove the theoretical incompatibility between 'established price theory' and Keynes' theory[11]. Clower considers a two-sector market economy: the output sector (i.e. firms' sector) and the factor sector (i.e. households' sector). In this market

[10] Clower is explicit on that: "Although Keynes himself never made a complete transition from statical to dynamical modes of thought, his work prompted many of his near contemporaries to do precisely this, and so wrought a fundamental change in intellectual perspective in the space of a few years" (Clower 1960, p. 323).

[11] "[...] *either Walras' Law is incompatible with Keynesian economics, or Keynes had nothing fundamentally new to add to orthodox economic theory.*" (Clower 1965, p. 110, original emphasis).

economy there are k commodities which can be divided into two different types: the goods ($i = 1, \ldots, m$) and the factors ($j = m+1, \ldots, n$). Taking the nth commodity as the *numéraire*, we have a vector of relative prices $\mathbf{P} = (p_1, \ldots, p_{n-1})$ which, from the individual 'transactor' point of view, is independently given[12]. This economy is, therefore, a sort of 'acapitalistic' production economy where two group of transactors, firms and households, demand and supply two different types of commodity. Namely, firms supply goods and demand factors, whereas households demand goods and supply factors. The firms' sector and the households' sector are respectively characterised by an aggregate transformation function, $T(s_1, \ldots, s_m; d_{m+1}, \ldots, d_n)$, and a common utility function, $U(d_1, \ldots, d_m; s_{m+1}, \ldots, s_n)$, which satisfy "all continuity and curvature properties" (Clower 1965, p. 105). Traditional profit-maximisation and utility-maximisation problems can be carried out subjected to two budget-constraints respectively:

$$\max \quad r = \Sigma_i^m \mathbf{p}_i s_i - \Sigma_j^n \mathbf{p}_j d_j \quad \text{s.t.} \quad T(s_1, ..., s_m; d_{m+1}, ..., d_n) = 0 \tag{2.1}$$

$$\max \quad U(d_1, ..., d_m; s_{m+1}, ..., s_n) \quad \text{s.t.} \quad \Sigma_i^m \mathbf{p}_i d_i - \Sigma_j^n \mathbf{p}_j s_j - \mathbf{r} = 0 \tag{2.2}$$

From the set of first order conditions of both problems[13] the demand and supply solutions are obtained as functions of $\mathbf{P}$, $\bar{d}_i(\mathbf{P})$ and $\bar{s}_i(\mathbf{P})$. From the household sector's standpoint, the profit is a given parameter, $\mathbf{r}$, so that its solution are indeed $\bar{d}_i(\mathbf{P}, \mathbf{r})$ and $\bar{s}_i(\mathbf{P}, \mathbf{r})$. Still, from the firms' sector maximisation problem we obtain $\bar{r} = \sum_i^m \mathbf{p}_i \bar{s}_i - \sum_j^n \mathbf{p}_j \bar{d}_j$ and from the household sector's budget constraint we know that $\sum_i^m \mathbf{p}_i \bar{d}_i - \sum_j^n \mathbf{p}_j \bar{s}_j = \mathbf{r}$. Subtracting the former to the latter, we obtain:

$$\Sigma_k^n \mathbf{p}_k (\bar{d}_k - \bar{s}_k) \equiv \mathbf{r} - \bar{r} \equiv 0 \tag{2.3}$$

because, being demand and supply functions at their equilibrium values, we can plausibly assume that $\mathbf{r} \equiv \bar{r}$. Equation (2.3) leads to what Clower calls "Walras' Law

[12]Boldface symbols are used by Clower also elsewhere in the article to indicate given parameters from the individual standpoint (Clower's 'transactor').

[13]Firms sector first order conditions: $\mathbf{p}_k + \lambda \partial T / \partial \bar{\nu}_k = 0$, $(\bar{\nu} = \bar{d}, \bar{s}; k = 1, \ldots, n)$.
Household sector: $\partial U / \partial \bar{\nu}_k + \gamma \mathbf{p}_k = 0$, $(\bar{\nu} = \bar{d}, \bar{s}; k = 1, \ldots, n)$. Lambda and gamma are Lagrange multipliers.

in the sense of Lange" (Clower 1965, p. 107) which, in the present context, must hold:

$$\Sigma_k^n \mathbf{p}_k[\bar{s}_k(\mathbf{P}) - \bar{d}_k(\mathbf{P})] \equiv 0 \tag{2.4}$$

This is, in fact, Walras' Law in Lange's case of a moneyless economy (Lange 1942, pp. 50, 51)[14]. Furthermore, by construction, firms and households demand and supply respectively different types of commodities. Given the equilibrium vector of relative prices $\mathbf{P}$, and being $i = 1, ..., m$ the goods market and $j = m + 1, ..., n$ the factors market, Walras' Law here implies that the total value of the demand for goods is equal to the total value of the supply of goods and, correspondingly, the total value of the demand for factors is equal to the total value of their supply. This allows Clower (1965, p. 121) to decompose (2.4) in:

$$\Sigma_i^m p_i[\bar{d}_i(\mathbf{P}) - \bar{s}_i(\mathbf{P})] + \Sigma_j^n p_j[\bar{d}_j(\mathbf{P}) - \bar{s}_j(\mathbf{P})] \equiv 0 \tag{2.5}$$

where the first sum represents the equilibrium in the goods market and the second the equilibrium in the factors market. Equilibrium requires that at the equilibrium vector of relative prices ($\mathbf{P}$) both sectors' demand and supply functions must be such that neither excess demand nor excess supply of any commodity (be it a good or a factor) arises. From here Clower concludes that:

> [...] orthodox economics provides a general theory of equilibrium states – that is, an adequate account of the factors determining equilibrium prices and equilibrium transaction plans in a market economy. [...] however, orthodox analysis does not provide a general theory of disequilibrium states. (Clower 1965, pp. 107–108)

The demand and supply functions considered so far only depend on prices. In particular, income does not appear as an independent variable determining trans-

[14] In Clower's economy there is no money, so he claims that, for his analysis, "[T]he distinction drawn by Lange between Walras' law and Say's law is not relevant" (Clower 1965, p. 107, fn. 2). As Lange argues, the two are formally equivalent in case of a moneyless economy because the difference between Walras' Law and Say's Law only emerges when money comes into the system. Due to space limits, we must postpone to a future work a detailed discussion of Lange's argument which can be found in Lange (1942).

actors' demand and supply. The implicit assumption is that *realized* and *planned* transactions coincide[15]. Following Clower's argument:

> the definition of these functions *tacitly presupposes* [...] that every household expects to be able to buy or sell any desired quantity of each and every commodity at prevailing market prices. (Clower 1965, p. 117 , emphasis added)

and this *tacit* assumption, by definition, prevents "orthodox analysis to provide a general theory of disequilibrium states" (Clower 1965, p. 108), since:

> What is [...] *presupposed* about planned sales and purchases cannot possibly be true of realized sales and purchases unless the system is *always* in a state of equilibrium (Clower 1965, p. 117, emphases added)

Clower refers to this tacit assumption as " the 'unified decision' hypothesis" (Clower 1965, p. 118). Its implication is especially relevant when, as in Clower's economy, the jth commodity represents a factor (e.g., labour) that a transactor *plans* to sell to be able to buy the ith good-commodity. Since the assumption is made that transactions plans are realized, it is tacitly presupposed that all households can find the employment they desire (i.e. they are all satisfied with their income receipts). In Keynes' terms, this means that involuntary unemployment is by construction impossible[16]. Indeed, it is implicit in the households' utility maximisation problem that they can sell the equilibrium desired labour supply $\bar{s}_j(\mathbf{P})$ and that, from those income receipts, their demand for goods is derived as $\bar{d}_i(\mathbf{P})$. Furthermore, that from those

[15]Clower writes: "[orthodox analysis] yields no direct information about the magnitude of *realized* as distinct from *planned* transactions" (Clower 1965, p. 108). From this quote and from the following one –i.e., when Clower states that traditional analysis consider a "system [...] always in a state of equilibrium" (Clower 1965, p. 117)– we can already detect the origins of Clower's misunderstanding of traditional authors' notion of equilibrium. As we remarked in Chapter 1, the traditional long-period equilibrium position is conceived as the centre of gravity around which an the day-by-day disequilibrium states of the economy fluctuate. Traditional analyses admit out-of-equilibrium transactions and distinguish between the analysis of equilibrium –i.e., the position where, as Clower writes, planned transactions are equal to realised transactions– and the analysis of its stability. Further, traditional authors' concern is static stability. Namely, what they need to justify is not the *magnitude* of the disequilibrium adjustments but their *direction*.

[16]There can be no worker who cannot sell her planned labour supply at the current wage rate since, by definition, each planned transaction is a realized transaction.

demand and supply functions it is possible to establish the excess demand functions which ground the price-adjustment toward equilibrium[17].

2.2.2 The Dual Decision Hypothesis

To introduce the dependence of households' demand functions on *realized* income receipts, Clower modifies the budget constraint of households' utility maximisation problem as:

$$\Sigma_i^m \mathbf{p}_i d_i - \Sigma_j^n \mathbf{p}_j \mathbf{s}_j - \mathbf{r} = 0 \tag{2.6}$$

where now households' income receipts are determined by the *realized* sales of their factor supplies, $\Sigma_j^n \mathbf{p}_j \mathbf{s}_j$, and not, as in the 'unified hypothesis' case, by *planned* sales. The solutions of this modified households' maximisation problem are *constrained* demand functions which, conversely to *notional* demands, depend on both the price vector and realized income receipts, $\hat{d}_i(\mathbf{P}, \mathbf{Y})$, where $\mathbf{Y} \equiv \Sigma_j^n \mathbf{p}_j \mathbf{s}_j + \mathbf{r}$.

Since $\Sigma_j^n \mathbf{p}_j \mathbf{s}_j \leq \Sigma_j^n \mathbf{p}_j \bar{s}_j$ (i.e. the realized sales of factor supply cannot exceed the economy's notional supply of factors and they are different from factor endowments unless all factors are supplied),

$$\Sigma_m^i \mathbf{p}_i \bar{d}_i(\mathbf{P}) \geq \Sigma_m^i \mathbf{p}_i \hat{d}_i(\mathbf{P}, \mathbf{Y}) \tag{2.7}$$

That is, the monetary value of the *constrained* demands derived from Clower's Dual-Decision Hypothesis is, by definition, *at most* equal to the one of the notional demand functions. Therefore, in a context where the Dual-Decision Hypothesis is recognised, Walras' Law as specified in (2.5) must be modified as follows:

$$\Sigma_m^i \mathbf{p}_i [\hat{d}_i(\mathbf{P}, \mathbf{Y}) - \bar{s}_i(\mathbf{P})] + \Sigma_j^n \mathbf{p}_j [\bar{d}_j(\mathbf{P}) - \bar{s}_j(\mathbf{P})] \leq 0 \tag{2.8}$$

The equality is met if and only if $\Sigma_m^i \mathbf{p}_i \bar{d}_i(\mathbf{P}) = \Sigma_m^i \mathbf{p}_i \hat{d}_i(\mathbf{P}, \mathbf{Y})$, that is if and only if $\Sigma_j^n \mathbf{p}_j \mathbf{s}_j = \Sigma_j^n \mathbf{p}_j \bar{s}_j$[18]. Verbally, this implies that the sum of market excess demands

[17] As Clower explains: "We may assert that *excess supply of factors necessarily implies the simultaneous existence of excess demand for goods.* More generally, we may assert that in any disequilibrium situation, there is *always* an element of excess demand working directly on the price system to offset prevailing element of excess supply." (Clower 1965, p. 121) (emphases added).

[18] "According to the dual-decision hypothesis [...] the market relevance of the household functions

is never greater than zero and that only when the full-employment condition is met (i.e. no excess supply of factors remains unemployed, $\Sigma_j^n \mathbf{p}_j \mathbf{s}_j = \Sigma_j^n \mathbf{p}_j \bar{s}_j$) the standard equation (2.5) hold. From here, Clower concludes:

> [...] the dual decision hypothesis effectively implies that Walras' Law although valid as usual with reference to *notional* market excess demands is generally irrelevant to any but full employment situations. *Contrarily to the findings of traditional theory, excess demand may fail to appear anywhere in the economy under conditions of less than full employment.* [...] *when income appears as an independent variable in the market excess-demand functions [...] traditional price theory ceases to shed any light on the dynamic stability of a market economy.* (Clower 1965, pp. 122-123, original emphases)

Now, as anticipated, the 'orthodoxy' which Clower is challenging by introducing his DDH has to be intended as the Neo-Walrasian equilibrium theory. That is, what was generally accepted as a consistent theoretical extension of traditional equilibrium theory. Clower shares the commonly accepted idea that the latter, namely traditional authors' analysis of long-period positions, is a fundamentally static method[19] which, however useful to undertake comparative statics exercises, would not provide a "general theory of disequilibrium states" (Clower 1965, p. 108), and would illegitimately *assume* full employment to be a 'stable' and 'heavily damped' equilibrium position (Clower 1960, pp. 321–322). As we argue in the next section, however, in traditional authors the persistence and stability of the –full-employment– equilibrium, are *not* the result of the 'unified decision hypothesis' and, moreover, Clower's DDH is not a sufficient condition to theoretically invalidate traditional analysis of disequilibrium.

2.3 Traditional analysis of disequilibrium states

With the shift from the long period to Neo-Walrasian equilibrium analysis, marginalist theory undertakes a change of *method* (Garegnani 1976; Milgate 1982). In this

$\bar{d}_i(\mathbf{P})$ and $\bar{s}_i(\mathbf{P})$ is *contingent* on the satisfaction of the condition that realized current income be no less than planned income." (Clower 1965, p. 121, emphasis added).

[19] See Clower (1960) cited above, (Clower 1965, p. 117).

section, we recall how marginalist long-period method can provide a theoretical justification for both the persistence and the stability of the full-employment equilibrium, that together provide an explanation for the tendency toward it and, consequently, legitimise traditional authors' to focus only on the study of the equilibrium position[20]. Those are the two properties of the full-employment equilibrium which Clower (1960, p. 321), although recognising them (full employment equilibrium as a "stable" and "heavily damped" position), considers to be the result of an arbitrary *assumption* in the 'classical doctrine' as much as in 'established price theory'. Namely, the tacit assumption that we just presented as the 'unified decision hypothesis'. The following discussion, we will see, is also crucial to understand why Clower's own Dual Decision Theory is not sufficient to grasp the roots of "Keynes' original attack" (Clower 1965, p. 104).

2.3.1 The tendency toward full employment in traditional analysis

As we discussed in the first chapter, the persistence and stability of the full-employment equilibrium is an issue that is never seriously questioned before Keynes' *General Theory*. This might explain why the problem is seldom explicitly treated by traditional authors. However, this must not induce us to conclude that traditional long-period analysis cannot provide a theoretically consistent argument for the tendency toward full employment. Thus, although there is some truth in Clower's proposition that disequilibrium states were "never systematically analyzed" (Clower 1960, p. 322) by traditional authors, this is not sufficient to state, as Clower does, that traditional analysis *arbitrarily assumes* the equilibrium to be a full-employment position.

Let us briefly recall Hicks' analysis in the *Theory of Wages* (Hicks [1932] 1963) and check whether Clower's DDH invalidates it. The author provides a disequilibrium analysis of the labour market showing that, no matter how severe, *if* the marginalist

[20]Provided the economy *tend* to the equilibrium independently of the disequilibrium position the economy currently finds itself in, then it is legitimate to focus on the study of the equilibrium position only. Disequilibrium states are both unpredictable and impossible to be theorised in a definite manner. To anchor the –any– theory to the study of disequilibrium states would entail a general indeterminateness and the theory's predictive and explanatory power would be lost.

dominant market forces are allowed to work out their effect, involuntary unemployment cannot be persistent and will be eventually corrected in a competitive market economy.

Hicks considers a capital-labour economy where "the general level of real wages is raised, and maintained, at a height inconsistent with normal employment" (Hicks [1932] 1963, p. 198). The situation considered, therefore, corresponds to an economy which, because of non-economic reasons (e.g., trade unions impose a higher than 'normal' wage level), is displaced from point E to point D in Figure 2.2.

