



Munich Personal RePEc Archive

Clower's volte-face regarding the 'Keynesian Revolution'

Plassard, Romain

Lille Economie Management

November 2017

Online at <https://mpra.ub.uni-muenchen.de/78919/>

MPRA Paper No. 78919, posted 04 May 2017 17:33 UTC

Clower's *volte-face* regarding the 'Keynesian Revolution'¹

Abstract

Robert W. Clower's article "The Keynesian Counter-Revolution: A Theoretical Appraisal" (1965) was central to the transformation of Keynesian macroeconomics since it contributed to the emergence of fixed-price models, in the 1970s. Despite this influence, no scholar has proposed to explain its origins. My paper aims to fill this gap. It is argued that Clower came to build his disequilibrium program of microfoundations after changing radically his views about the meaning and the nature of the 'Keynesian Revolution'. During a first research phase (1949-1957), Clower considered that Keynesian macroeconomics was compatible with market clearing and with Walrasian microfoundations. But he eventually moved away from these equilibrium and synthesis perspectives. During a second research phase (1958-1962), he came to conclude that Keynesian macroeconomics had to be rooted in a disequilibrium framework and could not be based on Walrasian microfoundations. Hence the existence of a *volte-face*. This *volte-face* is explained by putting the invariants of Clower's thought (i.e., his search for microfoundations adapted to Keynesian macroeconomics, and his concerns with unstable dynamics) in perspective with the contemporary developments in the disequilibrium macroeconomics of Don Patinkin, and in the non-tâtonnement economics of Frank Hahn and Takashi Negishi.

JEL Codes: B2, D5

Keywords: microfoundations of macroeconomics, disequilibrium theory, instability of the full employment equilibrium, Clower, Patinkin.

¹ University of Lille, LEM-CNRS (UMR 9221): plassardomain@gmail.com.

I am grateful to Roger E. Backhouse, Harald Hagemann, Kevin D. Hoover, Goulven Rubin, Michel de Vroey, and an anonymous referee for their valuable comments on earlier drafts of this article. I am also grateful to the staff of the David M. Rubenstein Rare Book and Manuscript Library of Duke University for their help with the Robert Clower Papers.

Introduction

Robert W. Clower's article "The Keynesian Counter-Revolution: A Theoretical Appraisal" (1965) was central to the transformation of Keynesian macroeconomics since it contributed to the emergence of fixed-price models, in the 1970s (Roger Backhouse and Mauro Boianovsky, 2013; Michel de Vroey, 2016). This influence is attributable to two ideas. The first one was that John Maynard Keynes' *General Theory* (1936) should be rooted in a disequilibrium framework. Clower (1965) argued that involuntary unemployment meant that workers failed to realize their standard optimization plans because of labor market non-clearing. The second idea was that the integration of Keynes' income analysis and Walrasian microeconomics was impossible. Clower (1965) stressed that in situations of involuntary unemployment, realized income acted as a constraint on workers' decisions to consume. According to him, this was not compatible with the tâtonnement hypothesis and the standard theory of the consumer. An alternative microeconomic framework had to be conceived. Clower proposed that trade took place out of equilibrium and formulated the famous 'dual-decision' hypothesis.

Economists and historians acknowledged the relationships between Clower's (1965) theoretical propositions and other insights developed either in the non-tâtonnement economics of Frank Hahn and Takashi Negishi (1962), or in the disequilibrium macroeconomics of Don Patinkin (1956). During the discussion held at the Royaumont conference (where Clower first presented the "Counter-Revolution" article), Frank Brechling "regarded Clower's paper as a contribution to the theory of non-tâtonnement" (Hahn and Brechling, 1965: p. 302).² Negishi agreed with him, arguing that in "existing theories of non-tâtonnement, the process of exchange was similar to the dual decision" (Hahn and Brechling, 1965: p. 302).³ Later, Robert Barro and Hershel I. Grossman (1971) stressed the complementarity between Patinkin's 'spill-over' effects and Clower's 'dual-decision' hypothesis: Patinkin (1956) explained that if the market for goods did not clear, entrepreneurs would take into account the quantity of goods actually

² In 1965, Hahn and Brechling published a volume gathering all the articles presented during the International Economic Association conference held from 03/08/1962 to 04/07/1962, at Royaumont (France). At the end of the volume, they printed a record of the discussion.

³ Negishi did not give details about this analogy between non-tâtonnement models and the 'dual-decision' theory. Instead, he stressed some differences in the way to model non-tâtonnement processes. In particular, individuals were not supposed to react to price and realized income in existing models of non-tâtonnement (Hirofumi Uzawa, 1960; Hahn and Negishi, 1962): "the process of price bidding by excess demand was developed not on the basis of such dual decisions (derived from the distinction between notional income and realized income) but on the basis of utility maximization subject to a single budget constraint of the notional income" (Hahn and Brechling, 1965: p. 302).

sold to revise their production plans; Clower (1965) explained that if the labor market did not clear, workers would take into account the quantity of labor actually sold to revise their consumption plans. According to Barro and Grossman (1971), these two behavioral hypotheses could be used to lay the foundations of a “general disequilibrium theory” (1971: p.83). This resulted in the seminal fixed-price model. Historians have also focused on the relationship between Clower and Patinkin’s insights. Goulven Rubin (2005) argued that Clower (1965) borrowed most of Patinkin’s (1956) concepts, Kevin D. Hoover (2012) stressed that like Patinkin (1956), Clower’s approach to the microfoundations of macroeconomics consisted in elaborating general-equilibrium models that displayed Keynesian features, and Backhouse and Boianovsky (2013) presented the 1965 article as an internal criticism of Patinkin’s disequilibrium macroeconomics.⁴ Either way, it is still an issue to understand how Clower (1965) came to build his disequilibrium program of microfoundations and to what extent his ideas were inspired by the works of Hahn, Negishi, and Patinkin. The present paper addresses this issue.

Clower’s 1965 article arises out of two research phases. The first phase starts with the doctoral dissertation that Clower prepared under Hicks’ supervision at Oxford, from 1949 to 1952, and ends with the publication of *Introduction to Mathematical Economics*, in 1957. It consists of a project to provide microfoundations to Keynesian macroeconomics, and of a project to devise a price theory allowing the unification of all forms of competition (from monopoly to perfect competition). During this research phase, Clower was not concerned with involuntary unemployment, and more generally, with the issues related to individual disequilibrium and its consequences. Moreover, he considered that extensions of the Walrasian microeconomic theory were enough to ground Keynesian macroeconomics. In other words, Clower defended the equilibrium perspective and the kind of synthesis between Keynesian and Walrasian theories that he attacked in the 1965 article. Hence the existence of a *volte-face* concerning the meaning and the nature of the ‘Keynesian Revolution’.

Clower’s change in perspective took place in a two-step process. In an unpublished manuscript titled “Keynes and the Classics: A Reinterpretation” (1958), Clower formulated his first disequilibrium interpretation of the *General Theory*. This opened the second research phase. Thereafter, Clower came to conclude that the tâtonnement hypothesis and the Walrasian

⁴ According to Hoover (2012), economists devised programs of microfoundations for macroeconomics long before the Lucasian Revolution. Patinkin and Clower would have contributed to the “general-equilibrium program” that was opened by John R. Hicks (1939) and that culminated with the fixed-price models, in the 1970s.

theory of the consumer had to be rejected to leave room for Keynes' insights in a general-equilibrium framework. I argue that Clower may have reinterpreted Keynesian macroeconomics from a disequilibrium perspective under the influence of Patinkin; and that his decision to reject part of Walrasian microfoundations was likely a reaction to the contradictions in the disequilibrium macroeconomics of Patinkin (1956, 1958), and a result of the confrontation between Clower's concerns for unstable dynamics and the stability analyses led in the non-tâtonnement economics of Hahn and Negishi (1962).

