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Brunner and Leijonhufvud: friends or foes?

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ABSTRACT

Karl Brunner and Axel Leijonhufvud constantly pointed out the prominence of imperfect information in macroeconomic analysis. This paper argues that, despite strong oppositions related to their rival schools of thought, this emphasis on informational problems led them to adopt similar views on many theoretical and methodological issues. These issues encompass the perception of the economic agent in society, the theory of price inflexibility and unemployment, the role of relative prices, the importance of signal-extraction problems and the position within the Marshall-Walras divide.

KEYWORDS Keynesian–monetarist debate; Marshall–Walras divide; history of macroeconomics

JEL CODES B22; D8; E12; E32

1. Introduction

In order to define the set of propositions he shared with a growing part of monetary economists, Karl Brunner introduced 50 years ago the term *Monetarism* into the mainstream vocabulary of economics. While Friedman seemed more interested in empirical and policy-oriented issues¹, Brunner (notably during his long association with Allan Meltzer) developed a theoretical framework devoted to formalise the tenets of Monetarism. Furthermore, David Laidler identified Brunner’s “stress on the importance of information and maximising agents’ search for it” as one of the “prominent characteristics of his particular brand of Monetarism” (2017, 11). Co-incidentally, Axel Leijonhufvud became an internationally-known author in 1968 when he published his *On Keynesian Economics and the Economics of Keynes*. His central thesis was that the income-expenditure approach

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*The views expressed are mine and not those of the Swiss National Bank.

¹ When asked to put his assertions in a broader theoretical perspective, Friedman simply chose the IS-LM apparatus and claimed that “the basic differences among economists are empirical, not theoretical” (1970, p. 234).

(Keynesian Economics) completely missed what he saw as the true message of Keynes (the Economics of Keynes), which would be based on communication failures. From this perspective, Peter Howitt considered that Leijonhufvud's book had "introduced the economics of information into macroeconomic theory" (2002, 285). In this paper, I propose a "debate" between Brunner and Leijonhufvud, namely between the monetarist and the Keynesian who pointed out the most strongly the crucial role of imperfect information in macroeconomic analysis. I particularly show that this emphasis led them to develop convergent positions on the theoretical and methodological grounds, in spite of deep differences related to their respective schools of thought.

It is worth recalling at this stage that in the late 1960s and early 1970s, the search for micro-foundations was going on quite intensely. Robert Gordon (1976) notably distinguished two strands in this quest. The first one, known under the "new microeconomics" label, mainly relates to the papers contained in the so-called "Phelps volume" (1970). In this group of essays, "the authors are mainly concerned with the factors which (1) make the natural unemployment rate greater than zero, and (2) explain the negative short-run Phillips-Curve relationship" (Gordon (1976, 205). According to Edmund Phelps, "The theoretical departure that is common to this otherwise neoclassical analysis is the removal of the Walrasian postulate of complete information" (1969, 148). However, this volume involved and was widely cited by authors of very different persuasions (such as Robert Lucas, Dale Mortensen, Thomas Sargent and, of course, Phelps), so that there was much confusion in those years about how the different approaches suggested did or did not fit together². The second one was termed "new-new microeconomics" by Gordon (1976). The aim was "to explain price and wage contracts, and hence sluggish price adjustment, as the result of microeconomic optimizing behavior" (207). A central component of this strand was the implicit contract theory³, which laid great stress on the heterogeneity in relative risk aversion between particular categories of agents

² The following quotations from Howitt (1984) illustrate this state of confusion: "Leijonhufvud is able to develop Keynesian ideas using the 'island' approach" (432); "Leijonhufvud's approach shares a great deal with modern rational-expectations theory in its focus upon signal-extraction problems" (442).

³ This theory was first developed by Costas Azariadis (1975), Martin Baily (1974) and Donald Gordon (1974).

(especially between employers and their employees), and was soon considered as an important contribution to the nascent New Keynesian literature.

The strong emphasis they put on information costs, especially along the lines drawn by Armen Alchian (who was a contributor to the Phelps volume), clearly placed Brunner and Leijonhufvud within the tradition of the new microeconomics. Hence, I could have proposed a debate between Leijonhufvud and Lucas, or between Brunner and Phelps, or even between Phelps and Sargent... I have nevertheless retained Brunner and Leijonhufvud for this debate, for two main reasons. First and foremost, the accent laid on informational problems was not restricted to a particular dimension of their work, or to a specific empirical fact in need of explanation. Instead, as we shall see, the significance of these problems was *pervasive* throughout their writings, whatever the issue addressed. Secondly, Brunner and Leijonhufvud belonged to schools of thought which debated extensively during this period, notably in public media. Their members were, and are still, portrayed as irreducible foes. Brunner and Leijonhufvud themselves were among the staunchest critics of their respective opponents. An aim of the proposed debate is to show that things are much less clear-cut.

Brunner and Leijonhufvud obviously held opposite views about important questions. For instance, Brunner stressed time and again that one of the main propositions of Monetarism dealt with the inherent stability of the private sector of the economy: “monetarists treat the economic system as stable. The system absorbs shocks and maintains stability if destabilizing policies are avoided... If such policies are avoided, the system will continue to fluctuate in response to real shocks, but the shock absorbing internal dynamics bound the deviations and move the system toward equilibrium” (Brunner and Meltzer (1997, 185)). This belief in the self-regulating capabilities of the market system legitimates “laissez-faire” arrangements. Leijonhufvud, especially in his first writings, took the opposite position. As raised by Laidler (2006), Leijonhufvud’s “version of the *Economics of Keynes* was, however, firmly based on the presumption that the experience of the inter-war years in general, and of the United States in the 1930s in particular, had demonstrated that market economies were inherently unstable” (11, italics in original). This instability makes a strong case for counter-cyclical policy actions.

A related issue for which Brunner and Leijonhufvud were also poles apart concerns the ability of market mechanisms to coordinate the allocation of resources in decentralised economies. Leijonhufvud highlighted throughout his writings the potential coordination failures characterising such economies. According to Michel De Vroey, Leijonhufvud's main message "was that a decentralized economy faces information and signaling problems, which make the coordination of economic agents' activities sub-optimal" (2016, 112). Indeed, communication failures⁴ between both sides of the market would prevent market forces from succeeding in coordinating individual choices. These failures could take place "intertemporally", given the inability of the interest rate to ensure the mutual consistency of saving and investment decisions. They could also take place between the spot markets for labour and consumption goods, "because unemployed people without money cannot bid for consumption goods" (Leijonhufvud (1983, 27)). This is the interaction between these two types of communication failure, which would give rise to states with "involuntary unemployment", a central concept in the work of Leijonhufvud. By contrast, Brunner perceived "market mechanisms (as) being capable of coordinating the activities of agents" (Laidler (1991, 639), brackets added). He was not interested by the investment-saving nexus, implicitly assuming that these decisions are continuously adjusted through interest-rate variations. Moreover, Brunner never considered involuntary unemployment, even in his analysis of the "stagflation" that occurred in the 1970s.

A last important question about which Brunner and Leijonhufvud had opposite viewpoints deals with the main impulses driving business cycles. Brunner pointed out in most of his writings the dominance of monetary shocks, which would be another proposition defining Monetarism. On the other hand, Leijonhufvud endorsed the "real" explanation advocated by Keynes and early Keynesians, namely that the bulk of cyclical fluctuations stems from exogenous changes in the marginal efficiency of capital. Both authors however tempered their positions in the 1980s, Brunner notably promoting "a more 'eclectic' view of the business cycle" (Brunner and Meltzer 1997, 154).

⁴ These communication failures were labeled as *effective demand failures* by Leijonhufvud (1973).

In this paper, I argue that these sharp differences hide many similar choices on the theoretical and methodological sides⁵. In [Section 2](#), I bring out the deep influence exerted by Alchian on Brunner and Leijonhufvud (who met Alchian at the UCLA^{6,7}) about two issues. The first one relates to the vision of the economic agent in society, Brunner and Leijonhufvud adhering to the evolutionary approach put forward by Alchian. The second issue concerns the nature of price inflexibility and unemployment. Alchian was a forerunner in the theory of “search” unemployment, and both Brunner and Leijonhufvud⁸ promoted this theory and advocated its introduction into macroeconomic analysis. In [Section 3](#), I stress the prominent role that they attributed to relative prices, particularly in their account of the transmission mechanism of monetary policy to aggregate demand. In addition, the alleged neglect of relative prices by Keynesian economics was the main reason advanced by Brunner and Leijonhufvud to dismiss both the income-expenditure approach and the IS-LM model. [Section 4](#) illustrates their emphasis on signal-extraction problems in the propagation of shocks. This is the case for monetary impulses and the related question of the short-run non-neutrality of money. This is also the case for real disturbances and the persistence of unemployment associated with stagflation. [Section 5](#) turns to their position within the Marshall–Walras divide. This section makes clear that Brunner and Leijonhufvud belonged to what Leijonhufvud (1998) called the “Classical” tradition, namely that of Alfred Marshall. They notably shared the state-of-rest conception of equilibrium held by this

⁵ As an organisational device, for each issue covered in the present paper, I will systematically begin by exposing the arguments of Brunner, then turn to that of Leijonhufvud, and conclude by confronting them in a final paragraph ([Sections 5.1.1 and 5.2](#) being the only exceptions).