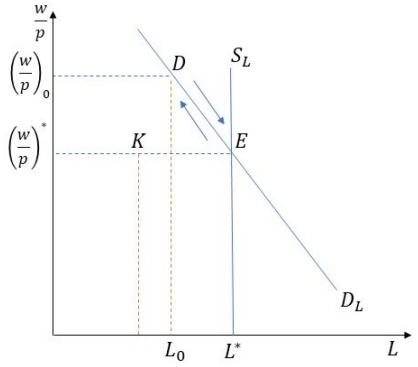

Figure 2.2: Hicks' analysis of involuntary unemployment

At point D the capital market is in equilibrium. We are on the aggregate demand curve for labour, which means that capital is maintained throughout the analysis as given and fully employed[21]. Then, assumed the full employment of the economy's total endowment capital, each point on the demand curve for labour indicates firms' optimal output for each possible level of real wages. At point D, the quantity $(L^* - L_0)$

[21]To ease the reading, here we recall two quotes remaking the condition that capital is maintained at its full-employment level: i) "there will thus be a tendency for capital to shift- from the less capitalistic to the more capitalistic trades [...] The wages of labour are higher and the rate of interest is lower than they would have been in a free market; so that more capitalistic methods of production which would have not been profitable then become profitable now. But the adoption of these methods lowers still further the amount of labour which is required with a *given* volume of capital; and so increases unemployment." (Hicks [1932] 1963, p.188 Emphasis added); ii) "[...] (provided there is *no wastage of capital* in the process) capital will be transferred to the more capitalistic industries and to more capitalistic processes within the same industries; and that this must go on so long as there is any possibility of increasing profits by such transformations." (Hicks [1932] 1963, X.I., p.198. Emphasis added).

of labour supply is involuntarily unemployed. However, Hicks argues, the position D finally achieved is one of *equilibrium*:

> [A] final position must be reached which is precisely the same as that which would have occurred if there had been *a direct reduction in the number of labourers available*, and a consequent rise in their marginal product on account of the increased capital per head available for them. [...] The final position thus reached is one of *equilibrium, if the existence of the unemployed is left out of account.* (Hicks [1932] 1963, X.I., p.198-199. Emphasis added)

Thus, the presence of unemployed workers does not imply a simultaneous disequilibrium in the output market. Excess supply of labour does not imply excess demand for output. As we argued in the first chapter, the only plausible explanation is that, at point D, the prevailing demand for output is not the one corresponding to a full-employment income distribution. Rather, firms *must be* deriving the output demand from the income receipts of *employed* factors only[22].

Point D, however, is not a persistent position. As we have shown in Chapter 1, vertical competition and factor substitution will correct the –transitory– disequilibrium in the labour market[23]. The adjustment toward the full employment position, that throughout the analysis has remained the undisturbed persistent centre of gravity of the economic system, is achieved through a fall in real wages induced by unemployment workers' downward pressure on money wages. As Hicks writes, "their wages will therefore fall, and the pressure of unemployment will be thereby somewhat relieved" (Hicks [1932] 1963, p. 190).

This fall in the wage level is considered sufficient and strong enough to move the economy back to full employment. As we already discussed, at any position on the aggregate demand curve for labour, firms produce the optimal output level –capital is fully-employed– corresponding to each possible level of real wage and this optimal output, at any point, is fully absorbed by the market because the demand for output

[22] As Hicks himself remarks, at point D the "total social product is reduced" (Hicks [1932] 1963, p. 199).

[23] Hicks remind us that: "the labour market is not a perfect market; the equalising forces do not act quickly and easily, but nevertheless they do act" (Hicks [1932] 1963, p.76).

comes from the receipts of employed factors only. Therefore, the fall in the wage level decreases real wages from $(\frac{w}{p})_0$ to $(\frac{w}{p})^*$ because firms expect their augmented output to find purchasers, more or less, at unchanged prices[24]. The increment in output is entirely due the expansion of labour employment –capital is always fully employed at any point *on* the labour demand curve. Those workers who, at point D, were 'left out of account' are now income-receivers and can effectively participate to the composition of output demand. At point E, where the adjustment process stops, the general level of income has been increased up to its full-employment level. Therefore, it is at point E –and only here – that the prevailing demand conditions of the product market can be described by the output demand corresponding to full-employment incomes.

2.3.2 The Dual Decision Hypothesis and Walras' Law

As far as traditional authors' long period equilibrium is concerned, the previous discussion should make it clear, on the one hand, that the notion of long-period normal position entitles them to exclusively focus on the study of the equilibrium and, on the other hand, how this does not imply that traditional theory cannot provide a consistent analysis of disequilibrium states[25]. Namely, the equilibrium is not persistent and stable because of a 'tacit assumption'. Clower's following statement is therefore unjustified:

> [...] orthodox analysis does not provide a general theory of disequilibrium states: first, because it yields no direct information about the magnitude of *realized* as distinct from *planned* transactions under disequilibrium con-

[24]If, as Hicks confirms, firms' output level coincides with the value of employed factors income receipts, then at any point on the aggregate demand for labour firms are at their optimum and have no incentive to change prices. Demand (income-constrained demand, in Clower's terms) absorbs their entire output. A decrease in money wages implies a fall in real wages but an increase in *total* income receipts due to the expansion in labour employment. This change in total incomes further corroborate firms non-incentive to change prices along the movement on the labour demand curve that Hicks discusses.

[25]Note that to focus on equilibrium positions is the only way to avoid indeterminateness. By definition, it is impossible to determine day-by-day market prices. They are constantly affected by unpredictable causes and accidents. The entire point of having a theory of the 'normal' position of the economy is indeed to allow or, at least to individuate, the locus of gravitation of those real market magnitudes and to establish the *direction* of disequilibrium adjustments (*static* stability). Cf. Hicks (1965, pp. 18-19, fn. 2). See also previous fn. 20.

> ditions; second, because it tacitly assumes that the forces tending at *any instant* to change prevailing market prices are independent of realized transactions at the same moment [...]. (Clower 1965, p. 108 , last emphasis added)[26]

Conversely, traditional authors' reliance on demand and supply functions that are, in Clower's terms, *notional* is entitled by the persistence of the equilibrium normal position. Those demand and supply functions, and the related equilibrium relative prices, aim to describe how the economy behaves in equilibrium, where planned=realised transactions. This is legitimate since those functions can be assumed to be persistent inasmuch the disequilibrium adjustment process, which in turn grounds the separate analysis of the tendency toward the equilibrium position, does not change the equilibrium position itself. Disequilibrium states, hence, are not *assumed* to be "negligible" (Clower 1960), but rather they are theoretically irrelevant. Traditional authors have sufficient basis for claiming that the equilibrium relative prices –those characterising the point of attraction of the economic system– are substantially insensitive to disequilibrium adjustments[27]. As we saw throughout Hicks' stability analysis, the centre of gravity of the system is always the full-employment position (i.e. point E in Figure 2.2).

Furthermore, granted this persistence, the separate study of the gravitation toward full employment in Hicks' analysis does not, on closer inspection, contradict Clower's DDH. Hicks' treatment of labour unemployment makes explicit that, at point D in Figure 2.2, the prevailing output demand, in Clower's terms, is a *constrained* output demand. That is, the one which corresponds to *realised* income receipts only. Therefore, being the product market's equilibrium undisturbed by the presence of involuntary unemployment, the transition from point D to the equilibrium E cannot be justified as driven by an element of excess demand of goods 'signalling' an excess

[26] In this passage we find a further confirmation of Clower's misunderstanding of traditional equilibrium analysis. The economy does not behave 'at any instant' as it is supposed to behave at equilibrium. In Hicks' analysis, for example, we have shown that firms, at point D in Figure 2.2 produce that level of output that *realised* income receipts will be able to absorb.

[27] As saw in Chapter 1 (cf. also p. 62), this theoretical justification rests on the functioning of the two fundamental dominant market forces: factor substitution and vertical competition. Their plausibility, we have also shown, depends on the possibility to specify the economy's capital endowment as total value-quantity with variable form.

supply of labour. Firms, at any point of the curve, are at their optimum and produce precisely the volume of output which will find purchasers given the *realised* level of employment. They have no incentive to change prices. The decrease in the real wage $(\frac{w}{p})$ is not caused by an increase in the price level (i.e. what would correct for an excess demand for goods), but by the fall in the money wage as a consequence of the downward pressure exerted by unemployed workers. According to the principle of factor substitution, such a fall induces firms to demand more labour. However, there is also the additional, often implicit, requirement that the augmented output will be *effectively* demanded because of the general increase in realised income receipts. The transition goes on until full employment obtains, where the *constrained* output demand is eventually equal to the *notional* output demand. Thus, the DDH is actually at work in a traditional analysis like Hicks' one. As anticipated, the only way Clower can argue that there cannot be a tendency to full employment is by assuming a *rigid* money wage which would stuck the economy indefinitely in a state of involuntary unemployment. This, however, leaves completely untouched the theoretical core of traditional authors. They have no troubles in admitting that, if the operation of dominant market forces is constrained (e.g. a rigid money wage imposed by trade unions), the tendency toward full employment will be more or less hampered depending on the persistence of such 'imperfections' or frictions against the smooth working of competitive markets[28].

Finally, Clower's DDH must be implicitly at work also in the positions *off* the demand curve that we discussed in the first chapter. As we saw, the fall in prices which follows the particular case of a proportional decrease of the rental price of both productive factors finds its theoretical justification in the fact that, at this point, the *realised* income receipts are lower than the ones which would have been generated by the same factors' ratio but at a higher level of employment. Hence, until the deflationary tendency does not come to an end, firms will content themselves with a smaller volume of output (and, hence, of factor employment) in order to avoid the risk of facing excessive unsold inventories. The value of total output must be, also at points off the demand curve, not the one corresponding to Clower's notional demands but the one corresponding to income-constrained demands.

[28]Cf., for example, the quote from Pigou (1943) we mentioned in the Introduction (p. 9).

Thus, as we argued, what does really matter for traditional authors is to guarantee that the process of adjustment does not severely change the equilibrium position itself. Namely, that the equilibrium of the economic system is not path-dependent. On the one hand, this persistence is what entitles them to focus on the equilibrium position where the prevailing demand and supply functions are the full-employment ones. On the other hand, it allows them to provide a *separate* analysis of disequilibrium states and of the tendency towards the equilibrium. And, in Clower's own terms and contrarily to what Clower argues, this stability analysis is not based on notional demand functions, which are only used to determine the equilibrium position.

Furthermore, no real contradiction with Walras' Law emerges. It is true, as Clower states, that Walras' Law refers to *planned* transactions. However, given the persistence of the full-employment position, traditional authors' reliance on *notional* demand and *planned* transactions, as we saw, can be theoretically justified and it is conditional to the realisation of these desired plans. Namely, there is an implicit, but plausible, assumption that transactors are effectively able to buy and to sell what they planned to buy and to sell. In a state of involuntary unemployment, conversely, not every transactor is able to realise her plans. The unemployed workers do not succeed in selling their labour supply. Still, there is no contradiction with Walras' Law in declaring that, although the presence disequilibrium in the labour market, the product market is in equilibrium. In fact, as we stated, at any point on the demand curve for labour the product market is in equilibrium in the sense that, at any point different from the full-employment equilibrium, total expenditure is equal to the value of *realised* income receipts and not to total *planned* expenditure. As Petri argues:

> Since only employed factors earn an income and demand goods, if other factor markets are assumed to be in equilibrium there will be disequilibrium only on the labour market, but with *no contradiction of Walras' Law because total expenditure is assumed equal to the income of the employed factors only*: it is as if the unemployed labourers were not present in the economy and the supply of labour coincided with labour employment. (Petri 2015, p. 326, fn. 18, emphasis added)

Or, as Hicks puts it, as "if there had been *a direct reduction in the number of labourers available*" (Hicks [1932] 1963, p. 198), and the presence of unemployed workers does

not disturb the output market's equilibrium. In other words, it is as if the supply curve of labour plays no role in the determination of the level of employment, which is entirely dictated by firms' demand for labour. The latter, in turn, is derived by firms from the prevailing *constrained* output demand *à la* Clower.

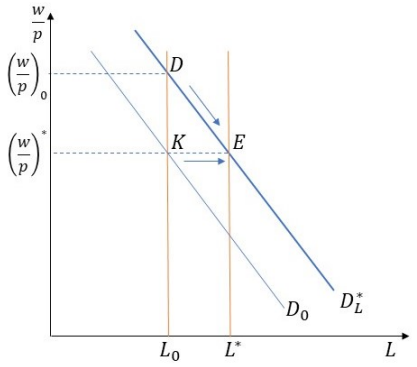

Figure 2.3: The non contradiction with Walras' Law

As Figure 2.3 illustrates, at point D, it is as if the supply of labour in the economy was given by the curve L_0, which corresponds to the amount of labour optimally demanded by firms at the level of real wage $(\frac{w}{p})_0$.

Further, in the case depicted by point K, where both labour and capital are simultaneously partially unemployed, it is as if firms' demand for labour was temporarily given by the curve D_0. As we discussed, however, due to presence of market mechanisms which guarantee the tendency toward the full employment of productive factors, this curve is not persistent. On this basis, hence, traditional authors can justify, at least as a first level of approximation, their focus on the study of positions and adjustment mechanisms taking place *along* persistent demand curves as the one depicted by D_L. Furthermore, conversely to what Clower maintains, this market adjustment mechanism along the curve *is not based on excess demands*. The same position seems to be held by Clower also in a later work with Leijonhufvud (Clower and Leijonhufvud 1973):

> The stability problem concerns the question whether it can be deduced that prices will adjust so as to reduce the absolute magnitude of aggregate

> EDs [excess demands] until, eventually, all aggregate EDs are zero [...] Many pre-Keynesian writers, who simply believed in the existence of general equilibrium, assumed "flexible prices"; they also assumed or argued that flexible prices would tend to move in such a manner as to reduce EDs to zero. (Clower and Leijonhufvud 1973, p. 158)

However, as our discussion of Hicks' stability analysis shows, traditional authors' argument for a tendency towards full employment is not based on adjustment processes driven by excess-demand functions. The correction for involuntary unemployment is not justified by the presence of a positive notional excess demand of output which 'signals' the presence of an involuntary excess supply of labour. Rather, it is explained by the two dominant market forces grounding the whole marginalist theory of value and distribution: the action of free –vertical– competition and the factor substitution mechanism. In other words, the presence of an excess supply of labour does not imply the presence of simultaneous excess demands in other markets (e.g. the output market and the capital market in Hick's analysis of the labour market's disequilibrium). Further traditional authors never discuss the 'magnitude' of the disequilibrium adjustments but their *direction* since their interest is indeed in static stability.

2.4 Keynes' 'original attack' on the Classics

It is now almost straightforward to understand why Clower's DDH is also unable to grasp the "theoretical presupposition which led Keynes' original attack on orthodox economics" (Clower 1965, p. 104). Namely, why the DDH is not sufficient to provide a theoretical justification to Keynes' claim that the economy can permanently find itself in a state of involuntary unemployment *equilibrium*. In what follows, we recall a fundamental requirement that must hold in traditional authors' stability analysis. The one that Keynes attempts to invalidate with his critique of the 'Classics'. Then, we inquire whether Clower's DDH does effectively embodies the theoretical novelty introduced by Keynes.

2.4.1 Keynes on the Investment-Savings market

In the first chapter, we saw how the critique in Keynes (1936) represents a *theoretical* attack (Milgate 1982). Keynes questions the marginalist proposition that a market economy has a natural and unique tendency toward full employment. In his theory, investment does not fully adjust to the level of savings through variations in the interest rate. As we discussed, this is the traditional mechanism which allows marginalist theory to argue that any variation in the value of output can be accompanied, and hence absorbed, by an equivalent variation in aggregate demand. Then, we showed how this mechanism is necessarily assumed in Hicks' particular disequilibrium analysis where only one market, the labour market, is in disequilibrium –capital and output markets are, by assumption, in equilibrium throughout the adjustment. If Keynes' notion of investment as an autonomous component of aggregate demand is applied to Hicks' analysis, then both the persistence and stability of full employment collapse. Namely, the economy could be plausibly stuck at equilibrium with involuntary unemployment. Further, this result is not contingent on any assumption relative to money wage rigidity or stickiness. The adjustment toward full employment obtains from unemployed workers' downward pressure on wages *and* from the additional condition that investment continuously adjusts to variations in savings. It is the latter condition that Keynes' critique questions, not the former.

2.4.2 The problem of Clower's two-sector economy

As we commented earlier, Clower (1965) introduces his Dual Decision Theory in a sort of *acapitalistic* economy, where labour, the only factor of production, is supplied by households and demanded by firms. The only goods present in the economy are consumption goods which households demand in exchange for their labour supply. Clower's DDH entirely rests on the hypothesis that some households might be unable to sell their labour supply and, hence, find themselves involuntarily unemployed with zero incomes. Those who, conversely, are able to sell to the market their labour supply are assumed to entirely spend their realized income receipts on the purchase of consumption goods. Figure 2.4 illustrates the scenario discussed by Clower. Y^* is the full employment level of output. At Y^* the whole labour supply is employed

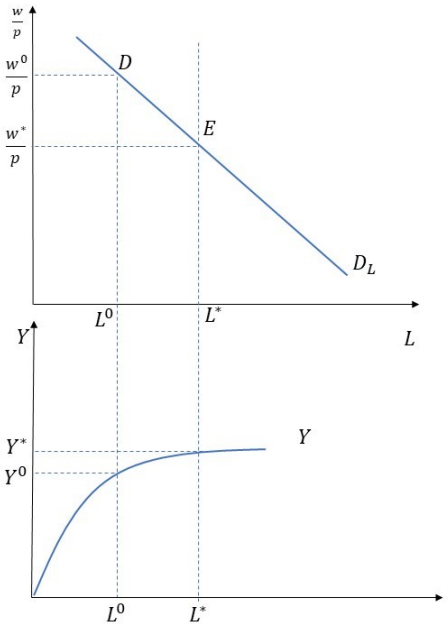

Figure 2.4: Clower's labour economy

at the equilibrium real wage $\frac{w^*}{p}$. To be sustainable, full-employment output must be met by an equivalent aggregate demand. In Clower's one-factor economy, this is a plausible assumption. The only income receipts are workers' wages. At Y^*, $Y^* = AD = \frac{w^*}{p}L^*$. In other words, in a non-capitalistic economy, there are no savings and, therefore, the problem of investment as intended by marginalist theory does not emerge. Therefore, we have to check how this economy could be stuck at position of involuntary unemployment as the one depicted by point D in figure 2.4. There are two options.