1. Equilibrium and synthesis perspectives: Phase I (1949-1957)

Between 1949 and 1957, Clower had two projects: to provide microfoundations to a Keynesian business cycle model and to elaborate a price theory capable of unifying all forms of competition. Despite their different objectives, these theoretical projects should be considered as part of the same research phase. All along the way, Clower considered that Keynesian macroeconomics was compatible with market clearing and with Walrasian microfoundations. More generally, the issues related to individual disequilibrium and to its consequences were never a focal point; and Clower sought to extend Walrasian microeconomics, not to break with it.

1.1 The "general theory of the trade cycle"

Clower's first project was to provide microfoundations to a macromodel inspired by Keynes (1936) and capable of addressing fluctuations and economic growth *à la* Roy F. Harrod (1939).⁵ It was outlined in Clower's doctoral dissertation, *Theories of Capital Accumulation with Special Reference to their Ability to Explain the Experience of the U.S since 1870* (1952a):

The writer began by examining the general pure theory of economic behavior (as expressed e.g., in *Value and Capital*) in an attempt to discover whether that theory was in any way inadequate as a foundation for capital accumulation theory. After making appropriate alterations to the general theory, the writer tried to fit various recent theories of capital accumulation [Reference to Keynes (1936), Harrod (1939) and Hicks (1950)] into it as special cases (1952a: p. 8).

⁵ For a comprehensive presentation of this project, see "The Origins, Development, and Fate of Clower's 'stock-flow' general-equilibrium program" (Plassard, 2017).

To elaborate his “general theory of capital accumulation”, Clower proposed a “reinterpretation” and an “extension of Keynes’s views on the theory of the trade cycle” (1952a: p. 11). The “reinterpretation” consisted of explaining fluctuations thanks to the variations of the liquidity preference instead of those of the marginal efficiency of the capital (1952a: pp. 80-83). The “extension” consisted of broadening the liquidity preference theory to physical assets (1952a: p. 69). Hence, trade cycles resulted from a capital accumulation process destabilized by speculative behavior (1952a: p. 79). Starting from this explanation of fluctuations, Clower built a ‘stock-flow’ macromodel. The stock dimension was related to entrepreneurs’ demand for the existing stock of capital assets, and accounted for the determination of the real interest rate.⁶ The flow dimension was related to entrepreneurs’ decisions to invest and to produce. And the inter-relationship between these two dimensions served to analyze the capital accumulation process – depending on the level of the real interest rate, the flow of new investment and the flow of depreciation may not match thus leading to variations of the stock of capital assets. Clower argued that because of speculative behavior, entrepreneurs’ demand for the existing stock of capital assets was subject to violent and repeated changes. This would prevent investment, production, and capital assets from reaching stationary positions and, in turn, would explain trade cycles (1952a: p. 89). On that basis, Clower made two points. The first one was that the instability underlying trade cycles in his macromodel was related structurally to the inter-relationship between the stocks and the flows of capital assets. The second one was that the same was true in Harrod-type models since the instability was closely related to the acceleration principle, a relation linking the rate at which the flow of output was changing with the stock of capital assets (1952a: p. 11). Clower concluded that the inter-relationship between stocks and flows was the essence of the capital accumulation process.⁷ Since this inter-relationship was at the heart of his macromodel, he claimed to have elaborated a “general” theory of the trade cycle (1952a: p. 184).

The challenge was to incorporate the relation of stocks and flows into the standard theory of choice and then, to undertake the derivation of Keynes and Keynesian business cycle

⁶ Clower was concerned with the determination of real magnitudes: “Entrepreneurs’ views concerning the profitability of owning real assets [depended on] the relative prices of inputs and outputs” (1952a: p. 68).

⁷ “The argument in previous chapters has been devoted primarily to demonstrating the unity of recent theories of capital accumulation. In retrospect, it appears that the thread which links together various theories – a thread that is hidden by difference in method and content – is to be found in the distinction between the *using* and the *holding* of assets [reference to Keynes (1936)]. This distinction obviously implies but it is not implied by the distinction between stocks and flows [reference to the models following Harrod (1939) and Hicks (1950)]” (1952a:p. 184).

models. For that purpose, Clower followed the main lines set out by Hicks in *Value and Capital*.⁸ He repeatedly referred to the formulation of a general equilibrium model to demonstrate the compatibility between economic behavior and aggregate. In his dissertation, Clower proposed the ‘producer-consumer’ theory of the firm to ground the ‘stock-flow’ architecture. This micromodel was inspired by the works of Leonid Hurwicz (1946) and Johannes de Villiers Graaff (1950) and consisted of introducing asset holding into entrepreneurs’ programs. Unfortunately, Clower (1952a) failed to offer a full-fledged formalization of the related theory of markets. Therefore, the connections between his theory of choice and Keynesian macromodels remained essentially informal. This explained at least partly why the examiners refused to award him the degree of doctor when he defended his dissertation, in May 1952.⁹ Retrospectively, Clower recognized that his thesis “was not in a form fit for publication” and “did not produce what he had hoped”.¹⁰ This failure would have led him to “develop healthier motivations”, staying “six months at home not only with *Value and Capital* but also with Pareto and Walras”.¹¹ This orientation is confirmed by the publication of a series of papers devoted to the development of ‘stock-flow’ market models: “Business Investment and the Theory of Prices” (1953), “Productivity, Thrift and the Rate of Interest” (1954a), “An investigation into the Dynamic of Investment” (1954b) and “Price Determination in a Stock-Flow Economy” (1954c). The last two papers were written with a mathematician specialized in dynamics, Donald Bushaw.¹² This marked the beginning of a collaboration which culminated with the writing of *Introduction to Mathematical Economics* (1957), a book almost fully devoted to ‘stock-flow’ market analyses.

A ‘stock-flow’ market theory accounted for the determination of prices when individuals’ plans to produce and to consume goods in the current market period were

⁸ For an exhaustive presentation of Hicks’ method, see Roy Weintraub (1979). For a short presentation, see Hoover (2012).

⁹ Whilst acknowledging that Clower’s microeconomics presented “some undoubted contributions to economic theory”, his examiners (Ian M.D. Little and Charles M. Kennedy) deplored the absence of “substantial connection with the main theme of the dissertation”. These quotations are taken from the report of Clower’s thesis defense, housed at Oxford University. Note that I had access to this document thanks to the help of Hoover and to the availability of Simon Bailey, a keeper of the University Archives.

¹⁰ The quotes are taken from a resume written by Clower in 1964. R. W Clower Papers, Box 1-2001-0088, Rubenstein Rare Book and Manuscript Library.

¹¹ The quotes are taken from a first version of the preface of “Money, Markets and Method: Essays in honor of R.W. Clower” (1999). R. W Clower Papers, Box 1-1999-0352, Rubenstein Rare Book and Manuscript Library.

¹² Bushaw did his PhD in mathematics at Princeton University, under Salomon Lefschetz’s supervision. He defended his thesis in 1952. According to Mike Kallaher (professor at the Washington State University), Bushaw’s dissertation contributed to the development of modern optimal control theory (see: www.math.wsu.edu/Events/bushawobituary.php, consulted on 19 August 2016).

distinguished from individuals' plans to hold goods in stocks, at the end of the market period. Formally, on the flow dimension, a set of supply and demand functions described the quantity produced and consumed during the current market period. On the stock dimension, Clower added a set of supply and demand functions describing the quantity inherited from the activities of past market periods and the quantities that individuals wanted to hold in stocks at the end of the current market period. On that basis, Clower distinguished two types of equilibria. The first one was "temporary" since the stocks available in the economy showed a tendency either to rise or to fall. For a given vector of prices, individuals would like to hold stocks of commodities different from the one inherited from the past. The stocks would be adjusted by the quantities newly produced and consumed in the market period. For that new stock available, a new price vector would be set. The process would continue until the quantity of stocks and prices became "stationary". This situation characterized the second type of equilibrium. From 1952 to 1957, Clower studied the static and dynamic properties of these models so as to know whether they could be used to link the theory of choice developed in the dissertation and Keynesian theories of the trade cycle. In the absence of conclusive results, the project petered out.

