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Macro's missing link the unbridged gap between Monetarism and the Wicksell Connection

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Wicksell Connection**

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Macro's Missing Link

The Unbridged Gap between Monetarism and the Wicksell Connection*

by

David Laidler

Abstract: Modern mainstream macroeconomics treats the economy “as if” always in equilibrium. Two older traditions, Monetarism and the Wicksell Connections have always dissented, arguing that how agents gather information and apply it to the co-ordination of their activities are prior problems requiring attention before equilibrium can, or cannot, be assumed. They have developed the implications of this claim along different lines, however, with the former dealing with questions raised by the existence of monetary exchange in general and the latter concentrating in particular on inter-temporal issues. This gap has persisted since Wicksell opened it up, and has never been satisfactorily bridged: why?

Key Words: Wicksell, Monetarism, information, co-ordination, equilibrium.

JEL Classifications: B13, B22, D50, D80, E10

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I *A Link Still Missing*

Viewed from the perspective of today's short-run macroeconomics which has been dominated since the publication of Michael Woodford's *Interest and Prices* (2003) by a mislabelled *New Keynesian* variation on *Dynamic Stochastic General Equilibrium (DSGE)* analysis, *Monetarism* and *The Wicksell Connection* seem closely related to each other.¹ Both traditions treat the co-ordination of the activities of individual economic agents as a crucial problem with which any economy, not to mention the economist studying it, must cope, rather than as a *fait accompli* from which serious analysis begins. As a corollary, both also treat monetary exchange and financial markets as fundamental to that coping. However, where Monetarism has paid attention to the role of money in the co-ordination of market behaviour in general, the Wicksell Connection has always stressed the particular problems posed by the coordination of economic activity over time. The resulting gap between them currently remains unbridged, even though it is obviously much narrower than the chasm that separates both traditions from mainstream *DSGE*, which takes it for granted that co-ordination issues of any sort should be treated as solved by assumption before serious analysis begins. So, why did these bodies of doctrine diverge in the first place, and why has their separation persisted, even widened in recent years?

II *Wicksell and the Quantity Theory*

Christopher Dow (cf. Dow 1964, p. 308) likened the *Quantity Theory of Money (QTM)*, Monetarism's centrepiece, to "a cat with nine times ninety lives", and when Wicksell published *Interest and Prices*, it was in the prime of one of them. In 1898, the dominant problem for macroeconomists was still the explanation of the price-level's behaviour, but by then the replacement of cost of production by marginal utility as the dominant concept in value theory had undermined the status of the *QTM*'s long-time rival in this endeavour, the proposition that the price level was determined by the "natural" value of gold and/or silver. Wicksell understood this development, but was uncomfortable with it. Under the influence of Thomas Tooke (e.g. 1844) in particular, he analysed two open questions about the *QTM*: how it should be applied to the monetary system of his time in which commercial banking was playing an increasingly significant role, and how it could be reconciled with the apparently long-standing fact of a systematically positive relationship between the levels of prices and interest rates. The result of

¹ In this essay the phrase *Wicksell Connection*, coined by Axel Leijonhufvud (1981), refers to a stream of ideas about the interaction of savings and investment in a monetary economy, and their influence on prices and output, which originated in Knut Wicksell's *Interest and Prices* (1898); while *Monetarism*, launched into widespread circulation, though not coined, by Karl Brunner (1968), denotes a doctrine whose modern life began in the 16th century with explanations of price inflation as the consequence of an inflow of silver from the New World, was extended in the 19th century to encompass a monetary explanation of the cycle, and, after a period in oblivion, belatedly acquired this label in the 1960s. Retrospective labels can be a source of discomfort, but note that the label *Quantity Theory of Money* originated only in the late 19th century. To be clear, as this label is used here, it excludes the analytic apparatus that has in recent decades dominated the conduct of policy under inflation targeting regimes, sometimes referred to as "Monetarism without money".

his endeavours was not the modernisation of the *QTM* that he intended, but almost an end to the charmed life it had recently been enjoying.²