The first possibility is that money wage is artificially kept at a level inconsistent with full employment (e.g. at w^0). This argument rests on the assumption of external frictions to the perfectly competitive market adjustments. As we saw, Hicks and, in general, traditional authors recognise how those disturbances may more or less hamper the tendency to full employment[29]. Thus, it is a theoretically uninteresting argument.

The second possibility is to assume, as Clower does, the latter hypothesis with the

[29]See, for example, Clark's or Marshall's definition of the static equilibrium method and of its scopes (Clark 1908; A. Marshall [1890] 2013).

additional condition that no effective excess demand for output exists at point D, so that real wages cannot fall due to a correction of the price level (i.e. a positive excess demand that would suggest the necessity of a rise of the price level from p^0 to p^*, which would decrease real wage from $\frac{w}{p^0}$ to $\frac{w}{p^*}$ and change optimal firms' demand for labour from L^0 to L^*). As argued in the previous section, this additional condition is *redundant* as far as traditional marginalist theory is concerned. We saw how the adjustment from D to E is not based on the presence of excess demands but on the assumption of vertical competition (i.e. unemployed workers' downward pressure on money wages). Therefore, as for the first possibility, also Clower's argument –the second option– is contingent on the assumption of a rigid money wage. Besides being theoretically uninteresting, we can now show how Clower's argument is insufficient to embody Keynes' "theoretical presuppositions" (Clower 1965, p. 104).

Clower's argument that effective demand may be different from the notional –full-employment– demand rests on the proposition that some households cannot sell their labour supply. In Clower's economy, the non realisation of all *intended* sales of labour supply gives rise to a deficient (i.e., less than notional) aggregate demand for output. That is different from Keynes' proposition that investment does no longer fully adjust to an increase in the level of savings that an expansion of employment entails. In Clower's scenario, there are no savings. As mentioned above, those who can sell their labour supply are assumed to entirely spend their incomes. In the Walras inequality, the value of income-constrained demands corresponds to the sum of all realised income receipts, $\Sigma_j^n \mathbf{p}_j \mathbf{s}_j$. Thus, we must conclude that Clower's DDH does not suffice to prove why Keynes' theory should be more *general* than traditional authors' equilibrium theory because it leaves the problem of investment's determination out of discussion. It misses precisely to put in evidence the mechanism of adjustment envisaged by traditional authors as grounding the tendency of investment to fully-adjust to savings. That mechanism which Keynes' critique of traditional theory of interest rate, propensity to consume and liquidity preference are set out to invalidate[30].

[30]It is by arguing that investment is an autonomous component of aggregate demand, in fact, that Keynes rejects Say's Law's proposition that 'supply creates its own demand'. An increase in the supply of savings, in Keynes' theory, no longer generates an automatic increase in investment demand, since the interest rate is no longer the equilibrating variable in the market for loanable funds. In Chapter 1, we already pointed out Keynes' neglect of the different role that Say's Law

In the end, Clower's labour economy remains stuck at positions of involuntary unemployment solely because, by assumption, money wages are rigid. If they were flexible, then the traditional unemployed workers' downward pressure would be at work and entail a fall in real wages.

In a nutshell, the theoretical weakness that this assumption imposes on Clower's DDH is threefold. First, we saw how it does not provide a valid criticism to traditional equilibrium analysis[31]. Conversely, it indirectly highlights Clower's misunderstanding relative to the notion of equilibrium within the method of long-period positions[32]. Secondly, the DDH does not capture the root of Keynes' theoretical attack. Conversely, it erroneously anchors Keynes' critique to the assumption of money rigidity[33]. Thirdly, it drastically weakens Clower's intention to break with the Neoclassical Synthesis, whose supporters commonly argue that involuntary unemployment must be largely attributed to money wages and prices inflexibility[34].

2.5 Stability in the Neo-Walrasian method

The last issue we must discuss is to what extent Clower's DDH questions the validity of Neo-Walrasian equilibrium theory. That is, of what Clower explicitly refers to as "contemporary price theory" (Clower 1965, p. 121) or "tâtonnement economics"

plays in classical and traditional marginalist authors. We will not recall the discussion here because it is not relevant for our present purpose.

[31]As Pigou writes: "The classicals, if pressed, would not have denied that, should wage-earners not act competitively, but contrive, by means of combination or otherwise, to set the real rate of wages "too high," the stationary state would not be one of full employment." (Pigou 1943, p. 343).

[32]It means that we have to downsize the extent of Clower's "stroke of genius" (Rubin 2014, p. 8) between the '60 and '62. Namely, the short-period within which Clower rejects the proposition iii) (see Section 1.1) and supposedly comes to realise the incompatibility between Keynes' theory and the Neo-Walrasian equilibrium method.

[33]In Clower (1965) and Clower (1969), Clower claims that his conclusions apply also in case of flexible wages – for example, see (Clower 1969, p. 294)– but he never proves it. Further, we already noted how vertical competition would be enough to explain how the tâtonnement adjustment could never stop at non-full-employment position. The downward pressure on money wages of unemployed workers –or better, workers that at the called vector of prices would remain unemployed– would be at work until the excess supply of labour is eliminated. De Vroey moves a similar criticism to Clower's DDH, see De Vroey (1999) and De Vroey (2004, pp. 123–126).

[34]For example, Patinkin's disequilibrium analysis in *Money, Interest, and Prices* (Patinkin [1956] 1965).

(Clower 1965, p. 111). The previous discussion of traditional marginalist analysis and Keynes' theory can help us to understand why, in this case, we do necessarily find that 'tacit assumption' which Clower's DDH, although with its inherent theoretical limits, correctly individuates as disturbing and attempts to reject. Namely, a stability analysis based on *notional* excess demand functions.

2.5.1 Stability in tâtonnement adjustment processes

As it is well known, Neo-Walrasian equilibrium theory is based on tâtonnement price-adjustments. Clower correctly observes that "when we turn to contemporary equilibrium theory [...] no trace of the hypothesis is anywhere to be found" (Clower 1965, p. 121). That is, no trace of his DDH, which implies the possibility of deriving demand functions from an income distribution which corresponds not to initial endowments (i.e. *planned* transactions), but rather to Clower's *realised* income receipts. The standard tâtonnement, in fact, by construction, does not allow disequilibrium transactions to take place. The fictitious auctioneer, given the initial distribution of endowments, calls a vector of price and collects all transactors' demand and supply in forms of 'contracts'. If, at the called price vector, there appears to be an excess of demand somewhere in the economy, those contracts are annulled (with no costs) and a new vector of price, adjusted in relation to the observed excess demand(s), is called out. The process goes on until the equilibrium price vector is found and *as if* 'instantaneously' imposed by the auctioneer[35]. Only those 'contracts' become binding and, therefore, this implies that within such a framework disequilibrium transactions can never be, in Clower's terms, *realised* transactions.

In a state of involuntary unemployment, tâtonnement economics maintains that the auctioneer would observe an excess demand somewhere in the economy signaling for the presence of an excess supply of labour. This would mean that the currently

[35]In Hicks's temporary equilibrium method (Hicks 1939) there is no auctioneer. The Monday-week device is created to avoid the occurrence of trade at 'false' prices (Hicks 1939, p. 128) –note that the same passage from Hicks' *Value and Capital* is mentioned by Clower (Clower 1965, pp. 112, 113) when he argues for the necessity to introduce disequilibrium incomes into the analysis. Hicks assumes that on Monday transactors go to the market and re-contract until the equilibrium price vector is established. In the following part of the week, the contracts agreed on Monday are fulfilled and, hence, as in the tâtonnement, trade occurs only at equilibrium prices. The next week, the same process is repeated and so on.

called price vector is not the equilibrium one. Therefore, the auctioneer would call another price vector adjusted on the basis of the observed excess demand. Thus, the tâtonnement process can never stop at positions other than full employment since any element of positive or negative excess demand is always accompanied by a respectively negative or positive excess demand. Those excess demand functions are, in Clower's terms, notional. Namely, output demands are derived from a income distribution corresponding to initial endowments and, thereby, to full-employment incomes since it is implicitly assumed that all transactors are able to successfully sell their labour supply. Clower, therefore, is right in pointing out that in Neo-Walrasian equilibrium analysis full employment is, on closer inspection, illegitimately assumed because of the 'tacit assumption'[36]. That is, because of a stability analysis described by the tâtonnement process, a price-adjustment mechanism based on *notional* excess demands. As our previous discussion aimed to stress, conversely, this sort of 'market' adjustment finds no place in traditional authors' stability analysis.

2.5.2 Why the auctioneer?

However, Clower's own solution –the DDH– is unsatisfactory and reflects the author's incomprehension of the far-reaching consequences of the shift from the long-period to the Neo-Walrasian method. To start with, the erroneous valuation of traditional authors' equilibrium analysis discussed earlier explains why Clower does nowhere question the *raison d'être* of adjustment mechanisms based on tâtonnement processes. We saw that no auctioneer-like assumption is made by traditional authors. In *Theory of Wages*, Hicks' stability analysis at no point introduces or requires a fictitious central market authority in charge of collect transactors' demands and supplies. The persistence and the stability of the full-employment normal equilibrium position is ensured by the working of the two dominant market forces –vertical competition and factor substitution mechanism– and by the relative insensitivity of the *data* to the process of adjustment toward the equilibrium. The latter, as we will see in a moment,

[36]Due to space limits we cannot discuss it in more detail but it is worth mentioning that, few years later, the same conclusion but –we may say– with a more profound understanding of its theoretical implications, is reached by the same Hicks: "In Keynesian terms, the Temporary Equilibrium theory is a full-employment theory." (Hicks 1965, p. 74).

is no longer ensured once we turn to a Neo-Walrasian context.

In a capitalistic economy, that is in an economy where capital appears explicitly as one of the productive factors, traditional marginalist theory necessarily needs to specify a total value-quantity of capital among the *persistent data* determining the equilibrium normal relative prices (Garegnani 1990). The factorial substitution, in the case of capital, does not simply involve different proportions of 'capital', as in the case of a homogeneous factor as land and –more questionably– labour, but a different physical composition of the capital endowment (Garegnani 2012, p. 1419). That is, during the process of adjustment toward equilibrium, which in the case of capital means a tendency toward an uniform rate of return on the supply price of each capital good and toward the full employment of the capital, the composition (the 'form') of the economy's capital endowment must be allowed to continuously change through the creation and substitution of different capital goods. Nonetheless, its total value-quantity remains unaltered throughout the process[37]. As we read in Wicksell's *Value, Capital and Rent*:

> [a]ll productive factors, and consequently capital too, could be considered approximately as *constant* magnitudes. Though in this case the forms of the latter change, its total value remains unchanged, since in place of the consumed capital goods new ones of equivalent value enter successively. (Wicksell [1893] 1970, II.I., p. 103. original emphasis)

On the one hand, if this condition does not hold, the theory would bear a path-dependency problem. If the theory specified among the persistent data determining the equilibrium position the physical composition of the capital stock, any disequilibrium adjustment would alter the equilibrium position itself since it would necessarily entail a change in the *form* of the capital stock. The gravitational property of their long-period equilibrium position would be deprived of its theoretical plausibility. On the other hand, traditional authors need to specify among the data determining the

[37]The argument to sustain this is that the economy's value-quantity of capital changes only slowly, with accumulation. Investment in new capital goods, thereby, is supposed to leave substantially –'approximately'– unchanged the total value of the capital stock and to affect its physical composition only (replacement of worn-out capital goods, creation of new capital goods to adapt the capital stock to different factor proportions).

equilibrium position the total value-quantity of capital. Otherwise, as Wicksell explicitly recognises, the theory would be condemned to "indeterminateness" (Wicksell 1934 [1901], p. 202). Namely, the specification of the total value of capital is necessary to close the system of simultaneous equations that determine the equilibrium relative prices[38]. The same derivability of the traditional factor demand curves, we saw, depends on the possibility to consider the other factor(s) as *given* and fully-employed. In Hicks' (Hicks [1932] 1963) analysis of labour unemployment, the labour demand curve is derived on the condition that the total amount of capital is given, fully utilized and does not change[39]. Conversely, the *form* of capital must be variable to give plausibility to the labour-capital substitution that Hicks' disequilibrium analysis requires[40].

Traditional authors' specification of the capital endowment as a single value magnitude in variable form is what the controversy on capital, started in the '60s with Sraffa's publication of *Production of commodities by means of commodities* (Sraffa 1960), has proved to be theoretically untenable. Namely, the illegitimacy, unperceived by Wicksell, of specifying among the *data* a given total value-quantity of capital (Garegnani 2012) as independent of the equilibrium relative prices and income distribution. Moreover, and this is what interest us here, a change in the capital specification is precisely what marks the shift, initiated by Hicks's *Value and Capital* (Hicks 1939) and consolidated during the years of the capital controversy, of marginalist equilibrium theory from the long-period to the Neo-Walrasian method[41].

In the Neo-Walrasian method, a vectorial specification of heterogeneous capital goods replaces traditional authors' value-quantity of capital among the *data* determining the equilibrium. The physical composition of the capital endowment is now given and should be sufficiently persistent if one does not want to recur to the traditional

[38]This is what recent critical literature terms as the *supply*-side role of capital. Cf. Petri (2004).

[39]We recall here the relevant quotes: "the adoption of these methods lowers still further the amount of labour which is required with a *given* volume of capital" (Hicks [1932] 1963, p. 188);"provided there is *no wastage of capital* in the process" (Hicks [1932] 1963, p. 198).

[40]If the composition of the capital stock was fixed, then the labour demand curve would be strongly inelastic. Cf. Hicks ([1932] 1963, pp. 18–22).

[41]In Milgate's words, the roots of this methodological shift are to be found in: "[the] desire to avoid a theoretical difficulty which had been encountered by early writers. This was the problem of defining the *quantity of capital* [...]." (Milgate 1982, p. 137, emphasis added).

authors' specification of capital as a total value-quantity. *Any disequilibrium transaction* would, now, alter the given composition of the capital endowment[42]. Thus, any disequilibrium transaction would entail a change in one of the datum determining the equilibrium prices and thereby of the equilibrium position itself. Critical literature later terms this path-dependency problem as the *impermanence* problem (Garegnani 1976; Garegnani 1990; Petri 2004; Petri 2017; Petri 2020). The tâtonnement adjustment is precisely set up to avoid disequilibrium transactions –'false trading'– from taking place and, thereby, changes in the initial composition of the capital endowment. We are introduced to the fictitious process of re-contracting under the guidance of a benevolent central market authority. This 'process' stops once that the equilibrium vector of prices is found, and *instantaneously* imposed, by the auctioneer[43]. In a Neo-Walrasian setting, therefore, realised transactions are only equilibrium transactions.

As we saw in the preceding discussion, Clower is silent on the problem of the capital specification. Labour is the only productive factor in the economy and there is no capital-investment market as such. This may explain why Clower's DDH attempts to relax that assumption without realising that, in tâtonnement economics, it is precisely this assumption which is responsible of preserving the persistence of the equilibrium position –i.e., to avoid changes in the physical composition of the capital endowment.

2.5.3 Clower's modified tâtonnement

Clower attempts to relax the 'tacit assumption' preventing any disequilibrium transaction from taking place by introducing a distinction between *realised* and *planned* transactions. Nonetheless, in the first version of the DDH's article (Clower 1965), it remains relatively obscure how such a distinction could be theoretically worked out. It is only in a second version of the same article (Clower 1969) that Clower addresses the issue by introducing an additional paragraph. It emerges that what Clower is

[42]As we just stated, this holds also in traditional disequilibrium adjustment process. However, it does not represent a problem since the *form* of capital is not specified among the data determining the equilibrium position.

[43]A 'process' –as much as an 'adjustment'– is by definition time-consuming. The definition of the tâtonnement as an *instantaneous* adjustment 'process' is self-contradictory.

proposing with his DDH is, on closer inspection, a *modified* tâtonnement[44]. The difference with the standard tâtonnement is that, in Clower's DDH, the final position of the economy becomes path-dependent.