Employment fluctuations, individual equilibrium, and tâtonnement dynamics

Both the 'stock-flow' market analyses and the doctoral dissertation are useful to account for the equilibrium perspective adopted by Clower in his microfoundational program. Clower's attitude regarding involuntary unemployment indicates that individual disequilibrium and its consequences were outside the field of investigation. Clower and Bushaw did not even mention the concept in *Introduction to Mathematical Economics*. From the beginning, Clower (1952a) argued that it was not of fundamental importance to know whether workers were voluntarily or involuntarily dismissed during the downturn. The effect on economic activity would be the same. Accordingly, in the context of trade cycles studies, it would be enough to account for the fluctuations of employment:

In practice, it is clear that large declines in employment may have the same influence on economic activity whether workers were voluntarily or involuntarily unemployed. We leave the matter at that (1952a: p. 66).

In spite of this lack of interest in the voluntary/involuntary distinction, Clower (1952a) proposed a short reflection on how to incorporate involuntary unemployment in a market

framework. He gave emphasis to the form of the labor supply function.¹³ According to Clower, it could be considered that “workers [were] dismissed involuntarily [if] the labor supply curve [was] infinitely elastic at the going wage rate” (1952a: p. 66). In other words, it would be enough to assume a horizontal labor supply curve to address involuntary unemployment.¹⁴ This solution implied market clearing and so, that workers realized their standard optimization plans (De Vroey, 2004). Therefore, at this stage, Clower viewed involuntary unemployment as an equilibrium situation.

More generally, Clower maintained that Keynesian macroeconomics could be rooted in a price theory in which all the markets cleared and so, in which all the individuals realized their optimization plans. This appears clearly in the short appendix devoted to the “Keynesian system”, in *Introduction to Mathematical Economics*. Bushaw and Clower aimed at deriving the standard IS/LM model from a ‘stock-flow’ price theory where the consumer goods market, the capital goods market, the labor market, and the securities market were balanced (1957: p. 46). This equilibrium perspective is also contemplated in dynamics. While studying the stability conditions of the ‘stock-flow’ price theory in discrete time, Bushaw and Clower (1957) insisted on the assumption that at any market period, all the markets cleared:

$p_1(t)$ and $p_2(t)$ assume values which make market demand equal to market supply at the beginning of each period (1957: p. 84).

The dynamic path of the economy would be determined by the variations of the stocks of commodities in the economy. It was assumed that the stationary equilibrium was reached when the net changes of stocks from period to period were nil (1957: p. 84). In continuous time, the dynamics was based on the same logic. Following economists such as Lange (1945) and Samuelson (1947), Bushaw and Clower studied the stability properties of tâtonnement processes (1954c: p. 343; 1957: p. 101). Accordingly, the focus was on the dynamic of abstract economies in which disequilibrium transactions were excluded. Individual disequilibrium and their consequences were therefore out of the field of investigations in ‘stock-flow’ market analyses.

¹³ “One has to make a series of assumption to obtain a supply function equivalent to the one used by Keynes (i.e., a function of a form which permits one to talk about ‘involuntary’ unemployment)” (Clower, 1952a: p. 66).

¹⁴ This assumption, also made by Franco Modigliani (1944) and Oskar Lange (1945), became very common in the 1950s. On its relevance to portray involuntary unemployment, see Michel De Vroey (2004).

The compatibility between Walrasian and Keynesian theories

In the introduction of his dissertation, Clower wondered about the compatibility between Walrasian and Keynesian theories. He claimed that the two theories were fundamentally compatible. Nonetheless, Walrasian microeconomics needed to be modified to ground Keynesian macroeconomics:

From a formal point of view, is the *General Theory* a special case of established general equilibrium theory? Once again, there are essential differences between the two levels of analysis, differences which may not be reconcilable until the foundations of general equilibrium theory are broadened (1952a: p. 5).¹⁵

According to Clower, neither Keynes' theory of investment nor his theory of consumption could be linked directly to Walrasian microeconomics. In the former case, this was because the standard theory of the firm did not distinguish the holding from the using of assets, and did not account for entrepreneurs' appreciation of the business climate (1952a: p. 71). Hence Clower's decision to broaden standard optimization plans. He proposed the 'producer-consumer' theory of the firm and showed that the resulting theory of investment "was equivalent to the theory of Keynes" (1952a: p. 62).¹⁶ In the later case, Clower's aim was to explain why income was an independent variable at the aggregate level while it was not at the microeconomic level (1952a: p. 64). For that purpose, he aggregated consumers' optimization plans, drew upon a national accounting relation to stress that money consumption depended on money income (1952a: p. 65), and made a few other assumptions to "arrive at the Keynesian propensity to consume" (1952a: p. 65).¹⁷ Besides, Clower (1952a) addressed the issue of the compatibility between Walrasian and Keynesian theories by discussing the relationship between his microeconomics and his "general theory of the trade cycle". He modified the standard theory of the consumer (1952a: p. 226) so as to justify the "floor" and the rising trend of his macromodel. The modification consisted of assuming that preferences were interdependent and, in turn, that the relative position of consumers in society influenced their patterns of consumption. On that basis, Clower considered that the maintenance of the consumption (to keep up with the Joneses)

¹⁵ Clower referred to Hicks' Walrasian framework when using labels such as "established general equilibrium theory" or "standard microeconomics" (1952a: p. 8).

¹⁶ For further details on Clower's demonstration, see Plassard (2017).

¹⁷ Clower started from optimization plans and deduced aggregate versions of supply and demand functions by simple summation (1952a: p. 61; p. 63). Clower justified this aggregation procedure by referring to Hicks' commodity theorem. The theorem defined the conditions to treat the aggregate as an individual (Hoover, 2012: p. 36).

would underpin the minimum limit of investment at which the economy would rebound. Then, since this “floor” was supposed to depend on the stock of capital assets accumulated and that this stock was likely to increase over time (1952a: p. 43), a rising trend would be established. In parallel, Clower argued that the ‘producer-consumer’ theory of the firm was a relevant foundation for the accelerator (1952a: p. 57) and could be used to justify the ‘stock-flow’ architecture of his Keynesian business cycle model.¹⁸

Thereafter, Clower developed the ‘stock-flow’ market theory to further his reflection on the compatibility between his microeconomics and Keynesian macroeconomics. The Walrasian flavor of the general equilibrium models could hardly be overemphasized.¹⁹ Symmetry and market clearing characterized the system of equations (1957: p. 46). Moreover, Clower assumed that individuals’ decisions were taken simultaneously. Indeed, when Bushaw and Clower (1957) gave details on the exchange technology underlying their ‘stock-flow’ price theory, they referred to a “central market authority” (1957: p. 31) setting prices so that supplies equaled demands (1957: p. 34).

Though largely implicit, connections with Keynesian macroeconomics were proposed both in partial and general equilibrium frameworks. In partial equilibrium, Clower was concerned with Keynes’ theory of investment (1954a) and with the liquidity preference theory (1954b). Clower (1954b) demonstrated that the dynamic path of the rate of interest was largely determined by the excess-stock-demand for bonds, not by the excess-flow-demand for bonds (p. 114). This feature was presented as a proof that the rate of interest was governed by speculative behavior, not by saving and investment. Then, Clower (1954a) demonstrated that given different levels of the rate of interest, the relation between the stock demand and the associated level of net investment could be used to obtain “a curve $K(r)$ which Keynes would call schedule of marginal efficiency of capital” (p. 76). Besides, in general equilibrium, Bushaw and Clower (1954c) referred to the project sketched in the doctoral dissertation. The ‘stock-flow’ price theory could ground the “models based on the acceleration principle” (1954c: p. 328). The reason was dynamic. The inter-relationship between stocks and flows was viewed as a source of instability ignored in pure stock and pure flow models (1954: pp. 341-342).