⁶ In an interview with Arjo Klamer (1984), Brunner told that his encounter with colleagues at UCLA, and most particularly with Alchian, had been even more important than his encounter with Milton Friedman.

⁷ Brunner was at the UCLA from 1951 until 1966, Leijonhufvud from 1964 until the mid-1990s. However, they did not seem to have directly met and discussed there (e.g., in faculty seminars) between 1964 and 1966. Indeed, neither Brunner (e.g., in Klamer (1984)) nor Leijonhufvud (e.g., in Snowdon (2004) or Jayadev and Mason (2016)) mentioned in interviews any interaction between them. David Laidler, who had close contact with both of them, recalls that during their overlap time at UCLA Leijonhufvud was very much Robert Clower’s protégé (email to author) and that Clower and Brunner did not get along very well. Moreover, Brunner established his famous Konstanz seminars in 1970. Leijonhufvud attended one of them, in the early 1980s. He also got a visiting appointment there. In both cases, Brunner seemed to have no involvement.

⁸ As we shall see below, Leijonhufvud considered Alchian’s theory as a necessary condition to involuntary unemployment.

latter. However, they differed from most professed “Marshallians” (such as Friedman) by coping with the “interdependence problem”⁹ through a general-equilibrium perspective. At the same time, they addressed similar criticisms to Walrasian economics, and especially to the New Classical Macroeconomics. [Section 6](#) concludes¹⁰.

2. The influence of Armen Alchian

Alchian is considered one of the leading figures of the above-mentioned “new microeconomics”, whose aim was to introduce informational problems into price theory in order to deal with institutional issues.

2.1. An evolutionary conception of the economic agent

Brunner and Leijonhufvud both referred to Alchian’s article entitled “Uncertainty, Evolution, and Economic Theory” (1950). In this important contribution, Alchian argued that the criterion of profit or utility maximisation, usually postulated by the standard economic analysis, applies only in case of perfect information. Alchian thus proposed to go back to “a Marshallian type of analysis combined with the essentials of Darwinian evolutionary natural selection” (213). He stressed that realised positive profits (which, contrary to maximum profits, represent the “pertinent requirement” (213)) could be achieved by *adaptive* behavior, notably through imitation and trial-and-error processes: “rules of behavior turns out to be codified imitations of observed success, e.g., ‘conventional’ markup, price ‘followship’, ‘orthodox’ accounting and operating ratios, ‘proper’ advertising policy, etc” (218). Once having recognised the necessity to escape from the standard maximisation criterion, “most conventional economic tools and concepts are still useful, although in a vastly different analytical framework – one which is closely akin to the theory of biological

⁹ This expression is borrowed from Kevin Hoover (1984).

¹⁰ A referee of this paper raised that it would have been worthwhile to compare the positions of Brunner and Leijonhufvud about monetary rules and regimes. Indeed, Leijonhufvud published extensively about monetary regimes, analysing both processes of (high) inflation and constitutional designs of monetary regimes in depth. Brunner, however, did not seem to share the same interest about these questions. I was not able to find dedicated work on these issues in his writings. David Laidler suggested that the important literature on central bank laws and inflation that Robin Bade and Michael Parkin had started in the late 1970s (notably in Bade and Parkin (1978)) could have some connections with Brunner (email to author). Nevertheless, Parkin only recalls that Brunner had, at best, “a limited interest in this topic” (email to author).

evolution. The economic counterparts of genetic heredity, mutations, and natural selection are imitation, innovation, and positive profit” (220).

This evolutionary approach was shared by Brunner and Meckling (1977) and Brunner (1987a). Brunner and Meckling especially introduced the acronym *REMM*, for “Resourceful, Evaluating, Maximizing Man”, to depict their conception of man in society. According to Brunner (1987a), “Resourcefulness, evaluating and maximizing behavior possess a common basis ... (for which) the individual is born with a biological and genetic heritage” (371, brackets added). However, the term “maximizing” should not be understood in the usual sense of the neoclassical theory. Indeed, Brunner emphasised that “rationality is perhaps a more basic component of the hypothesis than maximizing behavior. Limited computational facilities of computers and human minds, the cost of gathering and interpreting information and often a diffuse uncertainty prevent the expression of rational behavior in terms of straightforward maximization. Rational behavior produces instead a set of more or less conscious rules of procedure” (374)¹¹. Moreover, resourcefulness is such that “Man searches, probes, copes and experiments and is not a passive entity ... Resourcefulness, thus, prepares the ground for the evolutionary analysis” (371).

The influence of Alchian’s evolutionary conception on Leijonhufvud (1993) was most clearly expressed in a paper entitled “Towards a Not-Too-Rational Macroeconomics”, where Leijonhufvud described the program of computational methods in which he was involved at UCLA. In the abstract of this article, he argued that “The evolutionary view of Alchian should be used as a framework for theory construction in the field of macroeconomics and it can be modelled in a computable way”. Leijonhufvud further pointed out that “To understand what is actually going on, I strongly believe, one must abandon this entire mode of theory construction and rethink the matter from Alchian’s evolutionary perspective” (p. 12). The central role he gave to adaptive behaviour even appears in the title of another paper, namely “Adaptive Behavior, Market Processes and the Computable Approach” (1995). Such a behaviour would imply that

¹¹ This led Laidler (1991) to raise that “Karl’s *REMM* is a much more interesting and subtle creature than the mechanically maximizing *homunculus oeconomicus* of the intermediate microeconomics textbook, who is currently coming to dominate macroeconomics, too” (p. 636, italics in original).

agents “do not pick optimal points *ex-ante* from given opportunity sets. Instead, they obey simple feedback-based *decision rules* in less than completely known environments” (Leijonhufvud (1993, 9, italics in original)).

Brunner and Leijonhufvud thus shared the evolutionary vision of the economic agent suggested by Alchian. This agent operates under incomplete information. In such a context, the usual maximisation criterion is no longer relevant. His behavior is adaptive and manifests itself notably through the adoption of simple rules of thumb.

2.2. Price inflexibility and unemployment

Alchian exposed his theory of price inflexibility and unemployment of resources in the various editions of his book with William Allen and in Alchian (1969). Concerning the labour market, he argued that the theory of his time took unemployment as resulting from the inability of wages to adjust to shocks. Wage rigidities, in turn, were set in an ad-hoc manner, through union monopolies, minimum wage laws or even “conventions and taboos” (p. 109). Alchian, instead, aimed at truly finding an explanation of wage inflexibility and unemployment, namely one which would be consistent with individual rationality (p. 109).

His story starts by assuming that gathering information about jobs involves some costs, which are smaller when workers are unemployed. Moreover, “Changes in aggregate demand confuse the public. Each seller notices a changed demand for his current product, but he cannot tell if that is a change also in aggregate demand, which affects options elsewhere” (p. 121). Hence, when faced with a cut in his wage, a worker can fail to perceive that it is actually the equilibrium market wage, which has fallen. It is, therefore, rational for this worker to refuse the reduction in his wage (thus preventing wage adjustment) and to become unemployed in order to search for a better alternative: the rise in unemployment stems from a “lag of discernment” (p. 122) on the side of workers, i.e., from a signal-extraction problem. All this clearly anticipates “search” theory popularised by Diamond, Mortensen, and Pissarides.

Alchian stressed that this analysis could more generally apply to various types of resources and could thus explain price inflexibility and unemployment of “nonhuman goods as well as human services”

(p. 109). The seller of a particular asset is rewarded the selling price minus his search cost, while the buyer pays the selling price plus his search cost. Besides, a perfectly “liquid” asset is defined as one for which the maximum price that a seller can expect is reached instantly, with no search cost (p. 112).

Brunner shared the same diagnostic as Alchian about the inability of the received price theory to explain price inflexibility and unemployment¹². According to him, this inability resulted from the full information assumption underlying this theory. He thus proposed to introduce information costs into price theory through the lens of the recent (at that time) approach suggested by the “new micro-economics”. He notably referred to the book of Alchian and Allen in Brunner (1970, 4) and to the Phelps volume (1970) in which Alchian (1969) was reprinted (Brunner (1971, 26)). The following sentence brings out that it is the procedure advocated by Alchian to introduce information costs that Brunner had in mind: “the relevant costs for the buyer include both price and the marginal cost of information and adjustment. Similarly, for the seller information and adjustment costs must be subtracted from the market price in order to obtain the relevant net market return” (p. 21).

The implications drawn are the same as Alchian: price inflexibility and the unemployment of resources are consistent with individual rationality. In Brunner’s words: “Relative short-run price inflexibility thus emerges as a rational consequence of wealth-maximizing behavior in the context of incomplete market information” (p. 21) and “We obtain in this manner a price theory ... (which) explains, in particular, the occurrence of unused resources as a consequence of wealth-maximizing behavior” (Brunner (1970, 4), brackets added). Moreover, it is worth noting that in his interview with Klamer (1984), Brunner seems to suggest that Alchian’s theory of unemployment and price inflexibility was developed in close connection with Brunner himself: “These discussions (with Alchian, about unemployment) are clearly reflected in the first edition of Alchian’s textbook” (p. 183, brackets added).