As he writes, "Here and elsewhere in the argument, it may be helpful if the reader imagines that a central market authority is responsible for setting all prices" and:

> maintains continuous surveillance over all sale and purchase orders communicated to it by individual transactors to ensure that *no purchase order is 'validated' unless it is offset by a sale order that has already been executed* (i.e. purchase orders are simply 'cancelled' unless the transactor has a positive balance of 'book credit' with the market authority sufficient to cover the entire value of the purchase order) [...] Sale orders are 'validated' automatically but the *rate at which such orders are executed is governed by prevailing demand conditions*[45]. (Clower 1969, p. 289) (Emphases added)

It is this definition of the market authority's mode of operation that can justify –and incorporate– Clower's distinction between *realised* and *planned* income receipts. Such a mode of operation hardly fits with the standard tâtonnement, where the auctioneer collects all individuals' sale and purchase orders "at a single stroke" (Clower 1965, p. 117)[46]. It suggests a *sequential* information collection[47] by the market authority

[44]Literature has already argued how this 'Neo-Walrasian' flavor of the Dual-Decision hypothesis *de facto* sizes down Clower's attempt to break with precisely the 'established price theory'. The 1965 and 1969 articles remain, as De Vroey terms them, a "reformist attempt within the Walrasian approach" (De Vroey 2004, p. 125) and in the end "Clower attempted to extract Keynesian results from a Neo-Walrasian model" (Rogers, 1985, p. 118). Clower himself comes to acknowledge this in his later writings (e.g (Clower 1975, p. 4)).

[45]Furthermore, this market authority must also initially advance some positive 'book credit' to some transactor in order to set the trade arrangements in motion. Basically, if no one has access to this authority's credit, no purchase could ever be 'validated' in the first place since it could never be off-set by an equivalent executed sale: the economy could never be set in motion.

[46]Clower is perfectly aware of this: "[...] established preference analysis tacitly presupposed that selling, buying and saving plans are all carried out simultaneously. [...] all household decisions are accomplished at a single stroke [...]." (Clower 1965, p. 117).

[47]This implies that every transaction must be governed and 'validated' by the market authority who not only has to find the equilibrium price vector but, also and sequentially, to control the 'validation' of every purchase order constrained by –i.e., that must be offset by– an at least value-equivalent sale order already executed by the individual transactor considered. As a matter of

and, moreover, a sequential and irrevocable (i.e., path-dependent) process of trading arrangements. Namely, contracts are binding independently of whether they turn out to be a disequilibrium or equilibrium transaction. Only if this is allowed, the emergence of realised income receipts can be justified. Those derive from sale orders –in the 'Keynesian' case considered by Clower, sales of factor supplies $m+1,\ldots,n$– which have been already "executed". Hence, anytime a transactor has failed, due to absence of enough 'book credit' and/or sufficient positive income receipts, to satisfy her planned purchase orders, her notional demand must be substituted with income-constrained demands. That is, with 'constrained' demand functions derived from realised income receipts only. The entire point of Clower is to show that *if* the market authority takes into account such income-constrained demand functions *then* she would be unable to observe an excess good demand caused by an excess of labour supply (i.e. in presence of involuntary unemployment). The value of output –i.e., validated sale orders– corresponds to the value of realised income receipts and it is entirely absorbed by transactors' income-constrained demands for output. Thus, the income-constrained *excess* demands would be zero and would leave the auctioneer with no clues concerning the price-adjustment towards equilibrium she is supposed to carry out.

Therefore, the economy would be 'stuck' in a disequilibrium state with unsupplied labour factor. No matter how much Clower insists on labelling this final position as a 'disequilibrium' situation, what his DDH actually determines is a path-dependent equilibrium state, which is Non-Walrasian in the sense that one market, the labour market, does not clear (cf. Fisher 1989, p. 312, and Carlin and Soskice 1990, p. 113). The outcome of his tâtonnement, we saw, depends on the the order in which the central market authority collects individuals' demands. But this is not all. The mode of operation of Clower's market authority also suggests that any disequilibrium vector of relative prices, in the end, turns out to be the equilibrium vector of relative prices. Since the market authority only 'registers' effective income-constrained demands and executes sale orders equivalent to these demands, it has no way of observing some positive or negative excess demands in the economy. These are the necessary 'sig-

computability, in a way, Clower's central market authority appears even more requiring than the standard auctioneer's mode of operation.

nals' the market authority requires to establish whether or not the current vector of prices is the equilibrium one. If this possibility to register these 'signals' is ruled out, then any current vector of relative prices turns out to be the equilibrium one. Clearly, this peculiar outcome of Clower's tâtonnement –again– directly depends on the assumption of a rigid money wage that rules out the role of vertical competition –i.e., unemployed workers downward pressure on money wages. Because of such rigidity *and* the zero effective excess demand for goods – i.e., no inducement to change prices–, Clower can argue that the real wage does not vary and that the problem of involuntary unemployment remains unresolved.

2.6 Conclusive remarks

We suggested a theoretical reconsideration of Clower's Dual Decision Theory. We stressed that, although correctly individuating a theoretical deficiency in the stability analysis of Neo-Walrasian equilibrium method, it is, however, insufficient to accomplish Clower's primary aim. Namely, to show the theoretical incompatibility between Keynes' theory and 'orthodox' analysis.
The roots of this failure, we argued, are found in the common oversight of the far-reaching consequences of the methodological shift of neoclassical theory from traditional long-period equilibrium analysis to the Neo-Walrasian approach. We saw how traditional analysis could provide a theoretical justification to the tendency toward a full-employment normal position and how Clower's DDH is, at the level of disequilibrium analysis, implicitly assumed by traditional authors. Conversely to what earlier and more recent literature argues, or implicitly accepts, Clower's DDH is, therefore, nothing new under the sun.

Then, we showed how Clower's critique is not able to grasp the theoretical roots of Keynes' attack to the Classics. The DDH leaves out the problem of investment which, conversely, constitutes the basis of Keynes' theory of effective demand and rejection of Say's Law in the *General Theory*.

Relative to Neo-Walrasian equilibrium analysis, which Clower refers to as "contemporary price theory" (Clower 1965, p. 104), the DDH represents an attempt to relax the 'tacit assumption' that the auctioneer always considers an aggregate demand

determined from an income distribution corresponding to full-employment incomes, which implies a stability analysis –i.e. tâtonnement processes –based on notional demand functions *à la* Clower. Nonetheless, we argued that Clower does not realise that this tacit assumption he is correctly attacking concerns a stability problem *specific* to Neo-Walrasian equilibrium analysis. Further, that Clower's DDH represents a modified tâtonnement adjustment that, in the end, determines a path-dependent equilibrium whose theoretical scope and utility remain unclear and whose conclusions directly rest on the assumption of rigid money wages.

We conclude, therefore, that, despite its path-breaking intention, Clower's 1965 article does not represent a 'volte-face' to the Neoclassical Synthesis. It is silent precisely on the original theoretical departure of Keynes' theory from the classical doctrine and appears to be ultimately insufficient to prove the theoretical inconsistency of the neoclassical re-integration of Keynes' theory.

Chapter 3

Patinkin's disequilibrium dynamics of involuntary unemployment

Abstract

We discuss Patinkin's disequilibrium dynamics of involuntary unemployment in *Money, Interest, and Prices*. Patinkin's book is an influential piece of the Neoclassical Synthesis. Especially, it represents the first explicit attempt to incorporate Keynes' message in *The General Theory* (Keynes 1936) within a Neo-Walrasian equilibrium analysis. Our goal is twofold. First, we remark how Patinkin's disequilibrium dynamics reduces involuntary unemployment to a disequilibrium phenomenon that could persist only in the presence of absolute rigidity of money wages and prices. We show that, besides the introduction of the real-balance effects, the author's analysis *prima facie* replicates the outcomes of Hicks' (Hicks [1932] 1963) traditional analysis of the labour market's disequilibrium. Further, how his indirect real balance effect ultimately relies on the traditional interest-elastic investment schedule that the later capital controversy denies. Secondly, we investigate the claim, currently shared by some literature, that Patinkin's disequilibrium dynamics of involuntary unemployment is incompatible with the Neo-Walrasian methodological premises of his equilibrium analysis. We accept the conclusion but we suggest an alternative explanation for such a methodological inconsistency. We show how Patinkin's disequilibrium analysis is grounded on several assumptions that, conveniently enough, allow the author to preserve the persistence and stabil-

ity of his Neo-Walrasian full-employment equilibrium. Nevertheless, we argue, there still remains a problem related to Patinkin's specification of the capital endowment, which deprives of theoretical plausibility the capital-labour substitution that his equilibrating process requires to explain the adjustment to full employment. Finally, we note how the assumption of no redistributive effect also limits the generalisability of Patinkin's disequilibrium dynamics. The real-balance effect plays a crucial role in the author's explanation of the tendency to full employment. Redistributive effects, if admitted, would seriously undermine the real-balance effect's effectiveness and, thereby, would condemn to indeterminateness Patinkin's disequilibrium dynamics of involuntary unemployment.

Introduction

In this chapter we discuss Patinkin's disequilibrium dynamics of the labour market. We mostly focus on Patinkin's influential *Money, Interest, and Prices* (Patinkin [1956] 1965), that, as Rubin writes, "became a landmark of the neoclassical synthesis" (Rubin 2011, p. 16). Our aim is two-fold. First, Patinkin's effort of reconciling Keynes' conclusions with the marginalist approach offers us an *ex-post* opportunity to check the theoretical propositions we advanced in the first chapter. Namely, to confirm Garegnani's claim (Garegnani 1983, p. 50) that the root of Keynes' theoretical attack to the Classics is in his alternative theory of the interest rate. In Chapter 1 we saw to what extent Keynes' argument could undermine Hicks' traditional disequilibrium analysis. Patinkin's discussion and introduction of the real-balance effect, as we will see, can be interpreted as the attempt to precisely accommodate for the problem that Keynes' critique brings out in a traditional disequilibrium dynamics of involuntary unemployment. A reconciliatory task that, as we already discussed in the first chapter, turned out to be facilitated by Keynes' acceptance of marginalist factors' employment schedules (the marginal productivity of labour and the marginal efficiency of capital), the "Achilles' heel" (Garegnani 1983, p. 60) of Keynes' *General Theory*.

Second, we show how Patinkin's disequilibrium dynamics is methodologically incompatible with the Neo-Walrasian setting that he assumes. Recent literature already acknowledges how this problem ultimately weakens Patinkin's analysis of involuntary unemployment. However, we believe that the right conclusions are being derived from the incorrect argument. We attempt to show how Patinkin, on closer inspection, preserves the persistence and stability of the full employment equilibrium and that he does so consistently with the Neo-Walrasian methodological premises of his analysis. Nevertheless, this preserved consistency is allowed by several restrictive assumptions that seriously undermine the generalisability of Patinkin's disequilibrium dynamics. We individuate the origin of Patinkin's methodological inconsistency in his specification of the capital stock. The author assumes that the physical composition of the capital stock is given and remains substantially unaltered throughout the disequilibrium adjustment process. We argue that this notion of capital hardly fits with the adjustment mechanisms based on the marginalist concept of capital-labour

substitution that Patinkin advances to support the tendency to full employment.

In section 3.1 we introduce Patinkin's "coexistence theorem" (Patinkin [1956] 1965, p. 315). which underlines Patinkin's notion of equilibrium. Section 3.2 we present Patinkin's disequilibrium dynamics of involuntary unemployment. This is supposedly the core of Patinkin's book since it is here that the author attempts to re-incorporate Keynes's critique and to prove why involuntary unemployment cannot be an equilibrium position. Section 3.3 compares Patinkin's disequilibrium dynamics with Hicks' one (Hicks [1932] 1963). We evidence how, to some extent, it replicates Hicks' and relies on traditional mechanisms of adjustment. Conversely to what current literature maintains (De Vroey 1999; Rivot 2016; Rubin 2011), we show how the assumption that the economy behaves as if there existed a single homogeneous good seemingly preserves the persistence and stability of Patinkin's full employment equilibrium. Although this largely diminishes the generalisability of Patinkin's disequilibrium analysis, it is not here that the methodological incompatibility between the author's disequilibrium dynamics and his Neo-Walrasian equilibrium determination emerges. Rather, we argue that Patinkin's inconsistency relies in his specification of the capital endowment, which deprives of theoretical plausibility the labour-capital substitution that his equilibrating process toward full employment suggests. Section 3.4 addresses Patinkin's assumption of no redistributive effects. Those, independently of the method, would undermine the working of Patinkin's real-balance effect. Further, in Patinkin's temporary equilibrium setting, the equilibrium position itself would not be insensitive to them, thereby strengthening our claim relative to the limited generalisability of Patinkin's disequilibrium dynamics of involuntary unemployment. Conclusive remarks follow in Section 3.5.

3.1 The coexistence theorem

Conversely to Clower, Patinkin's intention is reconciliatory. In *Money, Interest, and Prices* (Patinkin [1956] 1965) the author attempts a theoretical reconciliation between Keynes' analysis of employment (Keynes 1936) and the marginalist notion of equilibrium as a full-employment position. The first step to achieve this goal, Patinkin argues, is to recognise that Keynes' 'unemployment *equilibrium*' is by definition self-

contradictory[1]:

> [...] by definition, the extent of involuntary unemployment is identical with the extent of the excess supply of labour which exists at the prevailing wage rate. It follows that [...] the *coexistence of involuntary unemployment and flexible money wages precludes the existence of equilibrium.* (Patinkin [1956] 1965, p. 315) (emphasis added)

The incompatibility depends directly on Patinkin's definitions of involuntary unemployment and equilibrium. His definition of involuntary unemployment is the logical negation of full employment. Full employment exists "as long as workers are 'on their supply curve' –that is, as long as they succeed in selling all the labour they want at the prevailing real wage rate" (Patinkin [1956] 1965, pp. 314, 315). Therefore, involuntary unemployment occurs as workers are no longer on their supply curve[2]. Such position cannot be considered, as Keynes does, an equilibrium since Patinkin defines equilibrium as a state where "nothing tends to change in the system" (Patinkin [1956] 1965, p. 315). Conversely, involuntary unemployment in a competitive market implies that "the money wage rate tends to fall with excess supply" (Patinkin [1956] 1965, p. 315). Patinkin's 'flexibility' of money wages incorporates the fundamental theoretical consequence of the *vertical* competition assumption (see Chapter 1). An excess supply of labour, for marginalist theorists, implies that the market forces generated –and theoretically justified– by vertical competition are not at rest. Involuntarily

[1]Patinkin states that Keynes' notion of unemployment equilibrium denies an "innocuous tautology" (Patinkin [1956] 1965, 316, fn. 4). The tautology would be the proposition 'full employment equilibrium'. However, as the following discussion aims to highlight, to write that an equilibrium is a full-employment position is redundant only if one accepts the theoretical premises of marginalist theory. That is, if one accepts that the factor substitution mechanism and the vertical competition are dominant market forces in an economic system. The tendency toward factors' full employment is a marginalist theoretical result. That is, the adoption of the method of long-period positions alone does not suffice to infer that there exists a tendency towards full employment. On the issue, see for example Eatwell (1983) and Milgate (1982).

[2]Patinkin does not constraint his interpretation of Keynes' involuntary unemployment to any specific form of the supply function of labour (Patinkin [1956] 1965, p. 341). Admittedly, Patinkin criticises Lange's interpretation of involuntary unemployment as the "equilibrium position" (Lange 1944, p. 6) where the demand curve for labour intersects the infinitely elastic segment of the labour supply curve. According to Patinkin, Lange's way of theorising as a "reflection of the ingrained habit [...] of seeing only the points *on* the supply curve" (Patinkin [1956] 1965, p. 341) (original emphasis).

unemployed workers exert downward pressure on money wages that, if *flexible*, fall and, thereby, decrease real wages and change firms optimal demand for labour. This fall in money wages would stop as the excess supply of labour is zero.

The "coexistence theorem" (Patinkin [1956] 1965, p. 315) preliminary remarks how Patinkin's notion of equilibrium coincides –in principle, at least– with traditional authors' long-period equilibrium position intended as the centre of gravity of the economic system. Conversely to Clower (Clower 1960, pp. 321–322), for example, Patinkin recognises that the traditional equilibrium is not a full-employment state by *assumption*. Rather, equilibrium is the persistent and stable position towards which marginalist market forces drive the economy. The further conclusion that equilibrium is a full-employment position derives from the *additional* belief that those dominant market forces are the mechanisms of factor substitution and vertical competition (See Chapter 1). Thus, if, on the one hand, Patinkin considers full employment the centre of gravity of a market system, on the other hand, he seems aware that the full employment obtains from marginalist theory's assumptions and not by the definition of equilibrium in itself.

3.2 Disequilibrium Analysis

Patinkin assumes that, for whatever reason, a sudden decrease in aggregate demand displaces the economy[3] from full employment. This could be due either to a decreased demand for commodities or a decreased demand for investment (Patinkin [1956] 1965, p. 316).

The downward shift of aggregate demand from E to E_1 in Figure 3.1 represents such a decrease in aggregate demand in the expenditure-income diagram.