¹⁸ Clower presented in details his modifications of standard microeconomics in two papers: “Mr. Graaff’s Producer-Consumer Theory: A Restatement and Correction” (1952b) and “Professor Duesenberry and Traditional Theory” (1952c).

¹⁹ On the Walrasian representation of the functioning of a market economy, see De Vroey (1999).

In *Introduction to Mathematical Economics*, Bushaw and Clower recognized that “the path from their own (or from any similar model) to the Keynesian system [was] rather tortuous” (1957: p. 44). But in the “Keynesian appendix”, their “discussion [served to] show that a path exist[ed]” (1957: p. 44). Starting from a disaggregated general-equilibrium model, they made various assumptions and modifications to finally deduce the “Keynesian building block $Y=C+I$ ” (1957: p. 46) and standard Keynesian functions (1957: pp. 46-49). Regardless of the rigor of this derivation, this proves that until 1957, Clower considered that Walrasian and Keynesian theories were fundamentally compatible.

1.2 The “general theory of price determination”

In parallel with his ‘stock-flow’ general-equilibrium program of microfoundations, Clower developed a second theoretical project purporting to develop a price theory allowing the unification of all forms of competition (from monopoly to perfect competition). It was outlined in two unpublished manuscripts, written over the first half of the fifties: “On the existence of a General Theory of Price Determination” (c.1954a) and “Toward a General Theory of Price Determination” (1955). Then, Clower presented his main developments and results in the concluding chapter of *Introduction to Mathematical Economics*, in three sections titled: “Toward a Generalized Theory of Price Determination”, “A Unified Theory of Price and Quantity Determination” and “Monopoly and Competition: An Appraisal”. Reflections in this area continued until the end of the fifties through unpublished manuscripts and one paper: “On the Microdynamics of Price Formation in N-Seller Markets” (c.1958), “A Study of Elementary Learning and Response Mechanism in Dynamical Monopoly Model” (1958a), “Inductive Inference and Business Behavior” (1959a) and “Some Theory of an Ignorant Monopolist” (1959b).²⁰

Clower’s reading of *Monopolistic Competition and General Equilibrium Theory* would have been the original impulse. In this book, Robert Triffin took up the criticism of his supervisor (Edward H. Chamberlin) on the lack of realism of perfect competition. Triffin proposed to integrate some elements associated with monopolistic competition such as strategic behaviors and the interdependence of firms, into the Walrasian theory (Maria Cristina Marcuzzo, 2012). In the conclusion of his book, Triffin recognized the huge difficulties posed by this project and, in turn, maintained that it would be impossible to build a simple, elegant,

²⁰ R. W Clower Papers, Box 4, Rubenstein Rare Book and Manuscript Library.

and general price theory on monopolistic foundations. Such a project had to be viewed as a “philosopher’s stone” (1940: p. 289).

Clower reacted to this conclusion. While developing his ‘stock-flow’ models, he would have found the way to complete Triffin’s project via the elaboration of a “general theory of price determination”:

As a result of recent work in the theory of competitive price [...] Professor Triffin’s dictum no longer has to be accepted. On the contrary, *it is now possible to exhibit a consistent and unified general theory of price determination* (c.1954a: p.2)

The key to understand the project is to acknowledge that whatever the forms of competitive structure, the determination of equilibrium prices is based on the same logic. Clower considered that individuals (whether a “market authority” embodied by the figure of the broker, a seller, or a group of sellers) would try to find equilibrium prices trying to avoid unwanted stocks. Clower pointed out that, in perfect competition, brokers were responsible for setting equilibrium prices following a tâtonnement process. He concluded that a broker could be viewed “as an actual unit of economic decision similar to consumer and business units” (c1954a: p. 31), supposed to set prices following an internal equilibrium condition represented by a “desired excess-demand”. Clower’s point was that the equilibrium condition of a broker did not match necessarily the market one. In this case, the broker would observe unwanted variations of stocks. This would be a signal to vary prices. This procedure of revision would occur until the brokers’ “desired excess demand” and market excess demand would be simultaneously nil. After having presented this procedure of revision of prices, Clower turned to non-competitive structures. He argued that, if the assumption of “demand certainty” was dropped, price determination would appear to be analogous to the one occurring in perfect competition. In a monopoly, the seller decided on the level of production by estimating the price at which he would sell the integrality of the production and would maximize his profits. Of course, he may make mistakes, failing to correctly anticipate the objective demand. Accordingly, he would be forced to increase his stocks of goods or would not be able to exploit all the profit opportunities. To avoid the repetition of such scenarios, the seller would revise price until his internal equilibrium coincided with the market equilibrium. According to Clower, once this element of uncertainty was introduced in the standard monopoly theory, the extension to oligopoly model would be quasi natural. The difficulty would lie in the treatment of firms’ interdependences. By showing that

price determination was based on the same logic whatever the competition structure, Clower thought he had found the way to elaborate a “general price theory” allowing the unification of all forms of competition.²¹

To undertake this unification, Clower set dynamical systems with various adjustment rules describing the behavior of prices, outputs, and realized sales:

It will now be clear that the more general model is neither competitive nor non-competitive. Instead, it is a general theory of market adjustment (c.1954a: p. 43).

The difficulty was to define the adjustment processes in a sufficiently general way to ensure the deduction of specific behavior related to the market structures. During the 1950s, Clower sought for the best formalization of these adjustment processes. Unfortunately, the complexity of the dynamical systems made it difficult to study their stability conditions. Most of the time, dynamic analyses were therefore absent. This problem of tractability was put forward by Clower to explain why it would be preferable to stick to the assumption of perfect competition (1957: p. 190). Since he was unable to find a way to simplify these models, the project petered out.

Disequilibrium was not the issue

Despite the diversity of models developed by Clower, he always considered situations in which “individuals” (whether a “market authority”, a seller, or a group of sellers) set prices and made mistakes thus leading to disequilibrium transactions. For example, Clower (1957) assumed that independent sellers produced in time (t-1) a homogeneous good that they brought to the market in time t. At the beginning of the market period, they set the price at which they undertook to deliver the goods during the market period. The market price was supposed to be the minimum of the prices set by sellers. Those who set higher prices would not be able to sell the quantity they had planned. Symmetrically, consumers would not be able to realize their consumption plans when the quantities sold at the market price were not sufficient.

²¹ Following Samuelson (1947), Clower quoted Eliakim H. Moore’s *Principle of Generalization by Abstraction* (1910) to justify this viewpoint: “Until a short time ago, however, neither proposition was ever required in such an explicit form as that it is presented in this paper. Although I was well aware of E.H. Moore’s principle of generalization of abstraction, therefore viz., ‘the existence of analogies between central features of various theories implies the existence of a general theory which underlies the particular theories and unifies them with respect those central features.’ [footnote to refer to Samuelson (1947: p. 3)], its relevance to the case in question was never clear.” (c1954a: p. 49)

Accordingly, situations of individual disequilibria were considered in Clower's "general theory of price determination".

Yet, three features of these studies show that disequilibrium *à la* Clower (1965) was not the issue. First, in all the papers mentioned, Clower excluded the effects of disequilibrium transactions on individuals' choices by assumption. The sellers could not take into account the level of demand during the market period and readjust their production on this basis. Such adjustments were considered to be at work but would have consequences only on the next market period. Second, Clower considered only a partial equilibrium approach. As a result, he ignored the consequences of the non-realization of optimization plans on other markets, what Patinkin (1956) called 'spill-over' effects. Third, every study was led as if the dynamic properties of the models were a secondary issue. Clower set dynamic systems but mainly discussed the properties of their equilibria. Of course, this was partly due to the complexity of the dynamic systems. But beyond that, a deeper reason, consubstantial with his project, justified this approach. The goal was to demonstrate that a single price determination process, with a common criterion (supply/demand balance), characterized all forms of competition.²² This explains why Clower was mainly concerned with market clearing situations.