Axel Leijonhufvud's famous "family tree" of 20th century macroeconomic ideas (Leijonhufvud 1981, fig. 7-1, p.133) records the facts that Wicksell started from the *QTM*, and that his many intellectual descendants were responsible, directly or indirectly, for all but one of the area's significant developments over the next five decades or so. These centred on how the rate of interest's success or failure in co-ordinating saving and investment might influence the evolution of not just (or, by the interwar years, even mainly) the price level, but also of real output. The exception was Milton Friedman's Monetarism, which Leijonhufvud linked directly to the *QTM* with an isolated straight line that ran through Irving Fisher and bypassed Wicksell and his followers. Though the genealogy of macroeconomics became much more complicated after 1981, recent up-datings of Leijonhufvud's schema by Peter Spahn (2019), Bo Sanderlin et. al. (2014) and Michael Trautwein (2020) all continue to record the same unbridged gap between Monetarism and the Wicksell Connection throughout this earlier period.

Wicksell (1898) built his famous *cumulative process* model of price inflation in three steps. He analysed: first, a *pure cash economy* where the traditional quantity theory ruled; second, a completely cashless *pure credit economy*, where prices would remain stable if the *market* rate of interest at which banks were willing to lend was equal to the *natural* rate which borrowers were willing to pay, and rise perpetually (perhaps at an increasing rate if endogenous inflation expectations came into play) should the natural rate, which Wicksell (1907) identified explicitly with the marginal productivity of capital, move above the market rate; and, finally, a merger of these, a domestic monetary system linked to an international gold standard in which cash still circulated among the public but was also held as reserves by credit granting banks.

Contrary to still common misconceptions, and as Don Patinkin (1957) long ago stressed, Wicksell envisaged his cumulative process playing out within this hybrid system, not the pure credit economy. He showed how the price level would move from one meta-stable equilibrium value to another whenever a gap (usually positive in his examples) appeared between the natural and bank lending rates of interest. The perpetual inflation that such a gap would have caused in the pure credit economy here also created a reserve drain from the banks as agents adjusted their cash holdings to higher and still rising prices, and induced them to increase their lending rate of interest so as to bring this drain, as well as rising prices, to an end. Since Wicksell believed that such disturbances typically originated in what we would nowadays call productivity shocks, and were brought to an end by the response of the market rate of interest to the resulting drain of bank-reserves, the positive correlation between the levels of prices and interest rates which had been in need of an explanation since Tooke first drew attention to it seemed to have found one.

² I have dealt with all of these issues, as well as the features of Wicksell's analysis discussed below, in much greater detail in Laidler (1991) Ch. 5.

Finally, and more speculatively, because the only role for banks' stocks of monetary gold in the cumulative process was to signal the desirability of a change in the market rate of interest, Wicksell argued that the metal could be completely eliminated from the monetary system. "All" that was needed was for the public to be persuaded to dispense with gold coinage and/or convertible bank notes, and for the banks (under the guidance of national central banks) to learn to adjust their lending rates in direct response to the behaviour of the price level itself, without recourse to prompts from an intermediate variable.³

III *Wicksell's Cumulative Process and Fisher's Transition Period*

At first sight, Wicksell's cumulative process model seems far removed from Monetarism of any era. It attributes price level variations not to changes in the money supply, but to shocks originating in the real economy, and accords a purely accommodative role to bank deposits in their evolution. Wicksell called these deposits *credit* rather *money*. Following common contemporary practice, he confined to the latter word to metallic or paper currency, so "money's" only role in his way of telling the story was as a brake on bank lending, which brings inflation to an eventual end. And yet, perceptions of the breadth of the gap between this analysis and Monetarism were distorted by a mixture of semantics, expositional tactics, a particular substantive assumption of dubious generality made by Wicksell at a crucial place in his exposition, and an error of omission on his part. This is not the only time in their history that Monetarism and the Wicksell Connection have been pushed further apart than necessary by inessential factors.

Here, it is helpful to compare Wicksell's account of his cumulative process to its best known Monetarist counterpart, namely Irving Fisher's *transition period*.⁴ First, unlike Wicksell, Fisher extended the traditional use of the word "money" to chequeable bank deposits. Second, reflecting a substantive disagreement about the facts of actual economic life, Fisher, set his transition period in motion with a shock to the quantity of monetary gold, and hence the reserves of the banking system, rather than to the profit expectations of bank-borrowers, which occupied the equivalent place in his set up to Wicksell's natural rate of interest.⁵ These differences are

³ Lars Jonung (1979a, 2022) has shown how these recommendations, highly speculative in 1898, would directly influence the design of a policy regime actually adopted for a short while in Sweden in the early 1930s, and also have a strong claim to acknowledgement as the prototype of modern inflation targeting.