3.2.1 Full price flexibility

In a fully flexible scenario, writes Patinkin:

> [T]he downward shift in the commodity demand function automatically

[3]To begin with, Patinkin considers the simplest case of a "pure outside-money economy" (Patinkin [1956] 1965, p. 317).

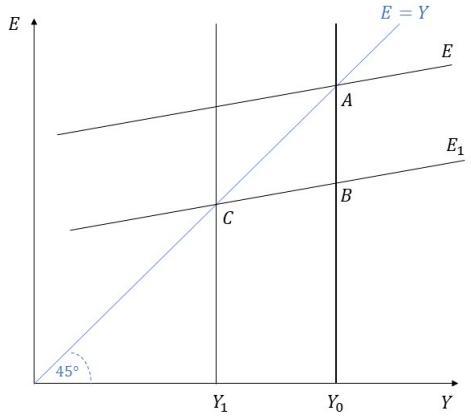

Figure 3.1: Decrease in aggregate demand

> creates market forces which tend to offset it. If this demand is *sufficiently sensitive* to these forces, it will *quickly* return to a full-employment position at a lower level of wages, prices, and interest. (Patinkin [1956] 1965, p. 318) (emphases added)

If the fall of aggregate demand translates into an increased demand for bonds, there will be an excess demand in the bonds market, driving the interest rate down. This fall, in turn, would push aggregate demand up again. Patinkin attributes this effect to the traditional loanable-funds theory[4]. If, on the contrary, the decrease in aggregate demand consists of an increase in money demand "without any shift whatsoever in the demand for bonds" (Patinkin [1956] 1965, p. 318), the fall on the interest rate arrives eventually due to the *indirect* real-balance effect. Specifically, a downward shift of aggregate demand from point A to point B in Figure 3.1 creates a deflationary pressure. Given the money available in the economy, a fall in prices implies an increase in individuals' *real* wealth. The increase in individuals' *real* wealth leads to an increase in the demand for bonds. Increasing demand for bonds lowers the interest rate and stimulates investment demand. Furthermore, this decline in prices also *directly* increases consumption goods demand –this is the *direct* real-balance ef-

[4]Patinkin recalls the traditional theory of loanable funds: "the familiar classical and neoclassical mechanism by which an increasing in savings flows into the loan market, thereby depresses interest, and thus stimulates an *off-setting* increase in investment." (Patinkin [1956] 1965, p. 318) (emphasis added).

fect. Thus, the deflationary process suffices to increase both components of aggregate demand and re-establish full employment.

A distinctive feature of this fully flexible case is that, throughout the adjustment, the economy's output remains the full employment output Y_0. Namely, the demand is so responsive to the deflationary pressures caused by a deficient aggregate demand that "producers will react to their temporary inability to sell by simply permitting their inventories to build up" (Patinkin [1956] 1965, p. 318). As we see in the next section, this does no longer hold as the responsiveness of demand to market forces is diminished.

3.2.2 The distinction between current output and notional output

Patinkin presents the previous fully flexible case to confirm his "coexistence theorem" (Patinkin [1956] 1965, p. 315). A completely responsive aggregate demand cannot be compatible with the idea of persistent involuntary unemployment. So Patinkin gradually abandons the flexibility assumption to investigate the market forces able to re-establish full employment in a non-perfectly flexible case. The first consequence is that the economy's output level reduces from full-employment output[5] to, say, output Y_1 in Figure 3.1 where sales exhausts the current lower level of aggregate demand E_1[6]. It implies that at unchanged money wages and price level –i.e. unchanged real wages– firms demand less labour. As Figure 3.2 illustrates, at current output level Y_1 and unchanged real wages $\frac{w_0}{p_0}$ firms' optimal demand for labour amounts to N_1. At point K (and corresponding point C in Figure 3.1), the quantity $(N_0 - N_1)$ of labour supply is involuntarily unemployed. Patinkin is here recognising a fundamental dependence of firms' demand for labour on current aggregate demand and output that, however, he considers "not explicit" (Patinkin [1956] 1965, p. 319) in the traditional demand-and-supply cross of the labour market equilibrium. As he states:

[5] In Clower's terms (Clower 1965; Clower 1969), Y_0 represents the *notional* output. See Chapter 2.

[6] As Patinkin explains: "In the absence of sufficient interest -and price-elasticity, the adjustment process becomes a *long*, drawn-out one. It cannot be realistically be assumed that firms will continue producing at unchanging level [...]." (Patinkin [1956] 1965, p. 318) (emphasis added).

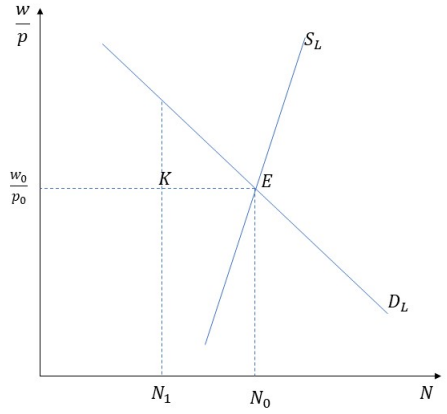

Figure 3.2: Effects on the labour market of a decrease in aggregate demand

> [...] our demand function for labour describes the behaviour of firms maximising profits within a framework of perfect competition. This means that the *planned* labor input it specifies for any given level of real wage rate reflects firms' assumptions *that they will be able to sell all of their resulting output at the prevailing market price.* (Patinkin [1956] 1965, p. 319) (first emphasis added)

Thus, the labour demand curve D_L does not represent the demand for labour that describes firms' choices at the reduced aggregate demand E_1. At unchanged money wages and price level, the notional output Y_0 is no longer sustainable. Since firms produce the output level that the market is willing to absorb, Y_1 now determines firms' demand for labour. A sudden decrease in aggregate demand at unchanged wages and price level simultaneously yields a leftward shift of firms' demand curve for labour. Patinkin's insistence on the dependence between the output market and firms' demand for inputs is crucial to give a non contradictory characterisation of point K. It is by recognising that at point K current aggregate demand conditions make Y_1 the firms' sustainable output level that allows him to state that, at this point, there is only an excess supply of labour. Namely, that the simultaneous excess demand for labour is only apparent since, although point K is on the left of the aggregate demand for labour D_L, this curve does not represent current firms' input

choices and, therefore, "no effective excess demand for labor exists" (Patinkin [1956] 1965, p. 322) at this point. At point K, however, firms have undesired excess capacity. The absence of excess (unsold) output does not imply that, at the unchanged real wage $\frac{w_0}{p_0}$, firms' desired output is no longer Y_0. As Patinkin clarifies: "Even though this point [point K] is not marked by an excess of *output*–firms are selling all they are producing–it is marked by an excess of *supply*. That is, despite the fact that they have decreased their output to Y_1, the fact remains that the *optimum* output they *desire* to supply at [unchanged] the real wage rate– *should the market be willing to absorb this output*– is still Y_0." (Patinkin [1956] 1965, p. 321)[7].

The first step in Patinkin's disequilibrium analysis is to check whether full employment can be re-achieved in such case. The scenario is different from the previous section's one since, as just illustrated, firms have reduced their output to Y_1. If wages and prices are still flexible *and* change proportionally, the dynamics of the adjustment from point K to point E follows the same argument of the previous section. Through the indirect and direct real-balance effects, the deflationary pressure stimulates aggregate demand back to the full-employment output level Y_0, which will obtain at a lower level of money wages, prices, and interest. The second step is to introduce some lags in the adjustments of either money wages or the price level. Namely, to introduce "stickiness" (Patinkin [1956] 1965, p. 327). We consider the case of sticky money wages in detail because, as we will see in a moment, this will allow us to compare this reasoning with Hicks' disequilibrium analysis (Hicks [1932] 1963) presented in Chapter 1.

3.2.3 Sticky money wages

If the price level is flexible whereas money wages are –at least initially– sticky, then the system would gradually move from point K to a position as the one depicted by point D (Figure 3.3). The price decline from p_0 to p_1 that obtains from the deflationary pressure on the one hand, through the real-balance effects, expands aggregate demand (E_2) and, on the other hand, increases the real wage rate from $\frac{w_0}{p_0}$ to $\frac{w_0}{p_1}$. The deflationary pressure stops at D (figure 3.3) since at the new real wage $\frac{w_0}{p_1}$ firms are

[7]The distinction between current output and desired output is already discussed in Patinkin (1949).

at their optimum by employing N_2 labour inputs and producing Y_2. Point D is *on*

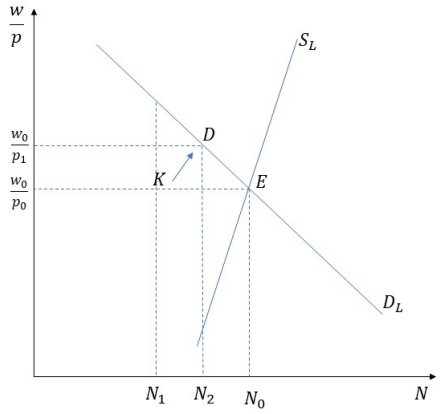

Figure 3.3: Sticky money wages

the aggregate labour demand curve, which means that firms have now neither excess output nor excess *desired* output (i.e., excess capacity). As Patinkin notes:

> [...] the rise in the real wage rate has decreased the optimum output of firms. [...] Hence there is no excess of either actual or desired output in the commodity market. In other words, there is neither output or excess capacity: firms are producing and selling exactly the optimum output corresponding to the [new] real wage rate. Hence *no downward pressure on prices emanates from this market*. (Patinkin [1956] 1965, pp. 326, 327) (emphasis added)

Therefore, firms' optimal output shifts from Y_0 to Y_2 due to the change in real wages at point D (see the corresponding point J on figure 3.4). However, points D and F are not persistent states since the labour market "is obviously *not* in equilibrium" (Patinkin [1956] 1965, p. 327). The involuntarily unemployed workers' downward pressure on money wages is the self-equilibrating market force able to move the system towards full employment. As money wages fall, the real wage rate decreases. Therefore, firms optimal demand for labour and level of output change. The decrease in real wage, therefore, "renew the downward pressure of excess capacity on the price level" (Patinkin [1956] 1965, p. 327) (suppose firms are at point F in Figure 3.5).

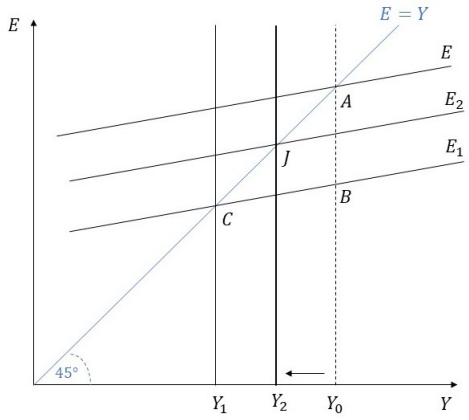

Figure 3.4: The change in desired output

The fall in prices through the real-balance effect stimulates aggregate demand until firms reach a position on the demand curve for labour (for example, point G in Figure 3.5). At this point there exists again downward pressure on money wages and the adjustment repeats itself until full employment is achieved. That is, the equilibrating process stops as the downward pressure on money wages ceases[8].

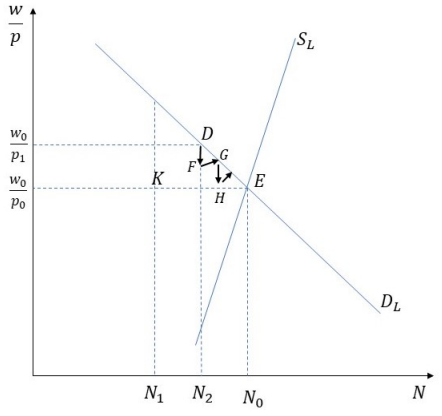

Figure 3.5: The dynamic adjustment under sticky money wages

Thus, if money wages are stickier than prices (i.e., less responsive to market pres-

[8]Patinkin is implicitly assuming that the expansion deriving from the real-balance effect dominates the possible destabilising effect of the fall in prices on firms' demand for labour.

sures than the price level), full employment is delayed[9] but not systematically prevented and "the essential nature of the equilibrating is not changed" (Patinkin [1956] 1965, p. 326) . Consistently with his "coexistence theorem" (Patinkin [1956] 1965, p. 315), in Patinkin's analysis, only *absolute* rigidity of money wages or prices would prevent achieving full employment[10]. As he argues: "[A]s long as either of these rigidities prevails, the system *must remain in a state of unemployment disequilibrium*"(Patinkin [1956] 1965, p. 328) (emphasis added).

3.3 Traditional disequilibrium dynamics

In this section we compare Patinkin's disequilibrium analysis with Hicks' traditional discussion of unemployment (Hicks [1932] 1963) we introduced in Chapter 1. After illustrating to what extent the two analyses coincide, we discuss why Patinkin's application of traditional reasoning is severely limited due to the underlying Neo-Walrasian premises of Patinkin's analysis.

3.3.1 The adjustment on the labour demand curve

Let us briefly recall the salient points of Hicks' disequilibrium analysis (Hicks [1932] 1963). Hicks' considers a labour-capital economy that finds itself in a peculiar disequilibrium position. Namely, in a state where only one market, the labour market, is in disequilibrium due to an external imposition of a wage rate higher than the one consistent with "normal employment" (Hicks [1932] 1963, p. 198). This means that firms are *on* the aggregate demand for labour, and this, in turn, has a two-fold theoretical meaning. First, the other factor, capital, remains fully-employed along the adjustment towards full employment. Secondly, at such disequilibrium state, the

[9]As Patinkin claims, "the primary effect of the initial 'stickiness' in money wages will thus be a prolongation of the dynamic adjustment process" (Patinkin [1956] 1965, p. 327).

[10]At the International Economic Association Conference in 1962 Patinkin makes the same point. As we read in the summary record of the debate: "Professor Patinkin suggested that Keynesian under-employment could be an equilibrium situation *only if money wage rates were perfectly rigid or if there existed a liquidity trap.* If neither of these assumptions were made, *automatic market forces could theoretically re-establish full employment.* But he did not think that this was relevant for the real Keynesian message, which must be read within a disequilibrium context." (Brechling and Hahn 1965, p. 306) (emphasis added).

value of firms' optimal output corresponds to the *employed* factors' value of income receipts. The output market's equilibrium is not disturbed by the presence of the labour market's disequilibrium.

It is evident that Patinkin's disequilibrium dynamics in the case of sticky wages, in principle, replicates Hicks' scenario and describes the same equilibrating process. We just argued how the demand curve for labour shows the optimal firms' output level for each possible real wage. As Patinkin discusses (Patinkin [1956] 1965, p. 327), therefore, at point D on Figure 3.3 the only corrective market force to move along the demand curve for labour is unemployed workers' downward pressure on money wages. Such downward pressure on money wages stops as no involuntary unemployment exists, i.e., when point E in Figure 3.3 is eventually achieved. As for Hicks, it is only a continued inflexibility of money wages that could permanently stick the economy in a state of "unemployment equilibrium" (Patinkin [1956] 1965, p. 328). However, point D could never be termed, as Keynes does, as an unemployment *equilibrium* because there exist market forces pressuring to move the system away from that position. No matter if those forces are weak and require long-lasting adjustment processes[11] (e.g., Patinkin's sticky money wages) or if they are prevented from working out their effect (e.g., Hicks' wage rate externally imposed), they do exist. Therefore, in both disequilibrium analyses nothing seemingly invalidates the fact that position E in Figure 3.3 remains, throughout the out-of-equilibrium adjustment, the persistent point of attraction of the economic system.

As we have shown in Chapter 1, the plausibility of Hicks' disequilibrium analysis directly depends on the correct working of two different, but related, marginalist market forces. Namely, the factor substitution mechanisms and vertical competition. Both represent the theoretical ground necessary and sufficient to make Hicks' argument in *The Theory of Wages* (Hicks [1932] 1963) plausible. We also saw how the plausibility of those two market mechanisms rests on the possibility of defining

[11] Evidently, the fact that those forces are weak and may require long-lasting adjustments is not a problem for Patinkin. However, we must remark that in such a case the equilibrium would plausibly lose its persistence. The persistence of the data determining the equilibrium is a plausible assumption only inasmuch the disequilibrium adjustments are assumed to be faster than the changes in these data. In other words, that the market forces are precisely *dominant* and strong enough to correct for disequilibrium deviations before any change occurs to the normal position itself (i.e., changes in the data). See Garegnani (1976).

the economy's capital endowment – a *datum* necessary to determine normal relative prices– as an "approximately constant" (Wicksell [1893] 1970, p. 103) given value-quantity whose physical composition is endogenously determined throughout the equilibrating process toward the normal position. As we discussed in Chapter 1, this specification of the capital endowment, in traditional long-period analyses, plays two crucial roles. The value-quantity of capital has a demand-side role to the extent that it justifies the marginalist working (direction) of the factorial substitution mechanism and the equally necessary degree of substitutability among factors of production. That is, it is necessary to have well-behaved –decreasing– and fairly elastic factor demand curves. Secondly, it has a supply-side role. Its value-specification among the data determining the equilibrium is necessary to maintain that actual –and unpredictable– disequilibrium adjustments do not alter the normal equilibrium itself (i.e, to support the persistence and the static stability of the normal position)[12]. The same cannot be said of disequilibrium transactions in a Neo-Walrasian setting, which is precisely the method underlying Patinkin's *Money, Interest, and Prices* (Patinkin [1956] 1965). As we argue in next sub-sections, the –seemingly– coincidence between Hicks' and Patinkin's disequilibrium dynamics fundamentally rests on Patinkin's assumption that the economy behaves as if there existed a single homogeneous good. This assumption avoids a methodological problem specific to Neo-Walrasian equilibrium analyses. Further we stress that, even if accepted Patinkin's restrictive assumption, there remains an underlying problem relative to the labour-capital substitution that Patinkin's disequilibrium adjustment requires to be theoretically plausible.