Leijonhufvud largely referred to the theory of price inflexibility and unemployment developed by Alchian in order to explain Keynes’s

¹² “Such phenomena remained essentially unintelligible, unless one contrived to introduce arbitrary constraints justified by theoretically extraneous ‘social conventions’” (Brunner (1971, 31)).

concept of “involuntary unemployment”. This is particularly true in his 1968 book, where the analysis led in Chapter 2 (from page 76 to page 81) relies heavily upon Alchian’s theory. This was obviously acknowledged by Leijonhufvud: “Here the analysis paraphrases the article by Alchian quoted above” (p. 78, fn.24). The article to which the reference is made is Alchian (1969), but when Leijonhufvud’s book was published, it was still not the case for the article by Alchian, article whose title was a bit different from the one finally chosen: “The opportunity to read an unpublished article by Professor Alchian, ‘Unemployment and the Cost of information’, is gratefully acknowledged” (Leijonhufvud (1968, 69), fn.3).

Nevertheless, Leijonhufvud argued that “Alchian’s analysis remains perfectly applicable to the explanation of individual behavior in a state of ‘involuntary’ unemployment, and the initial ‘inflexibility’ of reservation prices that his analysis implies is, indeed, a necessary condition for the emergence of such a state. But it is not sufficient” (p. 81). According to Leijonhufvud, “Keynes’ involuntary unemployment is fundamentally a product of the cumulative process, which he assumed the initial increase of unemployment would trigger”. Leijonhufvud termed “multiplier” this cumulative process, which he related to the “dual-decision” hypothesis built by Robert Clower (1965). The workers who become unemployed (along the lines of Alchian’s theory) fail to realise desired sales of labour and thus find their consumption demand income-constrained. The resulting fall in consumption expenditures leads firms to reduce their labour demand further, generating more unemployed workers who, in turn, cut their expenditures, and so on.

Leijonhufvud (1969) acknowledged, however, that permanent income or life-cycle approaches of consumption, which link consumption to wealth rather than to current income receipts, do not imply that unemployed workers should cut their expenditures. A deviation-amplifying process, and then a state of involuntary unemployment, cannot develop with such approaches. To reconcile these latter with the multiplier, Leijonhufvud relied again on Alchian’s theory. However, he no longer applied this theory only to labour. Instead, he extended it to all the assets that comprise the net wealth of workers. Most of these assets, exactly as labour, are illiquid in the sense that some time and search are required to sell them at the maximum price. Consequently, “We may thus envisage an individual who, while

he regards his ‘wealth’ as in itself justifying a maintenance of accustomed living standards, finds that no component of his net worth can be realised at a market price that meets the reservation price he puts on it. He finds himself ‘locked in’, in effect, with the balance sheet he has. Only in this way, we can rationalise the behaviour of consumers who let current income receipts be the operative constraint on their consumption. The multiplier emerges from this analysis as an *illiquidity* phenomenon” (p. 44, italics in original).

To summarise, Brunner and Leijonhufvud referred extensively to the theory of price inflexibility and search unemployment of Alchian. Brunner endorsed this theory to describe the unemployment of labour as well as non-labour assets. Leijonhufvud used this theory in the explanation of involuntary unemployment. Hence, both Brunner and Leijonhufvud contributed to the introduction of Alchian’s approach of price inflexibility and unemployment into the macroeconomic analysis.

3. The central role of relative prices

3.1. *The transmission mechanism of monetary policy*

The transmission mechanism of monetary policy considered by Brunner and Meltzer, throughout their writings, relies on the relative behavior of two prices. On the one hand, the price of existing real assets, denoted by P , which is actually the price of *existing* real capital. On the other hand, the price of output, denoted by p , which is the price of the item that is used both for building *new* real capital and for consumption purposes. Brunner and Meltzer postulated higher costs of acquiring information for the output market than for the assets market¹³. This implies that the price of output adjusts only sluggishly to monetary shocks, while the price of assets adjusts instantaneously: an acceleration in the monetary base thus induces an increase in the ratio of P to p . This means that the price of new capital has fallen relative to the price of existing capital, stimulating investment (i.e., the production of new capital). Furthermore, the increase in the P to p ratio also generates a positive wealth effect and then a rise in consumption. Consumer expenditures, therefore, rise directly, “affected with equal speed as investment expenditures” and

¹³ Notably in Brunner (1970, 4–5 and 1971, 32–33) and Brunner and Meltzer (1972a, 954–955).

not “delayed by the prior operation of a multiplier mechanism set in motion by earlier changes of investment expenditures” (Brunner (1971, 54)).

Brunner acknowledged on various occasions that this mechanism was basically the same as the one exposed by Keynes in the *Treatise on Money* and in the *General Theory*. Especially, in Brunner (1970): “The monetarist analysis... exploits on the other hand suggestions from Keynes, Wicksell, and Fisher. Keynes argued essentially in the context of a relative price process. For simplicity, he identified bonds and real capital. This meant that every change of the interest rate necessarily involved a change in the relative price of existing real capital relative to consumables (or output). A change in interest rates was then equivalent in Keynes’ analysis to a change in the relative price of existing real capital. This relative price change either lowered the relative market price of newly produced capital goods or lowered the marginal cost of new production relative to its market price governed by the price on existing real capital” (p. 3, brackets in original).

Leijonhufvud stressed that one of the main aims of his 1968 book was to demonstrate that relative prices play a crucial role in Keynes’ theory: “It will be argued here that not only the interest rate but *relative prices generally, play a more important role* in Keynes’ thought than they have usually been accorded. The price-theoretical content of the *General Theory* appears to have been generally underestimated” (Leijonhufvud (1968, 15), italics in original). This role concerns the emergence of unemployment and its potential cure through automatic price adjustments: “the ‘trouble’ arises from inappropriately low prices of augmentable non-money assets relative to both wages and consumer goods prices. *Relative values are wrong*. Consequently, balanced deflation (as implied by the Pigou argument) will not correct the situation” (p. 46, brackets and italics in original). The importance of relative prices also deals with the transmission mechanism of monetary policy. Indeed, Leijonhufvud devoted the main part of Chapters 3 and 4 of his book to the impact of monetary policy on investment and consumption, respectively. He argued that in *the Economics of Keynes*, the transmission of monetary policy to aggregate demand operates through relative-price movements.

As indicated in the previous quotation, Leijonhufvud considered that two relative prices are critical in Keynes’ theory: first, the ratio of the demand price of real capital, i.e., P , to its supply

price, i.e., the nominal wage w ; second, the ratio of P to the price level, i.e., p . Informational problems (in relation with Alchian's theory of price inflexibility) entail that p and w are relatively sticky. At the same time, Leijonhufvud pointed out that Keynes, in the *Treatise on Money* as well as in the *General Theory*, lumped real capital with long-maturity bonds. This induces P to be highly sensitive to variations in the long-run interest rate. Hence, when an expansion in the monetary base occurs, the resulting decline in the long-run interest rate implies a large increase in P relative to p and w . Therefore, an expansionary monetary policy generates an increase in both P to w and P to p ratios. A rise in investment is associated with the increase in the first ratio. Simultaneously, the increase in the P to p ratio produces a positive wealth (or "windfall") effect which raises consumption. Leijonhufvud emphasised that this increase in consumption directly results from relative-price movements and is thus not simply induced by a previously raised income (p. 328).

Brunner and Leijonhufvud both described the transmission process of monetary policy to aggregate demand as operating through relative-price variations. For Brunner, consumption and investment positively depend on the P to p ratio. For Leijonhufvud, consumption also depends on this ratio while investment is positively related to the P to w one. For both of them, the fluctuations in consumption are direct and not the result of variations in income. Relative-price movements occur since informational problems prevent p and w from adjusting as rapidly as P to monetary impulses. Interestingly, Leijonhufvud (2000) noted the similarity between the transmission mechanism in the Economics of Keynes and the one advocated by Brunner and Meltzer: "Brunner advanced the concept of the interest rate as expressing the relationship between the (often implicit) rental value and the market value of all types of assets, real as well as financial. A decline in the interest rate, for instance, raises the demand price of an income stream relative to its rental. (This had basically been Keynes's concept also)" (p. 129, brackets in original).

3.2. The dismissal of Keynesian economics

Brunner was eager to stress that the transmission mechanism of monetary policy he proposed with Meltzer was very different from the one contained in the income-expenditure approach developed by early

Keynesians. In this approach, relative prices are of limited importance: “The Keynesian reinterpretation of Keynes discarded, however, price theory. It also developed a macro theory as an independent field partly conflicting with relative price theory” (Brunner (1971, 31)). This happens since “According to this analysis, real capital inherited from the past is frozen into the portfolios of individual agents’ wealth positions. It exists and decays beyond any portfolio adjustments proceeding on the market. No asset price P can emerge under the circumstances and relative variations of P and p cannot guide investment or consumption” (Brunner (1974, 32)).