Extension of the "traditional general equilibrium theory"

Now, let us focus on Clower's synthesis perspective. 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 [general] theory follows immediately from generally accepted postulate of traditional analysis in conjunction with one simple, almost obvious, further assumption which, while already at hand in elementary dynamical considerations underlying established analysis, is here utilized for the first time (c.1954a: p.2).

The extension concerned the dynamic procedure of revision of prices implied by the tâtonnement hypothesis. To stress the existence of a "general theory of price determination",

²² "Therefore, market equilibrium (in monopoly) is defined by the intersection of the supply curve s with the demand curve d — a result which is remarkably similar to that which defines market equilibrium price in an isolated competitive market! [...] Here, precisely as in the case of the monopoly, market equilibrium is defined by the intersection of the market supply and demand curves s and d " (1957: p. 189).

Clower proposed to couple this procedure with the assumption that the Walrasian broker did not want to hold unwanted stocks.

During the development of his project, Clower wondered whether simple extensions of Walrasian microeconomics were sufficient to account for the kind of behavior addressed in his “general” theory. In 1959, he mentioned the possibility of a break with the “traditional price theory”. But he claimed that it was preferable to remain in this established framework:

The inadequacies of traditional price theory as an instrument for describing observed market behavior have become increasingly apparent in recent years. It is still an open question, however, whether these shortcomings can be removed by appropriate generalizations of existing theories or whether modifications of a more fundamental kind will be required. [...] It seems to me that both points of view entail interesting programs of research and that neither can be said to involve anything more than this at the present time.[...] Meanwhile, it is interesting to speculate about the possible fruitfulness of an approach which lies somewhere between the two extremes. [...] The purpose of the present paper is to elaborate upon this theme by sketching a simplified “learning model” of oligopoly which is broadly consistent with traditional doctrine yet sufficiently general to include both established monopoly theory and the accepted theory of pure competition as special cases (1959a: p. 2).

Therefore, Clower considered that his “general theory of price determination” was compatible with Walrasian economics.

To conclude, until 1957 Clower developed two theoretical projects in which he was never interested in involuntary unemployment and more generally in individual disequilibrium its consequences (e.g., spill-over effects). Moreover, he always considered that extensions of “established” general equilibrium theory were sufficient to build his theoretical models. Therefore, what happened to him? How does one explain that in little more than three years, at the Royaumont conference (1962), he proposed a disequilibrium interpretation of the Keynesian theory whilst defending the need to break with Walrasian microeconomics?

2. Clower’s *volte-face*: Phase II (1958-1962)

In 1958, Clower reopened his investigations on Keynesian macroeconomics. In an attempt to shed new light on the Keynes-Classics debate, he radically broke with the equilibrium and

synthesis perspectives that prevailed until now. As a result, his reflections are considered here as part of another research phase (Phase II). Clower's *volte-face* took place in two steps. In "Keynes and the Classics: A Reinterpretation" (1958) and in "Keynes and the Classics: A Dynamical Perspective" (1960), Clower displayed a disequilibrium interpretation of the *General Theory* whilst maintaining that Keynesian and Walrasian theories were compatible. Thereafter, he came to conclude that the tâtonnement hypothesis and the Walrasian theory of the consumer had to be rejected to leave room for Keynes' insights in a general equilibrium framework. Clower reached this conclusion soon before the Royaumont Conference, where he presented a draft of "The Keynesian Counter-Revolution: A Theoretical Appraisal" (1965). The origins of such a radical change in perspective are mysterious. But it is clarified by the intellectual context and the invariants of Clower's works.²³ Clower probably considered that Patinkin's (1956) disequilibrium interpretation of the *General Theory* opened a fruitful avenue of research to address the two very issues on which he was working on since his PhD dissertation: the microfoundations of Keynesian macroeconomics and the dynamics of market economies. Besides, Clower's concerns for unstable dynamics may have led him to realize, in reaction to Patinkin's own contradictions and to the developments in non-tâtonnement economics, that a break with the Walrasian framework was imperative. In particular, Clower's (1965) decision to reject Walras' law may be justified on two grounds: Walras' law was violated in the dynamic analysis proposed by Patinkin (1956, chapter XIII), and it was one of the necessary conditions to ensure the stability of non-tâtonnement processes in Hahn and Negishi's (1962) model.

2.1 A two-step reorientation

Clower (1958) proposed a disequilibrium interpretation of the *General Theory*. The main ingredients of disequilibrium economics were mobilized. First, involuntary unemployment was the focal point. This concept was viewed as the dividing line between

²³ With regard to the intellectual context, emphasis is given to the disequilibrium macroeconomics of Patinkin and to the non-tâtonnement economics of Hahn and Negishi. In the former case, this is justified since Clower started interacting with Patinkin as early as 1958 (see their correspondence on the distinction between stocks and flows in Don Patinkin papers, Box 25, Rubenstein Rare Book and Manuscript Library). In the later case, there are evidences that Clower followed the developments of non-tâtonnement models in the early 1960s. At that time, he was engaging with Negishi and made comments on the first draft of "Monopolistic Competition and General Equilibrium" (1961: p. 196). Then, in a letter sent to Meyer Burstein, Clower referred to Negishi's analyses of non-tâtonnement processes: "Negishi [introduced] transaction rules that [were] artificial and [left] prices to vary dynamically on basis of desired rather than actual [magnitudes]". This letter is undated. Yet, there are strong grounds for believing that it was written before the Royaumont Conference. Indeed, Clower was very vague about how to explain individuals' behaviors out of equilibrium (see letter from Clower to Burstein: R.W. Clower papers, Box 8, Rubenstein Rare Book and Manuscript Library).

Keynes and the “Classics”, both in static and in dynamic frameworks. In the former case, Clower proposed to follow in Keynes’ footsteps to show that the “Classical point of full employment equilibrium” was an “*upper limit* to possible equilibrium level of employment in the Keynesian model” (1958, p.7). Yet, according to Clower “the relative merits of Keynesian and Classical [theories could not] be discussed profitably on a static level of analysis” (1958, p. 8). That was why he formulated a dynamic interpretation of the Keynes-Classics debate. The matter was instability of the full employment equilibrium in Keynes’s theory versus stability in the “classical” theory. Second, involuntary unemployment was presented as a disequilibrium situation. When Clower sought to account for the “unlimited number of equilibrium states” in Keynes’ *General Theory*, his ambition was to explain that entrepreneurs could set the volume of employment whilst leaving the labor market in excess supply (1958, pp. 6-7). Third, Clower considered involuntary unemployment as a dynamic phenomenon. The demonstration of its persistence through the analysis of market adjustment processes was the aim of his “dynamical interpretation” of the Keynes-Classics debate (1958, p. 2). Fourth and finally, Clower intended to account for the consequences of disequilibrium transactions. This was suggested through the distinction between two scenarios of the dynamic analysis: “*Case I*: it [was] assumed that all market transactions at output prices other than those which ‘clear the market’ [were] strictly provisional (i.e., the output market [operated] according to Walrasian or Edgeworthian principles). [...] *Case II* [was] rather different for it [rested] upon Keynes’ version of Say’s law; i.e., it [depended] on the proposition that “supply [created] its own demand” in the strictest possible sense” (1958, p. 9). Here, what Clower called Say’s law in the sense of Keynes meant that the model took into account the income constraints imposed on workers’ consumption when they failed to sell the quantity of labor planned. By assumption, workers would express a demand for goods determined by the level of employment imposed by firms.