[12]As Petri remarks: "[t]he endowments of the several capital were *not* data of the equilibrium, what would have deprived the equilibrium of the persistence required to conceive it as the centre of gravitation of day-by-day magnitudes; it was the endowment of 'capital' (the single factor) which was taken as a datum." (Petri 2004, p. 31) (original emphasis).

3.3.2 Long-period adjustments

Since the very first page[13] of *Money, Interest, and Prices* (Patinkin [1956] 1965), Patinkin declares that he adopts a Neo-Walrasian framework to develop his analysis, both the Microeconomics (Part One) and the Macroeconomics (Part Two). Current historians of macroeconomics consider Patinkin's 1956 work as the first *explicit* attempt to model Keynes' involuntary unemployment within a Neo-Walrasian equilibrium setting (Backhouse and Boianovsky 2012; De Vroey 1999; De Vroey 2004; Rubin 2011). Some of them capture the underlying deficiency of Patinkin's disequilibrium dynamics presented in chapter XIII (the one we just presented above). However, the origins of Patinkin's methodological inconsistency are not fully explored. De Vroey (1999) acknowledges that the fundamental problem in Patinkin's treatment of involuntary unemployment in chapter XIII –i.e., the explanation of the dynamic adjustment that allows to achieve full employment– is that it does not respect the "congruency requirement that Walrasian existence analysis ought to be underpinned by the tâtonnement hypothesis" (De Vroey 1999, p. 334). Rubin states that Patinkin in his analysis of involuntary unemployment –i.e., precisely that part of the analysis that he requires to successfully integrate Keynes' theory and Neo-Walrasian equilibrium determination– reaches a "deadlock" (Rubin 2014, p. 8)[14]. Rivot (2016) defines Patinkin's "goal" as "heroic", an "Herculean task" (Rivot 2016, p. 1002)[15].

Nonetheless, we believe that there is still scope to discuss the far-reaching consequences of Patinkin's adoption of a Neo-Walrasian setting. Especially, there has been insufficient emphasis on the problem that Patinkin's specification of the economy's

[13]More precisely, already in the Preface (to the 1st Edition) we read: "The analytical apparatus developed by J. R. Hicks in his *Value and Capital* is obviously fundamental to Part One. There is a correspondingly obvious dependence of Part Two on the macroeconomic concepts and techniques of J. M. Keynes' *General Theory* and the later Keynesian literature. Crucial use has been made at various points in the book of the dynamic stability analysis developed by P. A. Samuelson in his *Foundations of Economic Analysis*." (Patinkin [1956] 1965, p. xix).

[14]A theoretical impasse that, according to Rubin, Clower's dual decision hypothesis (Clower 1965; Clower 1969) would have overcame (Rubin 2005; Rubin 2014). Plassard's interpretation of Clower's contribution also agrees with this view (Plassard 2018). As we argued in the second chapter, this is not correct and, again, is an inference that derives from an erroneous interpretation of traditional long-period authors' disequilibrium dynamics.

[15]Patinkin's *Money, Interest, and Prices* "was about nothing less than the modelling of Keynes' arguments, which remained almost completely verbal, in the standard Walrasian framework of his time" (Rivot 2016, p. 1002).

capital stock entails for the theoretical plausibility of the adjustment mechanisms he advances to support the tendency to full employment. Our discussion will make evident that Patinkin inevitably appeals to the traditional long-period mechanism of capital-labour substitution that, however, is no longer theoretically plausible within the methodological framework the author adopts.

Patinkin's labour demand, the D_L curve in Figure 3.3, is a function of the real wage $\frac{w}{p}$ and of what Patinkin terms as the "fixed capital equipment of the economy" (Patinkin [1956] 1965, p. 203), K_0. The decreasing slope is justified by the traditional diminishing marginal productivity of labour. The supply curve of labour depends positively on the real wage rate, $S_L(\frac{w}{p})$. Labour market equilibrium obtains as the two curves intersect (i.e., at point $E(N_0, \frac{w_0}{p_0})$ in Figure 3.3). Therefore, writes Patinkin:

> If the the real wage rate were above this equilibrium level, there would be an excess supply of labour and *money* wage rate would fall; if it were below, there would be an excess demand and *money* wages would rise. (Patinkin [1956] 1965, pp. 203–204) (emphases added)[16]

Then, Patinkin makes 'explicit' the dependence between the labour market and the output market. Output is a function of labour, N, and capital K_0: $Y = F(N, K_0)$. Since the optimal demand for labour, as we just saw, in turn depends on the the real wage and fixed capital equipment, output can be determined as:

$$Y = F[(D_L(\frac{w}{p}, K_0), K_0] \tag{3.1}$$

This is identically equal to the firms' profit-maximising output supply for any given level of real wage –K_0, we saw, is fixed[17]:

$$F[(D_L(\frac{w}{p}, K_0), K_0] \equiv S(\frac{w}{p}, K_0) \tag{3.2}$$

This explain why, both in Hicks' and Patinkin's disequilibrium analysis, the labour

[16]Note how this confirms that if firms are on the aggregate demand for labour, there is no pressure on the price level because firms produce exactly the optimal output that finds purchasers at the current real wage rate. There exists, therefore, only a downward pressure on money wages due to the presence of involuntarily unemployed workers.

[17]See Patinkin ([1956] 1965, p. 210).

market disequilibrium does not disturb the output market equilibrium. In Patinkin's sticky wage case, at point D on the labour demand curve there is an excess supply of labour to the extent that $D_L < S_L$. However, the output market is in equilibrium. Firms optimally produce $Y_2 = [D_L(\frac{w_0}{p_1}, K_0), K_0]$. Total incomes exhaust the value of total output although they are not full-employment incomes.

However, we saw in Chapter 1 that Hicks' disequilibrium dynamics ultimately rests on the specification of capital as a single factor in variable form. This specification is necessary to warrant that the equilibrium position is persistent (supply-side role of capital) and stable (demand-side role of capital). Therefore, we must check whether Patinkin's treatment of capital can also be associated with the determination of a persistent and stable equilibrium.

Patinkin specifies K_0 as the "fixed capital equipment" of the economy. Throughout the equilibrating process that Patinkin discusses, this K_0 stays unaltered. This specification of capital reflects the methodological necessity specific to the Neo-Walrasian approach of inserting the physical composition of the capital endowment among the *data* determining the equilibrium position. As we proceed to show, this deprives Patinkin's equilibrating process of its theoretical plausibility.

Traditional authors consider the case of fixed capital composition as a short-period situation. In such a case, they admit the implausibility of asserting that the dominant market forces could set in motion the adjustments required to achieve the economy's long-period normal position. More specifically, capital-labour substitution has limited scope when the physical composition of capital is fixed. Given the durability of capital goods, a change in real wages does not imply that firms will immediately–or quickly– react by adjusting their demand for labour. As Hicks remarks this in *The Theory of Wages*[18], there is a "lag" in firms' adjustment to the new optimal capital-labour ratio:

> The principal reason for this 'lag' is to be found in the fact that one of the cooperating factors –capital– is, at any particular moment, largely incorporated in goods of a certain degree of durability [...] if the capital is

[18]Hicks remarks this issue also in *Value and Capital* when he remarks the "specific character of the initial equipment" and the short-period "technical rigidities" (Hicks 1939, p. 211) . This book, supposedly, inspires and provides the theoretical bases of Patinkin's *Money, Interest, and Prices*. Cf. fn. 12 above. See also Petri (1991).

> at present invested in durable goods, the change in conduct which follows from the change in relative profitability cannot immediately be realised. At the moment, only a small portion of the total supply of capital is 'free' –available for investment in new forms– and although this portion will be reinvested in ways more appropriate to the new situation, that in itself may make very little difference to the demand for labour [...] In the short period, therefore, it is reasonable to expect that *the demand for labour will be very inelastic*, since the possibility of adjusting the organization of industry to a changed level of wages is relatively small. (Hicks [1932] 1963, pp. 19–21) (emphasis added)

Thus, as long as firms do not adjust the *form* of the capital stock, the demand for labour must be conceived as a rigid –inelastic– curve. The short-period demand curve for labour should be represented, therefore, as in Figure 3.6 (cf. Petri 1989, pp. 278–279).

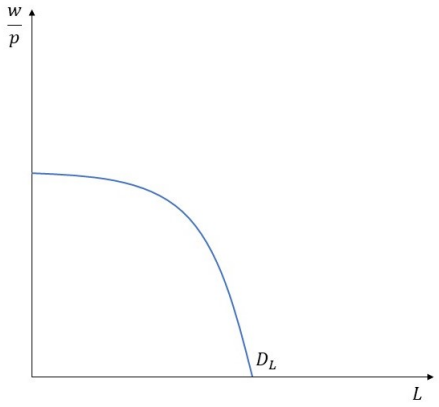

Figure 3.6: The short-period demand curve for labour

Initially, the marginal productivity of labour can be constant –if not increasing– since firms are still far from reaching full capacity utilisation. However, as soon their capital goods are fully utilised, the marginal productivity of labour rapidly falls to zero[19]. Firms cannot adapt the physical composition of their capital stock

[19]Intuitively, suppose a firm with a capital stock of ten computers. The firm currently employs ten workers, each of them assigned to one computer. The firm cannot find profitable to employ an

and, therefore, the marginal product of an additional worker is –or approximately is– zero[20].

In the disequilibrium dynamics that Patinkin introduces to discuss involuntary unemployment, he neglects that considering a fixed composition of the capital stock leaves limited theoretical scope to the capital-labour substitution. The demand curve for labour depicted in Figure 3.2 is an *elastic* demand curve (cf. Patinkin [1956] 1965, p. 316). Such elasticity, in traditional analyses, can be sustained behind the crucial premise that firms are given sufficient time to re-adapt the physical composition of their capital stock. And this change in the form of capital can be justified, in turn, by the traditional specification of capital as total value-quantity. Conversely, Patinkin argues that the equilibrating process from point D to point E (see Figure 3.5) –as much as any other adjustment to the equilibrium– can be undertaken with no physical changes in K_0[21]. Therefore, this implies that a change in the real wage induces firms to modify their capital-labour ratio from $\frac{K_0}{N_2}$ to $\frac{K_0}{N_0}$ with no change whatsoever in the form of capital. A proposition that traditional authors themselves would find hardly defensible[22]. For Patinkin illegitimately over-imposes long-period mechanisms of adjustment to a set of data that can only admit short-period considerations[23].

additional workers unless it can adjust the the form of its capital stock. For example, to adjust the form of its value-quantity of capital from ten computers to eleven. Otherwise, as it is likely in the short-period, the additional worker could add almost nothing to the firm's production of the final good or service.

[20]This analysis explains why traditional authors deal with elastic –long-period– factor demand curves. Only so an explanation of distribution in terms of demand and supply forces would allow to achieve plausible equilibrium outcomes. If the demand for labour was rigid, for example, the supply-and-demand equilibrium could imply a zero, or close-to-zero, equilibrium wage rate. A result that would clearly undermine traditional authors' claim that the marginalist market forces move the economy toward an optimal allocation of resources and distribution. See also Petri (2021).

[21]As we saw, Patinkin defines the labour demand function as $D_L(\frac{w}{p}, K_0)$ (Patinkin [1956] 1965, p. 203). Conversely, as we saw in Chapter 1, traditional authors derive the demand for labour contingently on the assumption that the total value-quantity of capital, K, is fully-employed but variable in its form. Namely, $D_L(\frac{w}{p}, K)$.

[22]Even less defensible as one considers Patinkin's case of sticky money wages. The equilibrating adjustment becomes a "long, drawn-out" (Patinkin [1956] 1965, p. 318) process. There seems to be no theoretical justification –and Patinkin does not advance one– to the idea that this prolongation of the adjustment process has no repercussions on firms' physical composition of capital.

[23]Patinkin's disequilibrium dynamics indeed confirms the argument we find in Dvoskin and Petri (2017). The authors stress that, in post-Keynes Neo-Walrasian authors and modern macroeconomic practice, "the continuing belief" (Dvoskin and Petri 2017, p. 628) in long-period traditional adjustments, although *implicitly*, is –and must be– still there. Those traditional adjustments inescapably

3.3.3 The persistence and stability of Patinkin's tâtonnement equilibrium

The previous problem highlights the importance of specifying the capital endowment as a single value-quantity of variable composition in traditional authors. This specification gives plausibility to the long-period adjustments they advance. We have discussed that Patinkin seems to overlook this problem.

Now we evidence some further possible problems underlying Patinkin's analysis in light of the results of '60s capital controversies and the later development of capital theory. Specifically, we stress how Patinkin's 'simplifying' assumptions allow his model's equilibrium position to be persistent and stable, thereby allowing the author to discuss the disequilibrium dynamics whose outcomes *prima facie* coincide the ones of traditional analyses (e.g., with Hicks' disequilibrium analysis)[24].

Patinkin considers two categories of commodities: consumption and investment goods (Patinkin [1956] 1965, p. 205). Therefore, he works under the assumption that there is a single homogeneous consumption good and a single capital good. The presence of two categories of goods does not necessarily undermine the persistence of the equilibrium position. As we know, the condition of a uniform rate of return on the supply price of capital goods (URRSP) is how the equilibrium's persistence manifests itself. In Patinkin's model, this condition manifests itself trivially. In other words, the capital composition cannot change with disequilibrium transactions since, by assumption, there is a single capital good.

The proceeding assumption still allows that, in disequilibrium, firms may desire to employ capital in different proportions without changes in its form. However, it may still happen that the forces that should push the economy towards the equilibrium do not work in the *right* direction. To see this, let us consider Garegnani's case of

depend on the specification of capital as a total value-quantity with variable form. Patinkin's disequilibrium dynamics, in fact, would be illegitimate "without reference to a 'well-behaved' substitution between capital and labour" (Dvoskin and Petri 2017, p. 633). See also Dvoskin and Lazzarini (2013, p. 18), where the authors remark how also Patinkin's traditional role of –endogenous– expectations reveals the author's implicit belief in the existence of a well-behaved interest-elastic marginal productivity schedule of capital.

[24]Certainly, provided that we ignore the –fundamental– problems explored in the previous subsection.

integrated industry. The industry produces one consumption good through labour assisted with a circulating capital good. The latter also needs labour and itself for its production. Given that the URRSP holds, we can consider the rental price as $R = p_k(1 + r)$, where p_k is the supply price of the capital good and r is the uniform rate of return. Now suppose the consumption good is less capital-intensive than the capital good. Taking the consumption good as the *numéraire*, a change in income distribution –e.g., a fall in the interest rate– increases the relative price of the capital good (Garegnani 1970). Thus, there are at play two simultaneous opposite effects. On the one hand, a fall in the interest rate reduces the rental R. On the other hand, however, the relative price of capital p_k rises. This latter effect is known as the Wicksell price-effect (Burmeister 1990; Garegnani 1984; Lazzarini 2011). This price-effect may be strong enough to offset the former. Namely, the total effect may amount to an increase in the rental of the capital good. Therefore, as the capital good becomes dearer relative to labour, firms demand less capital and more labour, i.e., the savings investment market is unstable. Note also that the fall in the interest rate implies an increase in real wage (i.e., the rental of labour). Hence, in such a case, both factors' demand curves would be upward sloping.

This potential problem does not emerge in Patinkin's analysis because the author makes the following assumption:

> The prices of [consumer commodities and investment commodities] are assumed to change in the same proportion. (Patinkin [1956] 1965, p. 205)

This passage tells us that the relative price of consumption goods in terms of the capital goods does not change as the income distribution changes (i.e., if there is a change in the real wage or the interest rate). In terms of the previous discussion, the condition implies that both kinds of goods employ the same capital-labour ratio in their production. Thus, the assumption is equivalent to consider an economy that behaves as if there was a single homogeneous good. The possible disturbing Wicksell price-effect disappears and the factor substitution mechanisms work in the *right direction*. Factor demand curves are downward sloping ('well-behaved') and can ensure the equilibrium position's stability.