Brunner asserted time and again¹⁴ that the income-expenditure approach promoted a borrowing cost interpretation of the interest rate, for which “The role of interest rates as the relative price of future consumption is neglected” (Brunner and Meltzer (1972b, 843)). Moreover, “The borrowing cost interpretation... narrowed the channel transmitting monetary impulses to a small range of expenditure categories. It was thus frequently concluded... that the interest elasticity of aggregate demand is negligible... The Keynesian view thus implied that monetary policy was unreliable”. (Brunner (1971, p. 46)). Ironically, Brunner and Meltzer (1972b) claimed that Friedman’s (1970, 1971) adoption of the income-expenditure framework to summarise his views had led him to accept this interpretation of interest rates and then to drop the importance of relative-price movements¹⁵.

Brunner (1970) pointed out that the transmission process of monetary policy he put forward with Meltzer, which crucially rests on relative-price variations, should lead to rejecting the IS-LM model. Indeed, “The relative price process... introduced substitution and wealth adjustment channels which... occur as shifts of the IS and LM curves” (p. 4). This means that monetary impulses entail some shifts in the IS schedule which do not occur in standard analyses led with IS-LM. These shifts have two implications. First, they sharply dampen the role of the elasticities of the IS and LM schedules in the transmission of monetary policy: “In the context of the Keynesian analysis, the transmission of monetary impulses was essentially governed by the slopes of the two curves in the paradigmatic IS-LM apparatus... The relative price approach radically

¹⁴ See notably Brunner (1970, 1971) and Brunner and Meltzer (1997).

¹⁵ “Friedman avoids developing an alternative to the Keynesian analysis of the ‘transmission mechanism’ with its emphasis on borrowing costs. Equally important and related... Friedman avoids any explicit role for relative price changes and the application of price theory to aggregative analysis” (p. 843).

changed the outline of the transmission process. The slopes of the two curves in the IS-LM diagram are not sufficient to summarize the relevant information”. Secondly, they transform the whole IS-LM apparatus into a cumbersome and irrelevant framework: “The heavy emphasis on the shift properties of the IS-LM curves reflecting the substitution processes and the wealth adjustments set in motion by a monetary impulse converts the traditional IS-LM diagram into a rather inconvenient description” (p. 5).

Leijonhufvud (1967, 404–405) emphasised that “Relative prices are, indeed, allowed little play” in what he termed *Keynesian Economics*, i.e. the income-expenditure approach. This stems from the “aggregative structure” retained by this approach, which lumps together consumer and capital goods. As a result, “The price of capital goods in terms of consumer goods is fixed” (p. 404). He concluded that Keynesian economics involves “a theory in which neither relative values nor monetary phenomena are ‘important’” (p. 402). In a nutshell: “Keynes’ successors immediately reverted to an algebraic model devoid of relative prices and with only a single commodity aggregate – a model which showed no trace of the analytical problem that Keynes had wrestled with for a decade” (Leijonhufvud (1968, 24)).

According to Leijonhufvud, early Keynesians perceived interests rates as borrowing costs, leading them to downplay the effectiveness of monetary policy: “In the income-expenditure literature, therefore, the general case against reliance on monetary policy was based on the postulate of a very low interest-elasticity of investment. The decisive impetus to this latter thesis came from the famous Oxford Surveys, which seemed to indicate that variations in borrowing costs had very little influence on the investment plans of businessmen” (p. 158–159). Leijonhufvud (2000) further recalled that Friedman, after having initially raised the importance of relative-price movements in the transmission process of monetary policy¹⁶, had subsequently neglected their role when he had used the income-expenditure approach to express his positions: “The relative price mechanism, therefore, is fading out of the picture” (p. 130).

Within the IS-LM model, the standard practice to analyse the consequences of a particular disturbance consists in shifting one curve while holding the other constant. Leijonhufvud (1980b) argued that such practice implicitly assumes that agents have incomplete

¹⁶ Notably in Friedman and Schwartz (1963b).

information about the shock which shifts the curve: “Once the sequence is spelled out in this way, it is obvious that the analysis definitively does assume incomplete information” (p. 19). Instead, theories that assume full information would require that both curves shift at the same time. Two consequences ensue. First, “the steady-state elasticities view is seen to be misleading. What the response to a particular impulse will then depend upon the state of information and not just on steady-state behavioral parameters” (p. 14). Secondly, “It is also apparent that IS-LM can be a cumbersome inappropriate framework for representing theories that make non-standard assumptions about the knowledge of transactors and, consequently, about the time-phasing of events” (p. 19). Leijonhufvud, therefore, concluded: “So is the procedure of shifting LM, keeping IS constant – or vice versa – justified? The answer is: Sometimes, perhaps often, but not necessarily or always. And that is very largely what is the matter with IS-LM” (p. 32).

Brunner and Leijonhufvud dismissed Keynesian economics for having developed an approach in which the importance of relative prices (and notably the ratio of P to p) is discarded. They stressed that this approach (that even Friedman used on occasion) underrated the effectiveness of monetary policy, since interest rates were considered as borrowing costs displaying a limited impact on aggregate demand. Brunner and Leijonhufvud thus rejected one of the main ingredients of Keynesian economics, namely the IS-LM model. This model would be intractable for analysing the consequence of shocks and would have contributed to place the elasticity debate (which both of them found irrelevant) at the heart of the “Monetarist controversy”.

4. Signal-extraction problems and the propagation of shocks

Signal-extraction (or inference) problems tackled by Brunner and Leijonhufvud relate to the non-neutrality of money in the short run, as well as the persistence of unemployment associated with stagflation¹⁷.

¹⁷ The arguments developed in this section are close to those exposed in [Section 2.2](#). I have, however, chosen to treat them separately. Indeed, the object of [Section 2.2](#) has been the direct application (and the promotion) of Alchian’s theory of price inflexibility and unemployment by Brunner and Leijonhufvud. This theory involves a particular type of signal-extraction problems (between aggregate and idiosyncratic shocks), essentially in the labour market. Instead, the present section deals with alternative types of inference problems (notably between permanent and transitory shocks) which do not necessarily occur in the labour market. We may infer that these differences could explain why Brunner and Leijonhufvud did not mention Alchian’s theory in this part of their work.

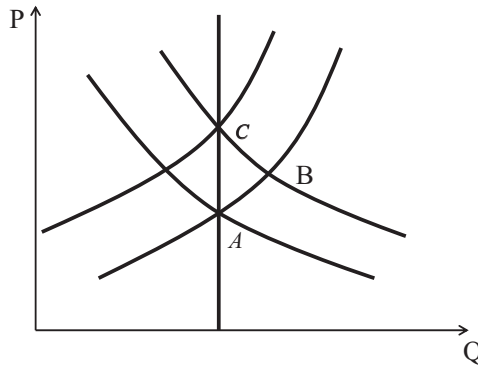


Figure 1. Short-run non-neutrality of money in Brunner and Meltzer (1997).

4.1. Monetary shocks and the non-neutrality of money

For a long time, Brunner considered that fluctuations in real output resulted mainly from exogenous variations in the growth of the monetary base¹⁸. The explanation of the non-neutrality of money in the short run is most clearly exposed in Brunner and Meltzer (1997)¹⁹. As illustrated by Figure 1, they used a standard aggregate supply/aggregate demand apparatus for which the aggregate-supply curve has a positive slope and the aggregate-demand curve a negative slope in the real output/price level plan. The position of the aggregate-supply curve depends on nominal wages (the higher these wages, the higher the position of the curve in the plan). There is also a vertical line which represents the level of “normal” real output. Note that the term “normal” refers to the Marshallian lexicon, an issue about which I will turn below.

The analysis starts from “an initial position located on the normal output line. An expansionary monetary policy action is undertaken to raise output above the normal level. Initially, output and the price level rise from point *A* to point *B*. Recognition of the permanence of the change induces a corresponding adjustment in wage contracts, pushing aggregate supply toward position *C*. The movement from *B* to *C* is slow, if the expansionary policy action is interpreted as a transitory change and more rapid if the change is perceived to be permanent. Recognition does not occur all at once and is not uniform for all market participants. The relevant operation of transaction costs,

¹⁸ This “stylised” fact would have been well documented by Friedman and Schwartz (1963a).

¹⁹ The argumentation developed there was first described in Brunner, Cukierman, and Meltzer (1983).

particularly costs of negotiation, interacts with the recognition problem to delay full adjustment” (p. 129–130).

Hence, the real effects of permanent monetary shocks stem from the failure by some agents (firms as well as workers) to initially recognise²⁰ the permanent dimension of monetary impulses: these agents interpret such impulses as only transitory and rationally choose to keep wages and then prices unchanged²¹. Brunner (1980) stressed that this type of signal-extraction problem (between permanent and transitory shocks) seems more relevant than the one (between local and global shocks) put forward by Lucas in his “island” models, notably since this latter type would not explain “the lamented unresponsiveness of prices to current conditions” (p. 417). Moreover, the capacity of monetary policy to enhance real activity will be reduced with further monetary expansions since “At some point, market participants recognize that the effects on output are temporary, while the effects on prices are permanent. Wages and costs adjust more rapidly and the aggregate supply curve moves faster; the upward shift accelerates” (Brunner and Meltzer (1997, 131)).