It is striking that whilst developing this disequilibrium interpretation of the *General Theory*, Clower kept maintaining that there was no fundamental difference between Keynes and the “Classics”. In 1958, Clower contended that the “Classical equilibrium problem [paralleled] that given by Keynes in chapter 2 of the *General Theory*; in particular, it [was] consistent with his treatment in every respect.” And in 1960, he claimed that “the essential formal difference between Keynes and the classics [was] more one of subject matter than of underlying postulates” (1960: p. 25). Keynes would have been interested in addressing “depression states” while the “Classics” would have been interested in addressing equilibrium situations. Accordingly, there would be no problem to synthesize the two theories.

This position radically changed shortly before the Royaumont conference.²⁴ A letter sent to Patinkin on March 1962 is often quoted to show Clower's break with Walrasian microeconomics (Backhouse and Boianovsky, 2013: p. 50; Rubin, 2005: p.18). Here in contrast, Clower's radical reorientation is emphasized drawing from a letter sent to George Delehanty (Massachusetts Institute of Technology):

The heart of the problem seems to be that Keynes, unlike the specialists in tâtonnement economics, assumes that market excess demands depend in part on the level of current transactions (that is to say, income flows). Dependence upon income as an independent variable is obviously inconsistent with traditional preference analysis since, if income is taken as given it is not possible to define factor supply functions. Why this difficulty has not been noticed before I cannot say, but I can tell you that it is more difficult to get over than one might suspect at first sight. My own proposal is a kind of dual decision theory of the consumer, which makes sense in a dynamic context, and happens to include traditional preference analysis as a special case – valid under full employment conditions.²⁵

The argument mentioned was the heart of the 1965 piece. Clower realized that Keynesian relations such as the consumption function could not be derived from Walrasian microeconomics. This was because realized income was an independent variable in Keynes' theory of consumption while it was not in the Walrasian theory. In the latter, individuals were supposed to choose their income when determining their selling and purchasing plans. Income was endogenous. No adjustment of consumption was possible unless prices varied. As a result, realized income could not act as a constraint in the Walrasian demand for consumption goods. For that to be possible, Clower contended that an alternative theory of the consumer was required. He proposed the 'dual-decision' hypothesis.

2.2 Why such a *volte-face*?

There is a coincidence in time between the emergence of Clower's disequilibrium interpretation of the *General Theory* and the beginning of his interactions with Patinkin. At the end of the fifties, Clower and Patinkin started a correspondence. Initially, Clower reacted to "Liquidity Preference and Loanable Funds: Stocks and Flow Analysis" (1958), a paper in which

²⁴ As a reminder, the conference took place from 03/28/1962 to 04/07/1962.

²⁵ Letter from Clower to Delehanty, (02/19/1962): R.W. Clower Papers, Box 2, Rubenstein Rare Book and Manuscript Library.

Patinkin addressed the validity of Walras' law in situations of involuntary unemployment. Then, the two authors started a new correspondence on monetary theory in reaction to the publication of George C. Archibald and Richard G. Lipsey's paper "Monetary and Value Theory: A Critique of Lange and Patinkin" (1958). In this context, Clower repeatedly expressed his admiration and his interest for the reasoning developed in *Money, Interest and Prices*:²⁶

Re-reading your book, I am more than ever impressed by the consistency of the analysis – given the assumptions—and with the absence of anything but minor slips.²⁷

Although Clower referred to the compatibility between the micro and macro parts of *Money, Interest, and Prices*, he did not discuss Patinkin's unemployment theory during the correspondence. Yet, it seems that it was not a simple fact of timing if Clower wrote "Keynes and the Classics: A Reinterpretation" at the same moment.²⁸ First, like Clower, Patinkin sought to provide microfoundations to Keynesian macroeconomics. And like him too, Patinkin insisted on the need to understand the dynamics of market economies. To be more specific, Patinkin proposed to explain involuntary unemployment as a dynamic phenomenon. Workers' inability to realize their Walrasian optimizing plans induced pressures on wages which, in turn, provoked market adjustments. These were the two points of entry in Clower's (1958) reconsideration of Keynes' *General Theory*. In 1958, behind the label "Keynes-Classics debate", Clower really addressed the compatibility between Walrasian and Keynesian theories and the stability of the market economy.

Second, the theoretical proximity between the two authors is undeniable. In 1958, Clower nearly paraphrased Patinkin (1956) to criticize Keynes (1936) for having defined involuntary unemployment as an equilibrium situation:

Perhaps the most curious aspect of the matter is the fact that *if* w and p just happen to fall at the same rate of time then, starting from an initial position of Keynesian equilibrium (with excess supply in the labor market), the economy will remain 'in equilibrium' indefinitely although prices and wages are

²⁶ See Rubin (2005: pp.17-18) for other quotations.

²⁷ Letter from Clower to Patinkin (03/10/1959): Don Patinkin Papers, Box 25.

²⁸ Backhouse and Boianovsky (2013) acknowledged that Clower and Patinkin were engaging at the end of the 1950s. Yet their analysis of the background in which Clower wrote the 1965 article may suggest that Patinkin was not influential in the emergence of Clower's (1965) ideas. According to me, Clower's reading of *Money, Interest, and Prices* triggered his reconsideration of Keynesian macroeconomics from a disequilibrium perspective.

constantly falling over time! Under these circumstances, it is perhaps natural to speak of the difference $N^s - N^d$ as ‘involuntary unemployment’; but it is a curious of language to refer to the situation as a whole as one of equilibrium (1958, p. 13).

All, then that Keynes means by the statement that the system may settle down to a position of ‘unemployment equilibrium’ is that the automatic workings of the system will not restore the system to a position of full employment equilibrium. He does not mean ‘equilibrium’ in the usual sense of the term that nothing tends to change in the system. All that is strictly in equilibrium is the level—or, possibly, only the fact—of unemployment; but there is no equilibrium of the money wage rate (Patinkin, 1956: p. 471).

Likewise, he nearly paraphrased Patinkin to emphasize the need to use dynamics to account for Keynes’ theory of involuntary unemployment:

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

Indeed, it is the very departure from these curves, and the resulting striving of individuals to return to the optimal behavior which they represent, which provides the motive power of the dynamic process itself. Thus our task in studying involuntary unemployment is to free ourselves of the mental habit – long ingrained by the methods of static analysis – of seeing only the points *on* the demand or supply curve (Patinkin, 1956: p. 220).

Lastly, Clower resorted to the logic of the ‘spill-over effect’ in the disequilibrium model put forward in 1958. The same mechanism underlined his application of “Keynes’ version of Say’s law”. Patinkin described the behavior of entrepreneurs that failed to sell the quantity of goods they had planned. They would take into account the level of demand as an additional constraint and would redefine their labor demand. Clower described the income constraints

imposed on workers' consumption when they failed to sell the quantity of labor they had planned. This was the symmetric effect.

Now, let us explain why Clower eventually considered that the Walrasian and Keynesian theories were fundamentally incompatible, a position diametrically opposed to Patinkin's (1956). Rubin (2005) considered that the roots of Clower's break with the Walrasian framework lie in Patinkin's own contradictions. Whilst studying their positions on the validity of Walras' law, Rubin showed that Patinkin (1956; 1958) preferred contradicting himself rather than rejecting the Walrasian framework. Clower (1965) would have identified the gaps and would have drawn the consequences that the invalidation of Walras' law was the *sine qua non* of the Keynesian theory.²⁹

Rubin's viewpoint is here reinforced by putting Patinkin's contradictions in perspective with the contemporaneous development in non-tâtonnement economics and with Clower's ambition to account for the instability of market economies, in his disequilibrium theory.

The dynamics of market economies and, more specifically, the possibility of a long-lasting depression was core to Clower's disequilibrium interpretation of the *General Theory*.³⁰ A disequilibrium model would have to account for i) the rationing suffered by workers in the market for labor; ii) workers' incentive to change the employment situation and the resulting pressures on wages; and iii) the dynamic of the whole economy, given that entrepreneurs have no interest to modify the employment situation. In this context, Clower insisted on the inability of the market system to bring the economy back to the full employment equilibrium.