⁴ See Fisher (1911) Ch. 4, and Robert Dimand, (2019) pp. 63-67 for a recent account.

⁵ Fisher's reading of 19th century history, like those of Cassel and Hawtrey, identified the effects of fluctuations in gold production on the quantity of money, rather than shifts in the productivity of capital, as the principal source of secular price level variations in gold standard countries, and he explained the positive correlation between the level of prices and that of nominal interest rates in terms of the influence of previously rising (or falling) prices on inflation expectations. The turnaround in the time path of prices that followed the introduction in South Africa of the cyanide process for refining gold, and fresh discoveries of gold in the Yukon, came between the publication of Wicksell (1898) and Fisher (1911). When Wicksell revisited this topic in 1915 in the third edition of his *Lectures*, he was much less insistent on the key role of non-monetary shocks. Fisher did not integrate his own path breaking analysis of the determination of the rate of interest, as first developed in Fisher (1907) and further refined in (1930), into the monetary theory set out in (1911). Thus he failed to develop a comprehensive macro-model that could have

hard to miss, but two others, though less immediately apparent, are of more substance. The first has its roots in the degree of abstraction Wicksell deployed in analysing his “pure credit economy”. He considered a simple, completely cashless, economy functioning over a uniform period during which production is financed by bank-loans taken out at its beginning and paid-off at its end when output is sold to consumers/workers. In this very special set up, which Wicksell constructed to achieve clarity in his account of the mechanics of the pure credit economy, not to approximate reality, the volume of bank deposits is passively endogenous. But he then implicitly carried the latter implication over to the hybrid gold standard system in which his cumulative process played out, and in which, because it *was* meant to approximate reality, such passivity should not have been assumed.⁶ Fisher, on the other hand, explicitly treated an increasing volume of bank deposits brought about by bank lending as being an active factor influencing prices.

Finally, Fisher’s banking system had a *target level* for its cash reserves and Wicksell’s did not. It is this absence that rendered the price level’s equilibrium value meta-stable in the cumulative process. When a goal for the level of reserves is added, it links the equilibrium quantity of deposits to their volume, establishing a relationship between the equilibrium value of price level and the quantity of money however defined, and it also renders the system’s out-of-equilibrium behaviour cyclical rather than unidirectional. With this error of omission corrected and money granted an active role in affecting prices, Wicksell’s cumulative process, like Fisher’s transition period, generates cycles of a type first described by that ardent quantity theorist and leader of the Currency School, Lord Overstone (1837) and subsequently developed, in addition to Fisher, by a long line of proto-monetarists, not least Alfred Marshall (1887), Ralph Hawtrey (1913) and Gustav Cassel (1918).⁷

IV *Cassel (1928) on the Price Level*

Fisher himself was not fully familiar with Wicksell’s work and did not discuss these aspects of it in (1911). But, as Lars Jonung (1979b) has shown, another Monetarist, also Swedish and thoroughly familiar with Wicksell’s work, namely Gustav Cassel did so with considerable persistence from 1904 onwards.⁸ Particularly relevant in the current context, and as discussed in

established a *Fisher Connection*, such as Sanderlin et. al. (2014) speculate about, in the sub-discipline’s subsequent development.

⁶ See Laidler (1991) p. 148 for a further discussion of the loose ends that this leaves in Wicksell’s analysis. A similar set of problems arise with Keynes’s treatment of the passive endogeneity of money in the *Treatise*. See fn. 14 below.

⁷ Leijonhufvud locates Hawtrey and Cassel within the Wicksell Connection, and does not mention Marshall. It would be too big a digression to pursue my difference of opinion with him about these matters in this essay. See, however, Laidler (1999b), especially pp.129-31, 134-35.