Throughout most of his work, Leijonhufvud saw the fluctuations in real variables as mainly stemming from real disturbances, especially the exogenous changes in the Marginal Efficiency of Capital (henceforth “MEC”) advocated by Keynes. Nevertheless, he later acknowledged the importance of monetary impulses. In Leijonhufvud (1986), he claimed: “My inference is that real impulses (with endogenous money) predominated until the mid-1960s and that while real impulses are still intermingled later, nominal ones predominate” (p. 414, brackets in original). Now, to the best of my knowledge, he did not provide a complete account of the way monetary shocks generate fluctuations in real variables.

However, he gave some interesting insights into Leijonhufvud (1981b). On the one hand, if solely monetary shocks occurred, a monetary expansion would induce economic agents to raise prices proportionally. On the other hand, if solely real shocks happened, an exogenous increase in the MEC would entail an endogenous increase

²⁰ Brunner and Meltzer spoke about a “recognition lag” (p. 144). As we shall see later, the assumption that agents fail to distinguish between permanent and transitory shocks was introduced by Brunner, Cukierman, and Meltzer (1980).

²¹ In this case, indeed, the expected gains of adjusting wages are lower than the costs incurred to renegotiate them. Wages are kept unchanged and so are prices, which are set by firms that apply a constant markup over marginal costs.

in credit and then in monetary aggregates, but prices would not be raised in proportion. When both types of disturbances can be present and may further interact, “transactors will have a difficult time sorting nominal from real shocks” (p. 22) so that monetary impulses can have real effects. Indeed, “When the base is seen to expand, is it an extension of ‘real credit’ by the Central Bank? Or is it a nominal scaling-up of all values in the system, so that one’s prices should be marked up proportionally? Uncertainty on this score could produce stickiness of nominal prices in the face of monetary expansion” and therefore, fluctuations in real output. This inference problem would provide “a more plausible reason for short-run non-neutrality of money than does the ‘islands’ story”. In addition, “As the economy learned to adapt, finally, to the incessant discretionary manipulation of a fiat money totally without an anchor, the lags in response of prices and nominal short-term rates shortened” (p. 14).

In order to explain the short-run non-neutrality of money (and the associated rigidity of prices), Brunner and Leijonhufvud stressed the prominent role of signal-extraction problems. Brunner emphasised inference problems between permanent and transitory monetary shocks, while Leijonhufvud invoked inference problems between monetary and real shocks. They further pointed out that the repetitive use of unexpected monetary impulses by central banks induces agents to recognise such impulses more rapidly. This would imply an ‘acceleration’ of wage and price adjustments, hence reducing the duration of real effects.

4.2. Real shocks and persistent unemployment

In the 1980s, as evidence accumulated, Brunner (1983, 29) tempered his former position about the dominance of monetary shocks in real-output fluctuations. He argued that “The movement of output, meanwhile, reflects an interaction of monetary and real shocks”. The first manifestation of this change can be found in Brunner, Cukierman, and Meltzer (1980), where the high and persistent unemployment associated with the stagflation that occurred from the mid 1970s would be the result of permanent negative shocks on labour productivity.

In their framework, there is “speculation of labor over time as in Lucas and Rapping (1969)” (p. 469, fn.5): the supply of labour is a positive function of the gap between the current real wage and the real wage perceived as permanent (or ‘normal’). If workers could distinguish between the permanent and transitory components of productivity, they would immediately reduce their estimation of the permanent wage in response to a permanent decline in productivity. The current wage and the perceived permanent one would fall commensurately so that workers would not modify their labour supply. However, economic agents can actually observe only productivity as a whole: they are unable to distinguish between its permanent and transitory components. Some workers wrongly interpret a permanent decline in productivity as a transitory one and thus do not immediately reduce their estimate of the permanent wage. The current wage is, therefore, lower than the perceived permanent wage, which induces these workers to substitute current for future leisure and then to become ‘unemployed’.

Moreover, unemployment can persist well after the shock has occurred. Indeed, workers stay unemployed as long as their estimation of the permanent wage is not fully adjusted to the new permanent component of productivity. The elasticity of expectations depends on the relative frequency of permanent and transitory shocks. When “people are unaccustomed to permanent shocks, they take longer to believe that the productivity shock is permanent after it occurs” (p. 489). In this case, expectations are relatively inelastic and unemployment is persistent: “Infrequent permanent shocks lengthen the period of stagflation”.

Another important corollary of the inability to distinguish permanent from transitory shocks is the emergence of wage ‘stickiness’ (p. 481). Indeed, “When people believe that the permanent level of productivity is higher than the actual level, they refuse offers of employment at wages below the wage they believe should prevail” (p. 483–484). This limits the downward adjustment of current wages: “Real wages decline on impact but do not fully respond to the shock until the permanence of the shock is recognized” (p. 490).

I have mentioned above that Leijonhufvud (1980a) (in most of his writings) took for granted that exogenous changes in the MEC were the main impulses of real-output and unemployment fluctuations.

In “Theories of stagflation”, he also explained the persistent unemployment that characterised this phenomenon by permanent negative shocks on the MEC²².

In this paper, as in many others, Leijonhufvud assumed that the demand for money of investors on the financial markets takes the ‘speculative’ form considered by Keynes: money demand is a negative function of the gap between the market interest rate and the interest rate perceived as ‘normal’. Suppose that, whenever a permanent decline in the MEC occurs, “all agents perceive correctly what has happened” (p. 7–8). Investors should immediately reduce their estimation of the normal rate. The market and perceived normal rates should fall commensurately so that investors should not modify their demand for money. For a given money supply, there should be no excess demand for money and aggregate demand should, therefore, stay at its full-employment level. However, “all agents will not in general correctly assess what is happening” (p. 8). Investors are assumed to have a less accurate perception of the MEC than entrepreneurs²³. In addition, Leijonhufvud (1983, 22) recalled that “historically, the average real rate of return has not been a volatile variable”. This induces investors to form expectations which are inelastic. Consequently, they do not immediately reduce their estimation of the normal rate when a permanent decline in the MEC occurs. The market rate is thus lower than the perceived normal rate, which implies an increase in their money demand. For a given money supply, the resulting excess demand for money generates a fall in aggregate demand, which stands below its full-employment level until investors completely revise their beliefs.

Hence, the fall in aggregate demand is explained by the failure of investors to recognise the permanent dimension of the decrease in the MEC. In other words: “What the theory says (roughly) is that it is only the unanticipated or, better, *unrecognized part* of this *real disturbance* that has an effect on aggregate real income and employment” (Leijonhufvud (1981a, 198–199), brackets and italics in original). Moreover, workers are assumed to lack information about wage rates

²² These shocks, and the related theory, would “explain the persistently disappointing performance by the American economy in this period (1965–1980)” (p. 26, brackets added).

²³ As a result, there are “inconsistent beliefs of firms and security market investors about the realizable rate of real profit in the economy” (p. 9).

in other jobs²⁴. In order to determine their reservation wages, they take past wages as references. They thus form inelastic expectations, which prevents reservation wages from being immediately adjusted to the lower demand for labour. As a result, the workers to whom lower wage proposals are made refuse them: “We may suppose that the one thing workers will not do is to auction off their services for the day at whatever wage employers will pay in total disregard of their own beliefs about the equilibrium rate is” (Leijonhufvud (1980a, 9)). Two consequences ensue. First, these workers become (‘speculatively’) unemployed so as to search for better wage offers elsewhere. Second, rejection of lower wages produces wage stickiness. Nevertheless, Leijonhufvud was anxious to warn the reader that even if workers finally accepted lower wages, it would not cure unemployment: “large-scale unemployment persists and even the willingness of labor to reduce the money wage will not help” (Leijonhufvud (1981a, 167)). The ultimate cause of unemployment is to be found in the financial market, rendering any adjustments in the labour market futile: “*With the interest rate at the right level, market forces should make unemployment converge on its ‘natural’ rate – but otherwise not*” (p.169, italics in original).

Leijonhufvud (1973) further pointed out that the persistence of unemployment increases in the case of large disturbances. He first raised that real-world economies are stock-flow economies, in which agents accumulate important amounts of liquid assets (or cash balances) so as to maintain the level of consumption when current receipts decline. Hence, when a relatively small decline in the MEC takes place, the resulting unemployed workers hardly reduce expenditures by drawing in their liquid assets²⁵. In this case, the economy stays *within the corridor*: deviation-amplifying forces are *weaker* than deviation-counteracting ones, such that the economy reverts back to full employment whenever investors’ beliefs are adjusted²⁶. On the other hand, when an unexpectedly large fall in the MEC happens, the buffer stock of cash balances will be quickly exhausted and unemployed

²⁴ “This story does not give both sides of the labor market the same information sets” (Leijonhufvud (1983, p. 28)).

²⁵ Moreover, if consumption is driven by wealth (like for permanent-income or life-cycle theories), small shocks will not impair this latter and consumption will not be altered at all if cash balances are enough.

²⁶ “Second thoughts on effective demand theory suggest that the capabilities self-regulating behavior of actual market systems are likely to be a good more ‘robust’ ” (p. 34).

workers will have to sharply reduce their expenditures. Here, the economy is pushed *outside the corridor*: deviation-amplifying forces are *stronger* than deviation-counteracting ones, which involves highly persistent involuntary unemployment.