We cannot know whether Patinkin makes such an assumption for simplification

purposes or because, although not explicitly, he recognises that, without it, the stability of his Neo-Walrasian equilibrium position would be at risk. Patinkin claims that his *real* disequilibrium dynamics of involuntary unemployment is compatible with the full-employment equilibrium position reached through tâtonnement. This claim would be valid if the equilibrium position was insensitive relative to the adjustment process. We saw that this is warranted, provided that the equilibrium is stable and persistent. However, in Patinkin, persistence –i.e., the determination of an equilibrium position where the URRSP holds– rests on the assumption that there is a single capital good. Stability, on the other hand, requires the *additional assumption* that this single capital good is homogeneous relative to the consumption good, i.e. the economy behaves as if there was only one type of good. Patinkin's conclusions, therefore, lack generalisability. The outcomes of his disequilibrium dynamics are instead the fortunate result of these 'simplifying' assumptions. Furthermore, as the previous sub-section has shown, there still remains the crucial problem of justifying the factor demands' elasticity that Patinkin's discussion of involuntary unemployment requires.

3.4 Real-Balance effects

The discussion of involuntary unemployment plays a central role in Patinkin's book. It is the part supposed to incorporate Keynes' theory back into the marginalist framework. The last section led us to acknowledge the methodological incompatibility between the disequilibrium dynamics of involuntary unemployment and the tâtonnement equilibrium determination. Compatibility that, in Patinkin, is seemingly preserved by the assumption that the economy behaves as if there was a single homogeneous good. In this section we closely investigate the real-balance effect, which Patinkin describes as the missing-piece in Keynes' discussion of involuntary unemployment (Patinkin [1956] 1965, p. 325).

3.4.1 Real-balance effect: the direct and indirect influence on aggregate demand

We just saw that Patinkin assumes an aggregate demand composed of consumption and investment goods that, by assumption (Patinkin [1956] 1965, p. 205), is equivalent to an aggregate demand for a single homogeneous good. A decrease in this aggregate demand is responsible for displacing the economy from full employment (Patinkin [1956] 1965, p. 316). Similarly, it is the real-balance effect the responsible for increasing up again aggregate demand once the deflationary pressures induce firms to expand their employment and level of output. On the one hand, a decrease in the price level increases consumers' real balances. For unchanged money supply and propensity to consume, the demand for consumption goods is higher the lower is the price level (direct real-balance effect). On the other hand, the same deflationary pressure also increases the demand for bonds and, eventually, drive the interest rate down. The fall in interest, in turn, stimulates the demand for investment goods given the traditional marginal-efficiency-of-capital schedule. (Patinkin [1956] 1965, p. 318).

These two real-balance effects allow Patinkin to declare that the deflationary pressure that, at unchanged money wages, drives the economy from K to position D in Figure 3.3 brings about an expansion of the level of output that is *sustainable*. Namely, that the change in the value of total output is precisely met by an equivalent change in the value of aggregate demand.

According to Patinkin, it is at points like K that the problem of Keynes' involuntary unemployment occurs. Namely, at points *off* the demand and supply curve for labour, where firms adapt current output to current aggregate demand –i.e., they reduce output from Y_0 to Y_1[25]:

> [O]ur first task in studying involuntary unemployment is to free ourselves of the mental habits –long ingrained by the method of static analysis– of seeing only the points *on* the demand or supply curve. Once we do this, we

[25] As Patinkin writes: "In the absence of sufficient interest and price-elasticity, the adjustment process becomes a long, drawn-out one. It cannot then realistically be assumed that firms will continue producing at unchanged price level, for this would require them to accumulate inventories ever increasing level. Hence they must eventually take some step to bring current output –and consequently current input– into line with current sales. *And this is the beginning of involuntary unemployment.*" (Patinkin [1956] 1965, p. 318) (emphasis added).

> find ourselves able to give precise expression to many intuitive, common-sense ideas which have all too frequently been unjustifiably rejected as violating the precepts of rigorous economic analysis. (Patinkin [1956] 1965, p. 323) (original emphasis)[26]

Thus, we find here Patinkin blaming traditional authors for ignoring points off the curves (in his case, labour demand and supply curves). Let us go back to a discussion we introduced in Chapter 1 and check whether Patinkin's statement is justified. We argued there that positions like point K are theoretically uninteresting for traditional equilibrium analysis to the extent that they are not persistent ones. Although they may represent a state that the economy may accidentally find itself in, they are not the normal state towards which the economy gravitates. Since the traditional factor demand curve assumes the other factors as fully-employed, Patinkin's point K in his one-good 'capital'-labour economy corresponds to a position where both labour and capital are not fully-utilised. From their standpoint, firms are not maximising profits. At unchanged money wage and price level, the decrease in aggregate demand does not afford them to produce the optimal level of output they produced before. How would traditional authors argue that the economy would be able to go back to full employment, i.e., to solve the temporary under-utilisation of both factors of production? In Wicksell we can find a possible explanation based on monetary factors[27].

Wicksell, unanimously with traditional marginalist authors, accepts the "Quantity Theory" of money which "assumes that everybody maintains, or at least strives to maintain, his balance at an average level that is constant (relatively to the extent of his business or of his payment)" (Wicksell 1936, p. 41)[28]. Point K can therefore be

[26]Note how Clower accepts Patinkin's proposition. In Clower (1960) we read: "The fruits of the Keynesian Revolution have been, and are being, gathered primarily by a new generation of economists, a generation that has finally accustomed itself to thinking in terms of points and planes instead of curves and crosses." (Clower 1960, p. 323). This corroborates Clower's negative judgement of traditional authors' explanation of the tendency toward full employment (see Chapter 2).

[27]The case of simultaneous unemployment of labour and land is explored in Chapter 1. Now we are interested in Wicksell's monetary analysis (Wicksell 1936) and in showing its similarity with Patinkin's real-balance effect.

[28]Traditional authors' *demand* for money must indeed be considered as the normal amount of money that individuals require to effectively be able to pursue that transactions that the normal relative price level suggests. See Petri (2004).

thought as a state where both firms and workers (some of them are unemployed with zero cash balances) are not satisfied with their cash balances and try to enlarge them. As Wicksell notes:

> This can only be done [...] through a *reduction* in my *demand* for goods and services, or through an *increase* in the *supply* of my own commodity (forthcoming either earlier or at a lower price than would otherwise have been the case), or through both together. The same is true for all owners and consumers of commodities. But in fact nobody will succeed in realising the object at which is aiming –to increase his cash balance; for the sum of individual cash balances is limited by the amount of the available stock of money, or rather is identical with it. On the other hand, the universal reduction in demand and increase in supply of commodities *will necessarily bring about a continuous fall in price*. This can only cease when prices have fallen to the level at which the cash balances are regarded as *adequate*. (Wicksell 1936, p. 40) (third emphasis added)

Therefore, given the supply of money available in the economy[29], Wicksell tells us that through price deflation it is possible to take the economy back to its state of *normal* activity. The decrease in the price level re-adjusts individuals' desire for cash balances and thereby stimulates again both consumption, firms' production and, consequentially, firms' demand for inputs. In fact, the deflationary pressure affects the price level as well the money wage and interest rate. Workers are involuntary unemployed and, according to the traditional vertical competition assumption, they bid down money wages. The same holds for capital's owners. *Without* the adjustment in individuals' desire for cash-balances, the deflationary pressure would simply entail

[29]In this passage, Wicksell unambiguously conducts the analysis in terms of a fixed money supply (Wicksell 1936, p. 39). However, later in his book and elsewhere (Wicksell 1935 [1901]), Wicksell considers the case of a pure credit economy. In this case, the money supply adapts to the overall value of transactions (cf. also Keynes 1936, p. 266). Therefore, the real-balance effect could play no role since a deflation would imply that agents require less money to conduct their transactions, leading to a reduction in the money supply. Price deflation and inflation emerge due to differences in the market interest rate and the natural interest rate (cf. Garegnani 1983, pp. 42–47, for a description of Wicksell's monetary theory). The latter alternative explanation of economic fluctuations may explain why Wicksell does not give too much importance to the real-balance effect –that the reported quote describes– as instead Patinkin does.

a continuous fall in all these variables with no effects on the level of output and employment[30].

Patinkin's claim that traditional authors ignore points off curves appears, therefore, unjustified. As we discussed in Chapter 1, their neglect of disequilibrium states can be explained by their presupposition that the economy's normal position is both stable and persistent. Disequilibrium states are, conversely, unpredictable (i.e., impossible to be theorised) and, at the same time, irrelevant to the extent that they do not affect nor change the equilibrium position itself. Further, by applying Wicksell's analysis to Patinkin's point *off-the-curve* (point K) we find that an explanation of the tendency towards points *on* the curve follows the same principle of Patinkin's real-balance effect[31]. Therefore, it seems quite questionable to consider, as Patinkin does, those points off the curves as the origin of involuntary unemployment.

3.4.2 Changes in money wages

From the preceding discussion it becomes clear that it is at positions such as point D in Figure 3.3 that the origin of Keynes' involuntary unemployment should be investigated. Precisely, Keynes' proposition that a reduction in money wages alone does not suffice to achieve, or restore, full employment. Patinkin refers (Patinkin [1956] 1965, p. 325) to Keynes' chapter 19 of the *General Theory* (Keynes 1936) when he blames Keynes for ignoring the influence of the real-balance effect on aggregate demand. That is, to the chapter in which Keynes abandons the assumption of fixed

[30]Traditional authors exclude the possibility of a prolonged fall in all prices, and hence of close-to-zero money wages. Marginalist market forces would allow the economy to achieve, or at least to gravitate toward, the equilibrium soon before that. The present interpretation finds support in Ackley (Ackley 1978, pp. 108–110), who states that the Quantity Theory provides traditional authors a "lower limit to the fall of [the price level]" (Ackley 1978, p. 110).

[31]Patinkin himself recognises Wicksell's analysis as a forerunner of his real-balance effect. Wicksell is enlisted, together with Fisher, among the authors that provided a "vivid" and "systematic picture of the real-balance effect" (Patinkin [1956] 1965, p. 604). However, Patinkin confirms his misconception of the traditional method of long-period position. He considers the "striking passage" of Wicksell–the one we just quoted– as "a description, unique in the literature, of the tâtonnement by which the absolute price level is determined" (Patinkin [1956] 1965, p. 581) and that "despite the vividness with which the real-balance effect is here described", Wicksell "might not have appreciated his full significance" (Patinkin [1956] 1965, p. 582). Surely, the deflationary process described by Wicksell to adjust individuals' cash-balances is not a tâtonnement adjustment. Cf. previous footnotes.

money wages to illustrate how this assumption is not necessary for the validity of his own theory.

As we saw in Chapter 1, Hicks' analysis of labour market disequilibrium also considers a state where the wage rate is higher than the one associated with labour's full employment while all other markets' equilibrium is maintained (i.e., the output market and the capital market) (Hicks [1932] 1963). We saw that Hicks claims that a money wage reduction is effective and sufficient to decrease the real wage rate and hence expand employment and output. Further, that this claim is justifiable since the capital market's equilibrium, i.e., savings-investment market, is maintained throughout the adjustment. This is a requirement for two main reasons. First, the maintenance of capital's full employment is necessary to remain on the labour demand curve. Secondly, it allows Hicks to state that an expansion of output yields an equivalent increase in aggregate demand. In the adjustment *along* the labour demand curve from D to E (Figure 3.3), new incomes are created. The investment must therefore adjust to the increased level of savings through variations in the interest rate. If not, aggregate demand would not absorb the entire augmented output, thereby making the latter unsustainable.

Then, we saw how Keynes's critique attempts to invalidate traditional authors' investment's self-correcting adjustment the level of savings. Investment becomes an autonomous component of aggregate demand to the extent that the interest rate is no longer the equilibrating variable in the savings-investment market. Granted that, Keynes describes the two alternative necessary conditions for a fall in money wages to have a "lasting tendency to increase employment" (Keynes 1936, p. 262):

> If the community's marginal propensity to consume is equal to unity, so that there is no gap between the increment of income and the increment of consumption; *or* if there is an increase in investment, corresponding to the gap between the increment of income and the increment of consumption, which will only occur if the schedule of marginal efficiencies of capital has increased relatively to the rate of interest. (Keynes 1936, p. 261) (emphasis added)

Thus, either all incomes go to consumption –a plausible assumption in a land-labour

economy where no capital as such enter into the production process[32]– or the fall in money wage has some expansionary effect on investment. The point is that an increase in investment must, somehow, fill the discrepancy between the value of total output and the quantity of it consumed. Otherwise, aggregate demand would be deficient and thereby invalidate firms' market incentive to expand output as grounding the spontaneous market self-correction towards full employment.

Patinkin's real-balance effect precisely aims to remedy the problem of insufficient effective demand introduced by Keynes and to re-assert the marginalist proposition that a downward flexibility of money wages creates the conditions for achieving full employment. Unlike Hicks (Hicks [1932] 1963), Patinkin does not take for granted the automatic working of marginalist theory of loanable funds[33] (see Section 2.1). Consequently, he introduces the real-balance effects to show how it can stimulate both consumption and investment.

In Keynes, a fall in money wages does not necessarily imply a fall in real wages and, indeed, he claims that money wages generally do not –and should not– decrease[34]. Cuts in money wages might merely lead to a fall in prices (Keynes 1936, p. 262). Patinkin accepts this possibility and, rather, states that this is precisely what happens when money wages fall. We saw that in case of viscous money wages, once firms reach points as D on the labour demand curve (Figure 3.5), the disequilibrium adjustment consists of a sequential[35] repetition of reductions on money wages and falls in prices. The deflation is crucial, according to Patinkin, to stimulate aggregate demand. As we saw, a fall in prices *directly* stimulates consumption because it increases individuals' *real* wealth. Then, it also *indirectly* stimulates investment. Patinkin admits that

[32]We saw in Chapter 2 how Clower's dual decision hypothesis (Clower 1965) neglects this point.

[33]Before Keynes' *General Theory* the tendency toward full employment and the marginalist theory of investment are never seriously questioned. As we saw in Chapter 1, this might explain why traditional authors do not explicitly work out the disequilibrium dynamics we find in Patinkin. Further, why Patinkin, post-Keynes, cannot ignore the *General Theory* and his attempt to incorporate it consistently within the marginalist framework.

[34]As Garegnani writes: "[...] the hypothesis of money wage rigidity would appear to be a *consequence*, and not the premise of the thesis that there exists no tendency to the full employment of factors" (Garegnani 1983, pp. 50–51) (emphasis added).

[35]Conversely, if money wages and prices changes simultaneously and proportionally, the disequilibrium adjustment would take the economy directly from point K to full employment E (Figure 3.3). For the rest, the real-balance effect is assumed to work just the same.

the initial decrease in consumption demand which displaced the economy from its full-employment state to point K (Figure 3.3) does not necessarily and immediately imply an increase in bonds demand, which, according to the theory of loanable funds, would push the interest rate down thereby stimulating "an off-setting increase in investment" (Patinkin [1956] 1965, p. 318). Rather, the author states that "the decline in interest *must await* the impact on the bond market of the positive real-balance effects generated by the downward pressure on prices of the initial deflationary gap." (Patinkin [1956] 1965, p. 318) (emphasis added). Thus, the fall in prices stimulates not only consumption but also the demand for bonds. The interest rate adjustment in the bond market increases investment according to the traditional marginal-efficiency-of-capital function (Patinkin [1956] 1965, p. 205)[36].

3.4.3 Redistributive effects

The real-balance effect's effectiveness usually rests on the belief that changes in the price level do not have strong redistributive effects. This point is already made by Kalecki (1944) in his critique of Pigou (1943). As Kalecki remarks:

> The increase in the real value of the stock of money does not mean a rise in the total real value of possessions if all the money (cash and deposits) is 'backed' by credits to persons and firms, i.e. if all the assets of the banking system consist of such credits. For in this case, to the gain of money holders there corresponds an equal loss of the bank debtors. (Kalecki 1944, p. 132)

Thus, depending on which sector is the creditor/debtor in the economy, deflationary pressures may not stimulate consumption or investment demand. On the one hand, if households are net borrowers, a reduction in the price level decreases the demand for commodities due to the increased real value of their outstanding debt. On the other hand, if firms are net borrowers, the deflationary pressure may offset the stimulus to invest given by reducing the interest rate.

[36]The indirect real-balance effect further confirms that traditional authors' specification of capital, although it re-enters silently from the backdoor, is still relevant and necessary to give plausibility to Patinkin's disequilibrium analysis. Cf. Dvoskin and Lazzarini (2013) and Dvoskin and Petri (2017).

The total real wealth, continues Kalecki, increases "only to the extent to which money is backed by gold". If the gold stock represents a small proportion of national wealth, concludes Kalecki, "it will take an enormous fall in wage rates and prices to reach" the full-employment equilibrium (Kalecki 1944, p. 132).

According to Patinkin, the relevant definition is 'outside-money', i.e., the monetary base, as distinct from 'inside money', which are deposits created by the banking system's lending operations. Patinkin considers outside money as given. It is the "debt of a unit (the government) exogenous to the economic system itself" (Patinkin [1956] 1965, p. 295). Moreover, the author bases the discussion on involuntary unemployment in a system with pure outside-money (Patinkin [1956] 1965, p. 317). With these assumptions, money represents a large proportion of national wealth. Thus, one could avoid drastic falls in prices for the real-balance effect to take the economy back to full-employment equilibrium.