⁸ The advice of Lars Jonung to pay attention to Cassel is gratefully acknowledged. Jonung (1979b) describes the long debate between Wicksell and Cassel in rich detail, and also draws attention to their sometimes strained personal relations, in which the latter’s difficult personality clearly played its part. His failure to cite Wicksell in (1928) is not his only omission of this type. In Cassel (1918), his lengthy exposition of general equilibrium theory fails to mention Walras.

detail by Thomas Humphrey (2002), Cassel (1928) would eventually develop a model in which the principal channel through which any discrepancy between the Wicksellian natural and market rates of interest affects prices is not the resulting deviation of investment from saving *per se*, but, as with Fisher (1911), or indeed Hawtrey (1913), money supply changes created by the movements in bank lending that such deviations induce. Though this paper of Cassel's drew heavily on his earlier critiques of Wicksell, it did not mention him, perhaps because it was an "occasional" article, explicitly written in support of Fisher's campaign to persuade Congress to pass the 1928 (Congressman James) Strong Bill, which sought to give the Fed. a legally binding (albeit rather loose) mandate to pursue price stability. But, as Humphrey demonstrates, it is nevertheless clearly an extension of Wicksell's (1898, 1907) analysis and hence succeeds in re-integrating its logic with that of the Monetarist tradition from which he had started out.

But a great deal had happened to macroeconomics between 1898 and 1928, and significant though Cassel (1928) might appear to those of us reading it today, it came far too late to have any contemporary influence. Indeed, according to Humphrey, it seems to have been completely ignored. Instead of the Wicksell Connection being reabsorbed after 1928 into a Monetarist tradition that was still concentrating on price level behaviour, therefore, its by-then widely recognised potential for analysing fluctuations in real income and employment enabled it to continue with an ever more distinct life of its own, not least among younger Swedish economists; so much so that by 1936 Bertil Ohlin, an already prominent figure among what would soon be known as the *Stockholm School*, was able to claim, with considerable satisfaction, that "By means of the brilliant assumption of a pure credit economy, Wicksell successfully escaped from the tyranny which the concept 'quantity of money' has until recently exercised on monetary theory". (Ohlin 1936, p. xiv).⁹

V *Saving, Investment and the Real Economy*

Wicksell himself had sought the explanation of variations in real economic variables such as output and employment in the dynamics of the growing capitalist economy and he never made more than perfunctory efforts to deploy his monetary economics in that search (cf. Mauro Boianovsky and Trautwein 2001). But the natural rate of interest that played such a central part in that economics was, after all, supposed to be determined by the fundamentals of that same real economy, and it did not take long for others to begin to follow up the connections implied by this hint. Efforts to clarify another of *Interest and Prices*' over-generalizations, namely its proposition that equality between the market and natural rates of interest would always generate what had come to be called *neutral money* – that is zero net credit creation as well as price stability - proved especially fruitful.¹⁰

⁹ It is difficult not to speculate that a veiled reference to the personality of Cassel, the leading Swedish quantity theorist, might be implicit in that word "tyranny".

¹⁰ Ludwig von Mises (1912) was an early and seminal contribution to this line of investigation. To be clear, Wicksell's (1898) concept of monetary neutrality does hold true for the economy analysed in the book's Chapter 9,

Details of these efforts need not concern us here. They have often been discussed elsewhere, (e.g. Leijonhufvud (1981) Ch. 7, (Laidler 1999) Part 1). What matters is that, beginning in the '20s, the so-called *Austrians*, the abovementioned *Stockholm School*, but also (among others) Dennis Robertson (1926) and Keynes (1930), increasingly tried to focus, not on the consequences for the price level of the success or failure of the rate of interest to co-ordinate current saving and investment decisions, but, with varying degrees of success, for the behaviour of real output.¹¹ They generated or refined many important ideas - forced saving, temporary equilibrium, the *ex-ante* – *ex-post* distinction - among others. And the Stockholm School in particular made serious efforts to model the expectations that must underlie any forward looking choice, but without finding a solution to this problem simple enough to move this question forward. Thus, in 1936, the Wicksell Connection was in a state of considerable flux, and therefore well primed to embrace Keynes' *General Theory of Employment, Interest and Money* (*GT*), which dealt with the crucial question of expectations by dividing the future into a long run, in which they were exogenously determined by *animal spirits*, and a short run in which perfect foresight was assumed.¹²