In summary, Brunner (from the 1980s) and Leijonhufvud (throughout his work) attributed the emergence and the persistence of unemployment to permanent negative shocks on productivity. Again, signal-extraction problems play a crucial role in the transmission of these disturbances. Unemployment emerges since some agents fail to immediately recognise the permanent dimension of the decline in productivity and then adopt speculative behavior. These agents revise their beliefs only gradually and unemployment persists as long as beliefs are not fully adjusted. This process takes more time (expectations are all the more inelastic) as permanent shocks occur infrequently. Leijonhufvud stressed that unemployment can persist over a longer period of time (turning to involuntary unemployment) in case of large shocks. For both authors, wage rigidities also arise endogenously as a result of inference problems. However, in spite of these similarities, Brunner and Leijonhufvud parted company on a key point: while Brunner's story essentially emphasises maladjustments concerning wages, Leijonhufvud's explanation relies primarily on maladjustments concerning interest rates.

5. The Marshall–Walras divide

5.1. A Marshallian approach of the whole economy

Leijonhufvud defined the Marshallian tradition as comprising five characteristics. [Section 5.1.1](#) illustrates that the work of Brunner and Leijonhufvud is consistent with four of these characteristics. The last one, namely the state-of-rest conception of equilibrium, requires more investigation. This is the object of [Section 5.1.2](#). Finally, [Section 5.1.3](#) points out that Brunner and Leijonhufvud departed from most Marshallian economists by adopting a general-equilibrium perspective.

5.1.1. Leijonhufvud's definition of the Marshallian tradition

In many writings, Leijonhufvud distinguished two traditions in neo-classical economics, which he termed “Classical and “Modern” in Leijonhufvud (1998). In the same article, as well as in Leijonhufvud

(2006), he associated the Classical tradition with the name of Marshall²⁷. The aim of the theory underlying this tradition would be the study of “the laws of motion of the system” (Leijonhufvud (1998, 171)). It would have five characteristics: (a) the motivation of economic agents is the maximisation of utility (or profit), but it is only “an assumption about motivation, not realization. Transactors are thought of as striving to ‘climb utility mountain’, not as lolling forever on their peaks” (p. 170); (b) their behaviour is “adaptive (often gradient climbing)” (p. 171); (c) their “cognitive competence” can be characterised as “bounded rationality”, agents being “capable of learning”; (d) the role of institutions is “essential in guiding behaviour, making the behaviour of others predictable”; (e) equilibrium is conceived as a “state of rest”: “the Marshallian equilibrium concepts are defined by the constancy of some *observable* (realized) variable” (p. 176, brackets and italics in original)²⁸.

Leijonhufvud’s own work undoubtedly belongs to this tradition. We have seen in Section 2.1 that his endorsement of Alchian’s evolutionary perspective led him to adopt characteristics (a) and (b). The third one is advocated on many occasions, and especially in Leijonhufvud (1993) when it is argued that “the typical agent copes with an incredibly complex environment armed with only ‘bounded rationality’” (p. 6). What decision-makers learn depends on the nature of prevailing institutions and market organisations. Their interaction in the marketplace is crucial for the information it brings to them. Moreover, money stands out prominently among institutions, not only as a medium of exchange but also as a store of value. Leijonhufvud (1977), particularly stressed that money should be treated as an institution, for in all its aspects each person’s choices about how much to use, hold, etc... depend critically upon conventions.

To the best of my knowledge, Brunner never explicitly claimed to be a Marshallian. It is nonetheless possible to find in his writings some evidence that he clearly inclined towards the Marshallian tradition, however, defined. For example, Brunner (1989) characterised Monetarism as a “‘classical’ programme of a non-Walrasian tradition” (p. 197) and recalled that “the idea of a normal output is inherent in

²⁷ As we shall see in Section 5.2, the Modern tradition is the Walrasian one.

²⁸ In the words of Leijonhufvud (2006, 59): “‘Equilibrium’ was understood as a state in which the pertinent ‘law of motion’ had ceased to operate”.

the classical tradition” (p. 221). I have already mentioned that the modifier “normal” refers to the Marshallian lexicon. Moreover, Brunner (1987b) praised Keynes for “His ‘Marshallian analysis’ (which), in contrast to a ‘Walrasian approach’, emphasized the importance of felicitous simplification in the best tradition of economics” (p. 49, brackets added).

Brunner’s work also fits well with Leijonhufvud’s classification of the Marshallian tradition. The main attributions of his “Resourceful, Evaluating, Maximizing Man” (described in Section 2.1) fall within the first two characteristics laid down by Leijonhufvud. Similarly, Brunner raising that “The issues addressed under the term ‘bounded rationality’ are ... quite relevant for our purposes” (1987a, 378) obviously relates to the third one. The REMM evolves in an environment for which “the interaction among individuals is, of course, not limited to the marketplace, but extends to a wide variety of organizational structure” (Brunner and Meckling (1977, 77)). All this “offers a new vision and a new understanding of social institutions” (Brunner (1987a, 368)). This is particularly the case for money, whose existence results from the willingness to reduce uncertainty and information costs (Brunner (1971); Brunner and Meltzer (1971))²⁹.

5.1.2. A state-of-rest conception of equilibrium

The state-of-rest conception of equilibrium is also a key feature of the Marshallian tradition for De Vroey (2000). According to this article, two equilibrium concepts coexist in book V of Marshall’s *Principles*, namely *market equilibrium* and *normal equilibrium*. Market equilibrium, which occurs in each trade round, is defined by the matching of *market* supply and demand, the quantity produced being given. Normal equilibrium is defined by the matching of *normal* supply and demand, for which agents³⁰ have no longer any incentive to change their behavior. Moreover, market-equilibrium values gravitate around normal-equilibrium values. Movements observed in prices and/or quantities thus represent the convergence process of market values toward normal ones. When this process is achieved, a situation of *full equilibrium* (in short, “equilibrium”) is said to prevail and the market

²⁹ It is interesting to note that Alchian (1977, 133) located the origins of Brunner’s monetary thought in their “long association” and in “some ancient joint discussions”.

³⁰ Essentially firms in Marshall’s theory.

comes to a standstill. In turn, “disequilibrium” prevails whenever normal equilibrium is not fulfilled, i.e., whenever market values differ from normal values. Importantly, it takes time for a new normal equilibrium position to be attained after a shock has disturbed an earlier one. Consequently, “the economy is generally out of equilibrium” (De Vroey (2016, 182)).

The state-of-rest conception of equilibrium stands in sharp contrast with the one advocated by neo-Walrasian economists. These authors put forward a single equilibrium concept, namely *intertemporal equilibrium*, for which all adjustments take place instantaneously after a shock: in each point of time, markets clear while all agents “follow an optimizing consumption/leisure intertemporal path” (De Vroey (2016, 184)), such that disequilibrium situations are impossible³¹.

Brunner retained the state-of-rest conception of equilibrium to deal with the short-run non-neutrality of money and the resulting fluctuations of output. We have seen that the analysis starts at some normal equilibrium position. A permanent monetary expansion is assumed to occur. The new normal equilibrium position is characterised by a higher price level, while the output is unchanged. However, agents (firms as well as workers) are unable to distinguish between permanent and transitory changes. A monetary expansion is thus perceived as only transitory by some of them: there are “heterogeneous beliefs among people about the actual situation” (Brunner and Meltzer (1997, 41)). The agents who interpret the monetary impulse as transitory do not immediately revise their expectations of the future price level. This implies that actual wages and prices are not all adjusted to their new normal values: “Some people perceive a change as permanent, some as transitory. Some are correct, some are wrong. These errors are unavoidable ... (and) delay the full response of all prices” (p. 100, brackets added). Therefore, output moves and gravitates around its unchanged normal value³². Gradually, the agents who initially failed to recognise the permanent dimension of the monetary expansion revise their beliefs. The convergence process towards the new normal equilibrium lasts until all agents revise their expectations and then adjust all wages and prices.

³¹ Models based on the intertemporal equilibrium concept comprise intertemporal substitution on top of intra-period substitution, while reasoning in terms of the state-of-rest equilibrium exclusively involves intra-period substitution.

³² There is “Motion of the equilibrium point around the normal output line” (p. 131).

Leijonhufvud adopted the state-of-rest conception of equilibrium in his explanation of output fluctuations. Starting from a normal equilibrium position at full employment, a permanent decline in the MEC is assumed to occur. The new normal equilibrium position is characterised by a lower normal (or natural) interest rate which induces offsetting variations in investment and consumption expenditures, leaving output unaffected. However, given that the average real rate of return was historically a relatively stable variable, investors on the financial markets fail to recognise the permanent decline in the MEC. Therefore, they do not immediately revise their beliefs about the normal rate. Investors and entrepreneurs thus form “inconsistent beliefs” about the value of this rate: “agents are acting on *inconsistent beliefs*. Such states will be called disequilibria” (Leijonhufvud (1981a, 140), italics in original). This entails that the interest rate on the stock exchange is not fully adjusted to its new normal value. Investment falls more than consumption rises. Output and then labour demand decrease. Gradually, investors revise their beliefs about the normal rate³³. The convergence process towards the new normal equilibrium lasts until investors completely revise their expectations and the market rate equates its new normal level. This process can last much longer if the decline in the MEC is large and involuntary unemployment ensues.