These assumptions seem far too restrictive. Admittedly, Patinkin claims that the analysis can be promptly extendable to an "economy with both outside and inside money, as well as interest-bearing government debt" (Patinkin [1956] 1965, p. 317). In this case, since the proportion of outside money to total national wealth reduces, the real-balance effect's effectiveness plausibly diminishes (Petri 2004, p. 291). Nevertheless, even assuming that this case does not severely hamper its effectiveness, the real-balance effect may not be strong enough to offset some possible disturbing consequences of deflation.

As Keynes remarks, "if the fall of wages and prices goes far, the embarrassment of those entrepreneurs who are heavily indebted may soon reach the point of insolvency –with sever effects on investment" (Keynes 1936, p. 264). Hence, the economy may find itself in a critical scenario where a wave of bankruptcies leads to output contraction and further increasing unemployment. Moreover, as one considers the government's expenditure among aggregate demand components, deflation worsens the real outstanding national debt. This situation may lead to lower public spending or higher taxation that prove adverse to the stimulus of aggregate demand. Keynes also recognises this detrimental effect as he claims that: "the effect of the lower price-level on the real burden of the National Debt and hence on taxation is likely to prove very adverse to business confidence" (Keynes 1936, p. 264).

Patinkin seems to acknowledge this problem and terms it the "real-indebtedness effect" (Patinkin [1956] 1965, p. 71). Throughout his book, and especially in the chapter on involuntary unemployment, he conveniently avoids these potential problems by making the following ad-hoc but highly-questionable assumption:

> Only if the terms of past indebtedness are adjusted to the new level of prices –or, what is equivalent, only if initial bond holdings are changed at the same time and in the same proportion as prices and initial money holdings– will this real-indebtedness effect disappear. (Patinkin [1956] 1965, pp. 71–72)

Therefore, the outcome of Patinkin's disequilibrium dynamics turns out to be truly sensitive to the assumption of neglecting redistributive effects. Once we recognise these effects' relevance, a deflation may set in motion disequilibrium adjustments that do not tend to the full-employment equilibrium.

3.5 Conclusive remarks

We divided our discussion of Patinkin's disequilibrium analysis of involuntary unemployment into three main stages. First, we showed that there are strong *prima facie* similarities between Patinkin's and Hicks' disequilibrium dynamics. The central understandable difference is that Patinkin attempts to incorporate Keynes' critique and to prove how the latter does not undermine the tendency to a full-employment equilibrium. The argument relies on the introduction of the real-balance effect.

Secondly, we discussed whether the disequilibrium dynamics can be considered compatible with Patinkin's Neo-Walrasian setting. First, we have shown how Patinkin over-imposes traditional long-period adjustments to a situation where the composition of the capital stock is given. In traditional analyses, the assumption that the physical composition of the capital stock is fixed would only be legitimate for short-period analysis. The reason is that such assumption would leave limited scope to the labour-capital substitution that the theory requires for the adjustment to the long-period equilibrium position. As Hicks, among the others, explicitly admits, the demand curve for labour would be strongly inelastic in this case. Patinkin seems

to neglect this issue. Secondly, we underlined further potential problems relative to Patinkin's disequilibrium dynamics. We stressed that Patinkin seemingly preserves the compatibility between his disequilibrium dynamics and his Neo-Walrasian determination of the equilibrium relative prices thanks to the assumption that economy behaves as if there existed a single homogeneous good. Such assumption permits Patinkin to preserve the persistence and stability of the equilibrium position and, thereby, the tendency to full employment. Patinkin's disequilibrium dynamics appears to lack generalisability and it is only seemingly insensitive to the well-known problems of the Neo-Walrasian method.

Finally, we closely investigated the conditions for the correct working of the real-balance effect. We mentioned Kalecki's critique to Pigou that redistributive effects may hinder the real-balance effect's effectiveness. For Kalecki, the mechanism may work properly only if gold backs most of the money supply. Patinkin replaces gold with the idea of 'outside-money', which stands for the monetary base. Then, in his analysis of involuntary unemployment, Patinkin considers a "pure outside-money" economy. Such an assumption would make fully-functional the real-balance effect. Nevertheless, the author also claims that the analysis is extendable to an economy with inside money and interest-bearing government debt. In this case, based on Keynes' insights, we argued that deflation might have disturbing effects that push the economy further away from equilibrium. Patinkin intentionally assumes away these 'real-indebtedness effects' throughout his analysis, possibly because their acknowledgement would render his disequilibrium dynamics indeterminate.

Patinkin's *Money, Interest, and Prices* plays a crucial role in the so-called *Neoclassical Synthesis*. It is considered even by more recent literature as the "landmark of the neoclassical synthesis" (Rubin 2011, p. 16) but, especially, as the first attempt to discuss Keynes' involuntary unemployment within a Neo-Walrasian equilibrium setting (Boianovsky 2002) and, also, to unify "Walrasian general equilibrium theory and macroeconomics"(De Vroey 2014, p. 11). Our discussion does not support a successful accomplishment in either of these two attempts. We saw how Patinkin's integration of Keynes' involuntary unemployment through the introduction of the real-balance effects is incompatible with the Neo-Walrasian framework and that Patinkin avoids such a problem through *ad hoc* assumptions relative to the economy's capital endowment

and the absence of redistributive effects. Further, how besides these assumptions, Patinkin's reliance on elastic factor demands curve is illegitimate. Thus, as we acknowledge these problems, Patinkin's disequilibrium analysis cannot provide a solid theoretical foundation –alternative to the standard 'instantaneous' adjustment with no trade at non-equilibrium prices– to the economy's tendency towards full employment. Either one still assumes the validity of traditional adjustment mechanisms or one must conclude that full employment is tautological in a Neo-Walrasian equilibrium setting. However, both options lead to an impasse. The results of the capital controversy invalidate the former and the latter, without the former, reduces full employment to an assumption.

Bibliography

Ackley, G. (1978). *Macroeconomics: Theory and Policy*. Macmillan Publishing Co.

Backhouse, R. E., & Boianovsky, M. (2012). *Transforming Modern Macroeconomics: Exploring Disequilibrium Microfoundations, 1956–2003*. Cambridge University Press.

Barro, R. J., & Grossman, H. I. (1971). A general disequilibrium model of income and employment. *The American Economic Review*, *61*(1), 82–93.

Benassy, J.-P. (1984). A non-Walrasian model of the business cycle [A special Issue on The Dynamics of Market Economies in commemoration of the birth of Joseph A. Schumpeter in 1883]. *Journal of Economic Behavior & Organization*, *5*(1), 77–89.

Boianovsky, M. (2002). Patinkin, the Cowles Commission, and the theory of unemployment and aggregate supply. *European Journal of the History of Economic Thought*, *9*(2), 226–259.

Brechling, F. P. R., & Hahn, F. H. (Eds.). (1965). *The theory of interest rates. Proceedings of a Conference held by the International Economic Association*. Macmillan.

Burmeister, E. (1990). Wicksell effects. In J. Eatwell, M. Milgate, & P. Newman (Eds.), *The new palgrave: Capital theory* (pp. 257–261).

Carlin, W., & Soskice, D. (1990). *Macroeconomics and the Wage Bargain. A Modern Approach to Employment, Inflation and the Exchange Rate*. Oxford University Press.

Clark, J. B. (1908). *The Distribution of Wealth. A Theory of Wages, Interest and Profits*. Macmillan.

Clower, R. W. (1960). Keynes and the Classics: A Dynamical Perspective. *The Quarterly Journal of Economics*, *74*(2), 318–323.

Clower, R. W. (1965). The Keynesian Counterrevolution. In F. Hahn & F. Brechling (Eds.), *The theory of interest rates* (pp. 103–125). Macmillan.

Clower, R. W. (1969). The Keynesian Counterrevolution. In R. W. Clower (Ed.), *Selected readings in monetary theory* (pp. 202–211). Penguin.

Clower, R. W. (1975). Reflections on the Keynesian Perplex. *Zeitschrift f. Nationalökonomie*, *35*, 1–24.

Clower, R. W., & Leijonhufvud, A. (1973). Say's Principle: What it means and doesn't mean. In J. Cunningham Wood & S. Kates (Eds.), *Jean-Baptiste Say: Critical Assessments of Leading Economists*. Routledge.

Coddington, A. (1976). Keynesian Economics: The Search for First Principles. *Journal of Economic Literature*, *14*(4), 1258–1273.

De Vroey, M. (1999). Keynes and the Marshall-Walras Divide. *Journal of the History of Economic Thought*, *21*(2), 117–136.

De Vroey, M. (2004). *Involuntary Unemployment*. Routledge.

De Vroey, M. (2014). Backhouse and Boianovsky on "disequilibrium theory". A review article of Transforming modern macroeconomics: Exploring disequilibrium microfoundations, 1956–2003. *The European Journal of the History of Economic Thought*, *21*(4), 724–742.

Drèze, J. H. (1975). Existence of an exchange equilibrium under price rigidities. *International Economic Review*, 301–320.

Dvoskin, A. (2016). An unpleasant dilemma for contemporary general equilibrium theory. *The European Journal of the History of Economic Thought*, *23*(2), 198–225.

Dvoskin, A., & Lazzarini, A. (2013). On Oskar Lange's Theoretical Positions on Equilibrium and Capital in Some 1930s and 1940s Writings. *History of Economics Review*, *58*(1), 1–26.

Dvoskin, A., & Petri, F. (2017). Again on the relevance of reverse capital deepening and reswitching. *Metroeconomica*, *68*(4), 625–659.

Eatwell, J. (1983). Theories of value, output and employment. In J. Eatwell & M. Milgate (Eds.), *Keynes's economics and the theory of value and distribution* (pp. 93–128). Duckworth.

Eatwell, J., & Milgate, M. (Eds.). (1983). *Keynes's economics and the theory of value and distribution*. Duckworth.

Fisher, F. M. (1983). *Disequilibrium foundations of equilibrium economics*. Cambridge University Press.

Fisher, F. M. (1989). Stability Analysis in Micro and Macro Theory: An Interview. In G. R. Feiwel (Ed.), *Joan robinson and modern economic theory* (pp. 311–322). Macmillan.

Garegnani, P. (1970). Heterogeneous Capital, the Production Function and the Theory of Distribution. *The Review of Economic Studies*, *37*(3), 407–436.

Garegnani, P. (1976). On a Change in the Notion of Equilibrium in recent Work on Value and Distribution. *Essays in modern capital theory*.

Garegnani, P. (1979). *Valore e domanda effettiva* (Vol. 101). G. Einaudi.

Garegnani, P. (1983). Notes on consumption, investment and effective demand. In J. Eatwell & M. Milgate (Eds.), *Keynes's economics and the theory of value and distribution* (pp. 21–69). Duckworth.

Garegnani, P. (1984). On some illusory instances of 'marginal products'. *Metroeconomica*, *36*(2-3), 143–160.

Garegnani, P. (1990). Quantity of Capital. In J. Eatwell, M. Milgate, & P. Newman (Eds.), *Capital theory* (pp. 1–78). Palgrave Macmillan.

Garegnani, P. (2012). On the present state of the capital controversy. *Cambridge Journal of Economics*, *36*(6), 1417–1432.

Hicks, J. R. (1937). Mr. Keynes and the "Classics": A Suggested Interpretation. *Econometrica*, *5*(2), 147–159.

Hicks, J. R. (1939). *Value and capital : An inquiry into some fundamental principles of economic theory*. Clarendon Press Oxford, Oxfordshire.

Hicks, J. R. (1965). *Capital and Growth*. Clarendon.

Hicks, J. R. ([1932] 1963). *The Theory of Wages* (2nd ed.). Palgrave Macmillan.

Kalecki, M. (1944). Pigou on "The Classical Stationary State". A Comment. *The Economic Journal*, *54*(213), 131–132.

Keynes, J. M. (1936). *The General Theory of Employment, Interest and Money*. Macmillan.

Lange, O. (1942). Say's law: A restatement and criticism. In O. Lange, F. McIntyre, & T. O. Yntema (Eds.), *Studies in mathematical economics and econometrics* (pp. 49–68). University of Chicago Press.

Lange, O. (1944). *Price Flexibility and Employment*. Principia Press.

Lazzarini, A. (2011). *Revisiting the Cambridge capital theory controversies. A historical and analytical study*. Pavia University Press.

Magnani, M. (1983). 'Keynesian Fundamentalism': a critique. In J. Eatwell & M. Milgate (Eds.), *Keynes's economics and the theory of value and distribution* (pp. 247–259). Duckworth.

Marshall, A. ([1890] 2013). *Principles of Economics*. Macmillan.

Marshall, A., & Marshall, M. (1879). *The economics of industry*. Macmillan.

Milgate, M. (1982). *Capital and Employment: A Study of Keynes's Economics*. Academic Press.

Modigliani, F. (1944). Liquidity Preference and the Theory of Interest and Money. *Econometrica*, *12*(1), 45–88.

Mongiovi, G. (1990). Notes on Say's Law, Classical Economics and the Theory of Effective Demand. *Contributions to Political Economy*, *9*(1), 69–82.

Ohlin, B. (1937). Some Notes on the Stockholm Theory of Savings and Investment. *The Economic Journal*, *47*(185), 53–69, 221–240.

Patinkin, D. (1949). Involuntary Unemployment and the Keynesian Supply Function. *The Economic Journal*, *59*(235), 360–383.

Patinkin, D. (1959). Reply to r. w. clower and h. rose. *Economica*, *26*(103), 253–255.

Patinkin, D. ([1956] 1965). *Money, interest and prices : An integration of monetary and value theory*. Harper & Row Publishers.

Petri, F. (1989). *Teorie del Valore e della Distribuzione. Un confronto tra classici e neoclassici*. NIS. La Nuova Italia Scientifica.

Petri, F. (1991). Hicks's recantation of the temporary equilibrium method. *Review of Political Economy*, *3*(3), 268–288.

Petri, F. (2004). *General Equilibrium, Capital and Macroeconomics*. Edward Elgar Publishing.

Petri, F. (2014). Blaug versus Garegnani on the 'Formalist Revolution' and the Evolution of Neoclassical Capital Theory. *Journal of the History of Economic Thought*, *36*(4).

Petri, F. (2015). Neglected Implications of Neoclassical Capital-Labour Substitution for Investment Theory: Another Criticism of Say's Law. *Review of Political Economy*, *27*(3), 308–340.

Petri, F. (2017). The Passage of Time, Capital, and Investment in Traditional and in Recent Neoclassical Value Theory. *OEconomia*, *7*(1), 111–140.

Petri, F. (2020). Capital Theory 1873–2019 and the State of Macroeconomics. *History of Economics Review*, 1–24.

Petri, F. (2021). *Microeconomics for the Critical Mind. Mainstream and Heterodox Analyses*. Springer International Publishing.

Pigou, A. C. (1943). The classical stationary state. *The Economic Journal*, *53*(212), 343–351.

Plassard, R. (2018). Clower's Volte-Face Regarding the 'Keynesian Revolution'. *History of Political Economy*, *50*(2), 261–287.

Rivot, S. (2016). Patinkin as a reader of Keynes' General Theory: Are wage cuts a good remedy to unemployment? *The European Journal of the History of Economic Thought*, *23*(6), 1001–1031.

Robbins, L. (1930). On a certain ambiguity in the conception of stationary equilibrium. *Economic science and political economy* (pp. 59–78). Springer.

Rubin, G. (2005). La controverse entre clower et patinkin au sujet de la validité de la loi de walras. *Revue économique*, *56*(1), 5–24.

Rubin, G. (2011). *Oskar Lange and the influence of Walrasian theory during the Keynesian revolution* [working paper or preprint].

Rubin, G. (2014). *Disequilibrium economics: some comments about its nature, origins and fate. A review essay of "Transforming Modern Macroeconomics, The Relationship of Micro and Macroeconomics in Historical Perspective" (2013)* [working paper or preprint].

Samuelson, P. A. (1944). The relation between Hicksian stability and true dynamic stability. *Econometrica (pre-1986)*, *12*(3, 4), 256.

Samuelson, P. A. (1955). *Economics: An Introductory Analysis*. McGraw-Hill.

Samuelson, P. A. (1978). The canonical classical model of political economy. *Journal of economic literature*, *16*(4), 1415–1434.

Shackle, G. (1972). *Epistemics and Economics: A Critique of Economic Doctrines*. Cambridge University Press.

Sraffa, P. (1960). *Production of Commodities by Means of Commodities*. Cambridge University Press.

Wicksell, K. (1936). *Interest and Prices*. Sentry Press.

Wicksell, K. (1934 [1901]). *Lectures on Political Economy, vol. I*. Routledge.

Wicksell, K. (1935 [1901]). *Lectures on Political Economy, vol. II*. Routledge.

Wicksell, K. ([1893] 1970). *Value, Capital and Rent*. Allen & Unwin.