In view of Clower's concerns for unstable dynamics, the contributions of Patinkin (1956; 1958) on one side, and of Hahn and Negishi (1962) on the other side, may explain why the rejection of Walras' law became a focal point. In chapter XIII, section II of *Money, Interest and Prices*, Patinkin broke with Walras' law when he explained the dynamic of his

²⁹ "Either Walras' law is incompatible with Keynesian economics, or Keynes had nothing fundamentally new to add to orthodox economic theory" (Clower, 1965: p.41).

³⁰ "On the other hand, any point which lies on the demand curve but above the supply curve refers to a state of *involuntary unemployment* in the sense of Keynes. [...] Under the latter circumstances, the marginal utility of the real wage exceeds the marginal disutility of labor, whereas the marginal product of labor is equal to real wage; hence *households alone* have an incentive to expand employment. By analogy with situations of a similar sort experienced in practice, it is natural to regard these as 'depression' states of the model. The interesting thing about 'depression' states is that it is not directly plausible to say that they cannot persist indefinitely. No doubt it can be asserted, with good reasons that any particular 'depression' state tends to be followed by another 'depression' state, and so on, *indefinitely*. This is clearly a dynamical stability question" (1960: p. 23).

disequilibrium model. In situation of involuntary unemployment, the excess demands for goods and labor were based on notional supplies and effective demands so that their sum (weighted by market prices) would be less than zero ([1956] 1965: p. 321). Then, in 1958, Patinkin addressed the validity of this law in Keynesian macroeconomics. He realized that the formulation of involuntary unemployment as a rationing in the labor market questioned its validity. By virtue of this law, it would not be possible to have an excess-supply in the labor market without having an excess-demand elsewhere in the economic system:

Walras' law relates to an economy in which all markets are in equilibrium. In the case of involuntary unemployment, on the other hand, there exists a state of excess supply –and hence of continued disequilibrium – in the market for labor. At first sight then, there would seem to be no place for the operation of Walras' law (Patinkin, 1958: p. 314).

In spite of these contradictions with his disequilibrium interpretation of the *General Theory*, Patinkin sought to maintain the validity of Walras' law. To this end, he assumed that workers adjusted passively their labor supply to the demand for labor:

One way out of this difficulty (there may well be others) is to assume it away by attributing to workers a completely passive behavior pattern according to which they adjust the amount of labor they plan to supply to the amount employers demand at the going wage rate (Patinkin, 1958: p. 314).

Under these circumstances, “equilibrium always [existed] in the labor market” (1958: p. 314) and so, Walras' law was respected. Patinkin acknowledged that his solution “[dodged] the real difficulties” (1958: p. 315). But the problem really was that the very existence of his disequilibrium analysis was in question. If the labor market was in “equilibrium”, the dynamic pressure supposed to act on wages in situation of involuntary unemployment did no longer exist. Accordingly, involuntary unemployment stopped being a dynamic phenomenon and so, Keynesian macroeconomics lost its status of disequilibrium theory. In a different way, the contemporaneous development in non-tâtonnement economics also emphasized the dynamic consequences of keeping Walras' law valid. Hahn and Negishi (1962) demonstrated that a general equilibrium system with disequilibrium transactions but in which Walras' law held good was stable. Clower may have heard about this article before the Royaumont conference since he was in touch with Negishi and followed the developments of the non-tâtonnement literature. And of course, as a careful reader of Patinkin's works, he surely noted Patinkin's

contradictions. Accordingly, Clower may have considered that the precondition to account for unstable dynamics in a disequilibrium model was to discard Walras' law.

It turns out that the theoretical message underlying the 1965 piece was that a break with the Walrasian framework was the key to vindicate the Keynesian heterodoxy. Such a view was expressed in section II of the "Counter-Revolution" paper, when Clower established a link between three "Keynesian indictments": the instability of the full employment equilibrium, the rejection of Walras' law, and the breaching of the "second postulate" (1965; p. 40). The core of the "Counter-Revolution" paper was devoted to the relation between the 'dual-decision' hypothesis and Walras' law. Clower demonstrated that the substitution of a "constrained demand" to a "notional demand" turned Walras' equality into an inequality in case of non-clearing labor market (1965: p. 53).³¹ This is the best known part of his argumentation, which is not the case of the relation between Walras' law and the instability of the full employment equilibrium. Clower contended that its validity entailed the existence of symmetric pressures on wage and price so that the return to the full employment equilibrium was ensured (1965: p. 52). But what would be the dynamic path of the economy if Walras' law was rejected? To answer this question, Clower considered a "typical" Keynesian situation. The labor market was in excess supply and the market for goods cleared – workers' effective demand was supposed to match entrepreneurs' notional supply of goods (1965: p. 54). In these circumstances, Clower seemed to consider that the economy might not return to a situation of full employment equilibrium:

The point of the example is merely to illustrate that, when income appears as an independent variable in the market excess-demand functions – more generally, when transactions quantities enter into the definition of these functions – traditional price theory ceases to shed any light on the dynamic stability of a market economy (1965: p. 55).

Since the disequilibrium theory sketched in the 1965 piece could integrate consistently the three main "Keynesian indictments", Clower firmly believed that he was taking the right direction to ground Keynes' economics.³² That is also why he did not hesitate to reject Walrasian microeconomics.

³¹ Note that market non-clearing and the breaching of the "second postulate" are two sides of the same coin.

³² Clower ended the discussion of his article at the Royaumont conference arguing that "people, including himself, had failed to understand that there was a general equilibrium interpretation of Keynes, namely the one

Conclusion

My paper aimed to explain the genesis of the “Counter-Revolution” paper. This was a difficult task since it entailed solving the mystery which, very often, surrounded Clower’s contributions. He was an ambitious economist, asked important questions to understand the functioning of market economies, and always provided promising intuitions to answer. But he rarely succeeded in formalizing the models that fully supported his views. So, intuitions were often put in the back burner. This makes it difficult to reconstitute the logic of his thought. Because of that, an archival work was necessary. It helped to reveal the intuitions, the intellectual influences, and the aims contemplated.

The 1965 piece was presented as the result of a *volte-face*. Clower’s (1965) advocacy of a disequilibrium theory and of an alternative to Walrasian microeconomics marked a break with the perspectives adopted in his early theoretical projects. There, Clower was not concerned with involuntary unemployment, and more generally, with individual disequilibrium and its consequences. Moreover, he considered that simple extensions of the Walrasian general equilibrium theory were sufficient to undertake the construction of his models. He moved away from these positions in a two-step process. In “Keynes and the Classics: A Reinterpretation”, Clower offered his first disequilibrium interpretation of the *General Theory*. Then, between 1960 and 1962, Clower came to conclude that the tâtonnement hypothesis and the standard theory of the consumer had to be rejected to ground Keynesian macroeconomics. In view of the interactions between Clower and Patinkin at the end of the 1950s, the author of *Money, Interest, and Prices* may have played a key role in the first move. Then, Clower’s decision to reject part of Walrasian microfoundations was explained as the result of his ambition to feature unstable market adjustment processes, and of his confrontation with both Patinkin’s (1956; 1958) contradictions and with the stability analyses led by Hahn and Negishi (1962). These influences show that interactions between Walrasian macroeconomics and non-tâtonnement economics contributed to the emergence of the search for disequilibrium foundations for Keynesian economics.

he had developed, which made all of the more familiar interpretation in terms of equational inconsistencies, rigid wages, liquidity traps, etc., unnecessary (Hahn and Brechling, 1965: p.309).