Brunner and Leijonhufvud both conceived equilibrium as a state of rest, notably in their explanation of output fluctuations. “Heterogeneous” or “inconsistent” beliefs imply that the economic system fails to immediately adjust from one normal equilibrium position to the other in response to permanent changes. The convergence process lasts until all agents revise their beliefs and the speed of adjustment is positively related to the frequency of permanent disturbances.

5.1.3. A general-equilibrium perspective

De Vroey (2004) recalled that “The standard view about the Marshallian and the Walrasian approaches... is that they are complementary... with Marshallian theory focusing on the study of

³³ “Why should not (the market rate) simply come down to (the new normal rate) as speculators learn that no better placements are opening up? It will” (Leijonhufvud (1981a, 199), brackets added).

isolated parts of the economy and Walrasian theory on the study of the economy as a whole. The latter then appears to be the generalization of the former” (p. 63). De Vroey, instead, dissented from this view and brought out that “there is room for a Marshallian general equilibrium approach distinct from the Walrasian” (p. 64). We have previously shown that Brunner and Leijonhufvud belonged to the Marshallian tradition (defined along the lines of Leijonhufvud). We now argue that they held a general-equilibrium perspective.

The adoption by Brunner of such perspective can be illustrated by the model he built with Meltzer to formalise the monetarist transmission mechanism of monetary policy. This model encompasses a money market, a credit market and an output market (sometimes supplemented with a labour market). Once all adjustments have been realised (in response to a monetary impulse) “the system reaches a new general equilibrium with all asset markets and the output market at a consistent equilibrium” (Meltzer (1995, 58)). Brunner (1971) emphasised that this framework provides a “complete analysis which elaborates *the full interaction* of output market, credit market and ‘money market’” (59, italics added), a highly desirable feature in his eyes. For him, the impact of changes in prices and quantities in one market on the prices and quantities in all other markets should be systematically examined. Brunner notably blamed James Tobin and the so-called “Credit View” on these grounds: “the Credit View derives from a *partial* and incomplete analysis of the interaction between the crucial relations describing an economy’s functioning” (59, italics in original), explained by “Yale’s usual disregard of the interaction between output and asset markets expressed by the assumption that output prices are constant” (35).

The strong emphasis laid by Brunner on the full interaction between markets sharply differs from the approach of another Marshallian, namely Friedman³⁴. According to this latter, “The distinction commonly drawn between Marshall and Walras is that Marshall dealt with ‘partial equilibrium’, Walras with ‘general equilibrium’. This distinction is, I believe, false and unimportant. Marshall and Walras alike dealt with general equilibrium” (1949, 490)³⁵. However, Friedman will not embrace a general-equilibrium

³⁴ Contrary to Brunner, Friedman is a professed Marshallian. He claimed his adhesion to the Marshallian tradition on many occasions (e.g. in Friedman (1972)).

³⁵ As mentioned above, this will also be the position of De Vroey (2004).

perspective to cope with the “interdependence problem”. Indeed, “Friedman recognizes interdependence, but insists that, for practical purposes, problems must be partitioned into parts analyzed in detail and parts summarized” (Hoover (1984, 74))³⁶. The systematic consideration of all interactions is instead what he conceived as the hallmark of a “Walrasian viewpoint”, for which “abstractness, generality, and mathematical elegance have in some measure become ends in themselves” (Friedman (1949, 490))³⁷.

Leijonhufvud stressed, as early as 1968, that the interaction between all markets should be at the heart of “a relevant theory of a monetary economy”: “In order to come to grips with this problem, however, we must relinquish the present single-market framework and deal with a system of several interrelated markets” (p. 80). Considering the economy as a whole would be especially required to explain the cumulative process leading to involuntary unemployment: “The assumed deviation-amplifying feedbacks involved in this process cannot be explained in terms of an isolated labor-market model – the entire *money-using* system must be considered” (p. 81, italics in original).

A few years later, in 1973, Leijonhufvud built the concept of “effective demand failures”. I have mentioned in the introduction of the present article that these failures are of two types: “The first concerns the saving-investment nexus. Increased savings (reduced consumption) leads to an excess supply of consumer goods in the present but does so without signalling an excess demand for consumption in the future ... The second type of effective demand failure is at the root of the Keynesian multiplier. Unemployed workers attempt to sell their

³⁶ More precisely: “For Friedman, Cournot’s problem is, given economic interdependence, how to cope with economic analysis using *practical* methods ... Marshall’s method is a response to Cournot’s problem. It attempts to keep an investigation manageable by examining one problem at a time ... For the point of the Cournot problem and Marshall’s (and Friedman’s) solution to it is that, whatever the economic problem, any practically significant analysis of it requires that reality be partitioned. The most important bits with respect to the problem at hand are analyzed in detail; the rest are summarized in less detail (but not forgotten, of course)” (Hoover (1984, 65–66, brackets and italics in original)).

³⁷ An example can illustrate this divergence between Brunner and Friedman. Friedman (1971) assumed a constant real interest rate in his preferred way of closing his “Theoretical Framework”. Brunner criticised this choice as follows: “By keeping real rates constant ... Friedman’s ‘common model’ neglects the variables that, we believe, explain many of the short-run changes in expenditure” (Brunner and Meltzer (1972b, p.847)). Friedman justified this assumption by invoking a “Marshallian approach” of economic theory: “From a Marshallian approach ... there is nothing inconsistent or wrong about using a theory that treats the real interest rate as constant in analyzing fluctuations in nominal income but using a theory that treats the real interest rate as variable in analyzing fluctuations in real income; the one theory may be more useful for the one purpose, the other theory for the other. *We lose generality by this procedure but gain simplicity and precision*” (1972, 920, italics added).

labour in order to buy consumer goods. In so doing, they exert an excess supply in the labour market, but their corresponding excess demand for consumption goods is ineffective when not backed by ready purchasing power” (Leijonhufvud (2006, 66, brackets in original)). Again, the interaction between markets is critical in the emergence of states with involuntary unemployment: “The *combination* of the two effective demand failures is crucial. Neither one will by itself send the system into an unemployment equilibrium... The trouble arises when the two effective demand failures interact. When saving exceeds investment at full employment real income, output and employment will fall. This in turn will reduce consumption – the deviation from full employment is amplified through the consumption – “multiplier”. The contraction will proceed until the decline in incomes reduces saving to equality with investment” (67, italics in original).

Hence, Brunner and Leijonhufvud adopted a general-equilibrium perspective. The interaction between markets would be a key feature, in the transmission of monetary policy (Brunner) as well as in the explanation of involuntary unemployment (Leijonhufvud). This contrasts with the position of other Marshallians who, like Friedman, dealt differently with the interdependence problem. In a nutshell, Brunner and Leijonhufvud developed some kind of “Marshallian general equilibrium approach”.³⁸

5.2. The criticism of Walrasian economics

Walrasian economics was labeled as the “Modern” tradition by Leijonhufvud (1998). This tradition would focus on “the logical principles of efficient allocation” (170), with five characteristics: (a’) “the statement that (agents) maximize utility or profit is taken to be a proposition about realized performance, not just intention or ambition” (171, brackets added); (b’) the behaviour of agents is “optimizing *ex ante*” (italics in original); (c’) agents have “unbounded rationality”, so that “they know all that they can know and need know in order to deduce all utility-relevant consequences of alternative courses of action”; (d’) “institutions become problematic rather than essential. What are they doing there? Why do people use money? The answers are lamentably unpersuasive”; (e’) the equilibrium

³⁸ That Leijonhufvud had tried to develop such an approach was already noted by De Vroey (2004, p.78 and 2016, p.116).

concept is one of “mutual consistency of all plans”, i.e., intertemporal equilibrium.

Leijonhufvud (1968) was already skeptical about the ability of Walrasian economics to grant a special role to money: “Much of the modern monetary theory deals with money as just one of the n goods in a general equilibrium model... Money has no special status, and in a model which deals only with situations characterized by exchange equilibrium, money is (at most) ‘just another good’” (79, brackets and italics in original). Instead, “In a money exchange system, the means of payment is ‘a good traded in all markets’. Herein, it is different from all other goods. The aesthetic attractions of modern general equilibrium models should not make us forget this fact” (80). He further pointed out that money “cannot be ‘important’ in theories which devote attention only to equilibrium situations” (80, fn.26) and “can be added to such models only by artifice” (Leijonhufvud (1967, 403)).

Leijonhufvud was also critical about the relevance of the intertemporal equilibrium concept. For instance, he raised that “intertemporal optimization constantly forces the economist to make information assumptions which are unreasonable” (Leijonhufvud (1998, 182)) and “the natural rate of unemployment doctrine is founded on the implicit assumption that we are dealing with a system that is always in intertemporal equilibrium... Certainly, the instability of Phillips curves does not by itself lend any support to this daring notion” (185, brackets in original). Leijonhufvud (2006) also complained that, in the Walrasian tradition, “‘Equilibrium’ is, however, a rather otiose term, since if no observed behaviour may be interpreted as a failure to optimize, ‘disequilibria’ are not possible” (60).

For Leijonhufvud (1989), “New Classical economics... adds a couple of ‘lemmas’ to the rational behavior postulate, namely (i) that the rational agent... will know the structure of the economy... and (ii) that rational agents will not leave any gains from trade unexploited” (11–12). “Now, it was supposed that the first of these lemmas more or less does away with discrepancies between the subjectively perceived and the objectively existing reality and also, therefore, between the expectations of different agents”. Thus, Leijonhufvud’s “emphasis on inconsistent beliefs is foreign to Rational Expectations theory” (Leijonhufvud (1981a, 199), fn.109).

The immediate and complete adjustment of prices naturally ensues: “If all agents in a market receive the same news and evaluate it using

the same theory, they will all agree on what change in price is indicated” (Leijonhufvud (1981b, 24)). This adjustment of prices notably applies to the interest rate in response to a real shock, both when agents act on “mutually consistent beliefs and these beliefs are correct” (26) and when they act on “Mutually consistent beliefs again, but we allow for the possibility that what everyone believes will still be wrong”, the latter case amounting to “a real counterpart to Lucas’ monetarist equilibrium cycle model” (28). In addition, “The argument that the agents will act so as to exhaust apparent gains from trade that the New Classicists have used against fix-price modellers is simply irrelevant in the intertemporal context chosen here... With incomplete intertemporal markets the interactions required to generate information about, and exploit, these potential gains from trade do not take place” (29, fn.32).

Recall that Brunner (1989) defined Monetarism as a “classical’ programme of a non-Walrasian tradition”. This explicit rejection of Walrasian economics is particularly related to its inability to account for the emergence of many institutions, and especially money: “The Walrasian paradigm, based on the absence of information and transaction costs, necessarily omits all social phenomena conditioned by the operation of such costs. With full information and in the absence of any transaction costs there is no reason for the occurrence of money, on financial intermediaries and no rationale for many other social institutions... Any positive valued item functions potentially as a medium of exchange. There is no reason for the concentrated and systematic selection of objects to function as an accepted medium of exchange used with dominant regularity. Important problems of our monetary and financial reality remain inaccessible to such a Walrasian tradition” (199). In a nutshell: “A Walrasian world has no role for money, financial intermediaries, business firms, or contractual arrangements” (Brunner and Meltzer (1997, 65–66)).

Among neo-Walrasian economists, Brunner focused criticism on the authors of the New Classical Macroeconomics. He first criticised them for their adherence to the intertemporal concept of equilibrium: “I also have strong reservations about crucial aspects of their ‘equilibrium approach’” (Klamer (1984), 191). To the question “So what is wrong with new classical economics?”, Brunner answered: “Their interpretation of equilibrium analysis seems dubious to me. This *specific* kind of equilibrium analysis implies that *all* prices are

market-clearing relative to *all* shock-realizations. Prices reflect all ongoing shocks irrespective of their duration, irrespective of whether agents perceive shocks to be quite transitory or very permanent” (192, italics in original).

Brunner and Meltzer (1997) stressed that the models of the New Classical Macroeconomics rely on what they called the “strong form of rational expectations”: “expectations are formed in a way that makes the subjective probabilities used to form expectations the same as the true probability distribution of the events to be forecast”, since agents are assumed to have “detailed knowledge about the structure of the economy” (38). Hence, “Anticipations are drawn from a known distribution” (64), so that beliefs cannot be heterogeneous. The instantaneous adjustment in response to shocks is closely related to the strong form of rational expectations: “rational expectations analysis implies that inertial processes and other response patterns are ‘immediately’ adjusted to new conditions. This follows from the assumptions of... homogenous decision makers with subjective probability distributions that match the true probability distributions” (132).

A main feature of the New Classical Macroeconomics is the absence of price stickiness. This is the case for later models (notably those of the Real Business Cycle approach), in which agents have complete information, as well as for the first ‘island’ models developed along the lines of Lucas, in which agents have the same imperfect information about the realisation of shocks (64–65). Furthermore, “Representatives of the new classical macroeconomics argue that exploitation of all mutually advantageous trades implies the occurrence of fully flexible prices” (133). To explain price inflexibility, “We must move beyond the Walrasian tradition, however, and recognize the relevance of information and transaction costs”.

Brunner and Leijonhufvud raised criticism to Walrasian economics for its incapacity to explain the existence of many institutions, especially money. They particularly criticised the authors of the New Classical Macroeconomics for adopting the Walrasian intertemporal equilibrium concept. They also questioned their assumption that agents know the structure of the economy (meaning that the subjective and objective probability distributions match) so that agents form identical beliefs. These features entail that all prices are adjusted in response to shocks. The full and instantaneous adjustment of prices

would occur when agents have perfect information, as well as when they have the same imperfect information about shock realisations. Brunner and Leijonhufvud further rejected the proposition that the exploitation by rational agents of all mutually advantageous gains from trade would be inconsistent with price inflexibility.

6. Conclusion

I have argued in this paper that Karl Brunner and Axel Leijonhufvud, in spite of strong oppositions related to their rival schools of thought, developed convergent positions on many theoretical and methodological questions. These positions relate to the evolutionary perception of the economic agent in society, the theory of price inflexibility and “search” unemployment, the role of relative prices (notably in the transmission mechanism of monetary policy), the importance of signal-extraction problems in the propagation of (monetary as well as real) shocks and the Marshall–Walras divide (the belonging to the Marshallian tradition (and especially to its conception of equilibrium), the adoption of a general-equilibrium perspective, the criticism of Walrasian economics). I have also argued that these convergences rest on the constant emphasis Brunner and Leijonhufvud laid on imperfect information.

Before concluding this paper with some words about their posterity, it is worth stressing that Brunner and Leijonhufvud developed their arguments at very different levels, and through very different styles. In many ways, their analyses differ in focus and in scope. This is so even when they discussed the same problems along similar lines (notably those of Alchian). In particular, the systemic width and depth of Leijonhufvud’s approach to macroeconomics sharply contrast with Brunner’s more limited and pragmatic stance³⁹.

An illustration of this contrast can be found in their respective use of formal models. Brunner devoted a large part of his writings to building a “monetarist framework for aggregative analysis” (Brunner and Meltzer (1972c)). This framework would serve not only to study the transmission of monetary policy, but also to make macro analysis in a broad sense. Moreover, Brunner also used formal models to deal

³⁹ This aspect may render our “friends or foes” subtitle somewhat less accurate. Rather than rivalry (“foes”) on the same plane of argumentation, there may thus be an issue of incongruence in discourse.

with the signal-extraction problems we have considered in [Section 4](#). Conversely, Leijonhufvud never wrote down any model. In Leijonhufvud (1997), he carefully distinguished “theories” from “models”: “I propose to conceive of economic ‘theories’ as sets of beliefs about the economy and how it functions. They refer to the ‘real world’ ... ‘Models’ are formal but partial representations of theories. A model never encompasses the entire theory to which it refers” (p. 193). And in his case, it is clear that the “the evolving sequence of theories” which constituted his “research programme” could not be easily encapsulated within single models. An interesting example on this ground relates to the “corridor hypothesis” proposed by Leijonhufvud (1973). Howitt (1978) suggested that, contrary to the doubts expressed by Grossman (1974), it could be possible to deliver a formal treatment of this hypothesis. However, he warned the reader that providing such a treatment “may require the employment of a variety of short-run stability concepts”, so that “The examples below... must therefore be regarded as nothing more than a first step” (269). Given the difficulty of the task, it is hardly surprising that this first step had no follow-up.

Their influence was also very different. That of Leijonhufvud mainly took place on the academic scene. There, Peter Howitt was undoubtedly the leading “Leijonhufvudian”. His *Keynesian Recovery* book was primarily dedicated to what he called the “coordination problem” (1990, 2). This problem would have two dimensions, namely “equilibrium coordination” and “disequilibrium coordination”. The former “is the achievement of a coherent collective outcome when people are basing their individual decisions on mutually consistent beliefs” while the latter “is the ability of the system to arrive expeditiously at an equilibrium; to harmonize people’s beliefs” (2–3). No need to recall that the term “consistent beliefs” is inherited from Leijonhufvud. Howitt raised that Leijonhufvud opened a research agenda which encompassed both aspects of the coordination problem. He notably stressed that Peter Diamond was treading in Leijonhufvud’s footsteps to deal with the equilibrium coordination aspect (p. 52). At the same time, the recent development of agent-based computational economics also owes much to the impulsion given by Leijonhufvud at UCLA in the early 1990s.

The impact of Brunner’s work on academic circles was instead quite weak. To the best of my knowledge, nobody tried to follow up

on his research agenda, and especially the attempt (with Meltzer) to build a “monetarist framework”. Yet, in his time Brunner appeared to have more influence than Leijonhufvud. Indeed, he played an important institutional role in the economic profession, particularly through the community-building forces of his Konstanz Seminars and Carnegie Rochester Conference Series on Public Policy. In these meetings, he brought academics, central bankers, and other policymakers together. They were the place where young revolutionaries, such as Lucas, Sargent, Finn Kydland and Edward Prescott, launched the ideas that were to transform macroeconomics. Brunner was also at the origin of the *Journal of Monetary Economics* and the *Journal of Money, Credit and Banking*, which soon became leading journals in the field of monetary theory.

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