References

- Archibald, G.C., and Richard, G. Lipsey. (1960). Monetary and Value Theory: A Critique of Lange and Patinkin, *The Review of Economic Studies*, 26(1), pp. 1-22.
- Backhouse, R.E., and Mauro, Boianovsky. (2013). *Transforming Modern Macroeconomics: Exploring Disequilibrium Microfoundations 1956-2003*. Cambridge: Cambridge University Press.
- Barro, R., and Herschel, I. Grossman. (1971). A General Disequilibrium Model of Income and Employment, *American Economic Review*, 61(1), pp. 82-93.
- Burstein, ML., and Robert W. Clower. (1960). On the Invariance of Demand for Cash and Other Assets, *The Review of Economic Studies*, 28(1), pp. 32-36.
- Bushaw, D.W., and Robert W. Clower. (1954c). Price Determination in a Stock-Flow Economy, *Econometrica*, 22(3), pp. 328-343.
- Bushaw, D.W., and Robert W. Clower. (1957). *Introduction to Mathematical Economics*, Homewood: The Irwin Series in Economics.
- Clower, R.W. (1952a). *Theories of capital accumulation with special reference to their ability to explain the experience of the U.S since 1870*, Thesis submitted for the Degree of Doctor of Philosophy, Robert Clower papers, Box 1-2001-0088, David M. Rubenstein Rare Book and Manuscript Library, Duke University.
- Clower, R.W. (1952b). Mr. Graaff's Producer-Consumer Theory: A Restatement and Correction, *The Review of Economic Studies*, 20(1), pp. 84-85.
- Clower, R.W. (1952c). Professor Duesenberry and Traditional Theory, *The Review of Economic Studies*, 13(3), pp. 165-178.
- Clower, R.W. (1953). Business Investment and the Theory of Prices, *Proceedings of the Twenty-Eighth Annual Conference of the Western Economic Association*, pp. 22-24.
- Clower, R.W. (1954a). Productivity, Thrift and the Rate of Interest, *The Economic Journal*, 64(253), pp. 107-115.
- Clower, R.W. (1954b). An Investigation into the Dynamics of Investment, *The American Economic Review*, 44(1), pp. 64-81.

Clower, R.W. (c.1954a). On the Existence of a General Theory of Price Determination. Manuscript. Robert Clower papers, Box 4, David M. Rubenstein Rare Book and Manuscript Library, Duke University.

Clower, R.W. (1955). Toward a Generalized Theory of Price Determination. Manuscript. Robert Clower Papers, Box 4, David M. Rubenstein Rare Book and Manuscript Library, Duke University.

Clower, R.W. (c.1958). On the Microdynamics of Price Formation in N-Seller Markets. Manuscript. Robert Clower Papers, Box 4, David M. Rubenstein Rare Book and Manuscript Library, Duke University.

Clower, R.W. (1958). A Study of Elementary Learning and Response Mechanism in Dynamical Monopoly Model. Manuscript. Robert Clower Papers, Box 4, David M. Rubenstein Rare Book and Manuscript Library, Duke University.

Clower, R.W. (1959). Inductive Inference and Business Behavior. Manuscript. Robert Clower Papers, Box 4, David M. Rubenstein Rare Book and Manuscript Library, Duke University.

Clower, R.W. (1959a). Some Theory of an Ignorant Monopolist, *The Economic Journal*, 69(276), pp. 705-716.

Clower, R.W. (1959c). Stock and Flow Quantities: A Common Fallacy, *Economica*, 26, p. 251.

Clower, R.W. (1958). Keynes and the Classics: A Reinterpretation. Manuscript. Robert Clower Papers, Box 4, David M. Rubenstein Rare Book and Manuscript Library, Duke University.

Clower, R.W. (1960). Keynes and the Classics: A Dynamical Perspective, *The Quarterly Journal of Economics*, 74(2), p. 318-323, Reprinted in Walker [1984], pp. 21-26.

Clower, R.W. (1965). The Keynesian Counter-Revolution: A Theoretical Appraisal, In Walker [1984], pp. 34-58.

Clower, R.W. (1984). Afterword, In Walker [1984], pp. 259-272.

Clower, R.W. (1995). Economic Doctrine and Method: Selected Papers of R.W Clower, London: Edward Elgar.

De Vroey, M. (1999). The Marshallian Market and the Walrasian Economy: Two Incompatible Bedfellows, *Scottish Journal of Political Economy*, 46, pp. 319-338.

- De Vroey, M. (2004). *Involuntary Unemployment: The Elusive Quest for a Theory*, London: Routledge.
- De Vroey, M. (2016). *A History of Macroeconomics from Keynes to Lucas and Beyond*, Cambridge University Press.
- Duarte P.G., and Gilberto T, Lima. (2012). *Microfoundations Reconsidered: The Relationship of Micro and Macroeconomics in Historical Perspective*. Cheltenham: Edward Elgar Publishing Limited.
- Duesenberry, J.S (1949). *Income, Saving and the Theory of Consumer Behavior*. Cambridge, MA: Harvard University Press.
- Graaff, J. DeV. (1950). Income Effects and the Theory of the Firm, *Review of Economic Studies*, 23(2), pp. 79-86.
- Harrod, R.F. (1939). An Essay in Dynamic Theory, *Economic Journal*, 49(193), pp. 14-33.
- Gondolfo, G. (2010). *Economic Dynamics*. 4th edition. Springer.
- Hahn F.H., and Takashi Negishi (1962). A Theorem on Non-Tâtonnement Stability *Econometrica*, 30(3), pp. 463-469.
- Hicks, J. R. ([1939] 1946). *Value and Capital, an inquiry into some Fundamental Principles of Economic Theory*. 2nd ed. Oxford: Clarendon Press.
- Hicks, J. R. (1950). *A Contribution to the Theory of the Trade Cycle*. Oxford: Clarendon Press.
- Hoover, K. D. (2012). Microfoundational Programs, In Duarte and Lima [2012], pp. 19-61.
- Hurwicz, L. (1946). Theory of the Firm and Investment, *Econometrica*, 14, pp. 109-136.
- Keynes, J. M. ([1936] 2007) *The General Theory of Employment, Interest and Money*. New York: Palgrave Macmillan.
- Lange, O. (1944). *Price Flexibility and Employment*. Cowles Commission for Research in Economics Monograph no. 8. San Antonio: Principia Press Trinity University.
- Marcuzzo, M. C. (2012). *Fighting Market Failure Collected Essays in the Cambridge Tradition of Economics*. Routledge Studies in the History of Economics.

Modigliani, F. (1944). Liquidity Preference and the Theory of Interest and Money, *Econometrica*, 12(1), pp. 48-88.

Negishi, T. (1961). Monopolistic Competition and General Equilibrium *The Review of Economic Studies*, 28(3), pp.196-201.

Patinkin, D. (1956). *Money, Interest and Prices*. Evanston: Row Peterson.

Patinkin, D. (1959). Reply to R.W Clower and H. Rose, *Economica*, 26, pp. 253-255.

Patinkin, D. (1958). Liquidity Preference and Loanable Funds: Stocks and Flow Analysis, *Econometrica*, 59, pp. 1-27.

Plassard, R. (2017). The origins, development, and fate of Clower's 'stock-flow' general-equilibrium program of microfoundations. Working paper.

Rubin, G. (2002). From Equilibrium to Disequilibrium: the Genesis of Don Patinkin's interpretation of the Keynesian Theory, *The European Journal for the History of Economic Thought*, 9(2), pp. 205-225.

Rubin, G. (2005). La controverse entre Clower et Patinkin au sujet de la validité de la loi de Walras, *Revue Economique*, 56, pp.4-24.

Samuelson, P.A. (1947). *Foundations of Economic Analysis*. New York: Atheneum.

Triffin, R. (1940). *Monopolistic Competition and General Equilibrium Theory*. Cambridge: Harvard University Press.

Walker, D.A. (1984). *Money and Markets: Essays in Honor of Robert W. Clower*. Cambridge: Cambridge University Press.

Weintraub, E.R. (1979). *Microfoundations: the compatibility of Microeconomics and Macroeconomics*. Cambridge: Cambridge University Press.