VI *Keynes and the Quantity of Money*

The very presence of the words *Employment* and *Interest* in the *GT*'s title confirm its claim to a prominent place in the Wicksell Connection; but what about *Money*? When Leijonhufvud and his successors constructed their family trees, they located the *Treatise on Money* (Keynes 1930) and the *GT*, in the Wicksellian line of descent. This was surely appropriate, but it failed to capture the facts that one of the former book's avowed purposes had been to link that tradition to Monetarism, in the form of the Cambridge *QTM*, and that the resulting Monetarist influence on Keynes's analysis persisted into the *General Theory*. They might have done better to place Keynes' name alongside Fisher's in Monetarism's line of descent on the strength of *Indian Currency and Finance* (1911) and *The Tract on Monetary Reform* (1923), and then explicitly link the *Treatise* back to these works across the gap that separated the Wicksell Connection from Monetarism.

which is stationary, with investment confined to working capital, but fails for obvious reasons as soon as investment in fixed capital, with its capacity to generate economic growth, is permitted.

¹¹ Lying behind this shift was a change in economic circumstances. The background to Wicksell's analysis, and to that of Cassel and Fisher was the long deflation in gold standard countries that began in the 1870s and was reversed in the late 1890s. Once the post WW1 hyper-inflations were out of the way, real instability and mass unemployment would become increasingly important problems. The United States was a relative latecomer to such experience after 1929.

¹² Nor was Monetarism in better condition in the 1930s. The onset of the crisis that began in October 1929 without prior warning from a rising inflation rate had discredited its Fisherian version in most eyes. Fisher's own first response to the Great Contraction was his distinctly non-monetarist "Debt Deflation Theory of Great Depression" (Fisher 1933), though, as Dimand (2020) recounts, by 1936 he was retrospectively attributing an important role to fluctuations in the quantity of money in explaining the depression. Even so, as Frank Steindl (1995) has documented, very few contemporary commentaries came even close to anticipating the Monetarist explanation of the 1930-33 contraction that Friedman and Schwartz (1963) would later develop. The work of Lauchlin Currie (1934a&b) stands as the nearest thing to an exception here, conspicuous because of its rarity, but, unlike Friedman and Schwartz, Currie would offer non-monetary explanations of later events such as the 1937-8 downturn.

It is well known that the economic fluctuations formally explained in the *Treatise* turned out to be in prices alone, and not, as its author intended, in output and employment as well. The further elaboration provided by the *GT* of the determination of output and employment was therefore sorely needed to complete the structure of Keynes's macroeconomics. This elaboration relied heavily on the theory of liquidity preference – a major extension of the quintessentially monetarist Cambridge demand for money function – which had already been developed in the *Treatise*, and this theory's then novel emphasis on the *systematic* dependence of the demand for money on the market rate of interest was central to Keynes' (1936) demonstration that, in a monetary economy, the latter variable could not be relied upon to equilibrate saving with investment at full-employment, and that perhaps, in then contemporary conditions, there might even be a floor under the rate of interest at a value high enough to prevent such a state of affairs ever being achieved.¹³

Although Keynes carried over his theory of the demand for money from the *Treatise* into the heart of the *General Theory* with only cosmetic changes, he dealt with the supply of money very differently in the two books. In the *Treatise* money was (as in Wicksell 1898), treated as passively endogenous. Furthermore (and *not* as in Wicksell 1898), this treatment was justified by an extensive discussion of contemporary monetary institutions. But in the *GT*, the extreme (and very Monetarist) assumption of a completely exogenous supply of money was deployed instead.¹⁴ Keynes made this change between 1930 and 1936, however, not because his empirical judgement had changed, but to facilitate the theoretical demonstration of his belief that attempting to reach full employment either by a "policy" of price flexibility or by increasing the supply of nominal money would be futile, the crucial conclusion that underpinned the *GT*'s radical policy proposals for the "socialisation of investment" in pursuit of full employment.

Thus, and in a paradox that its author surely enjoyed, the *GT* reintroduced the interaction of the supply and demand for money, the central feature of the Cambridge version of Monetarism, into the very heart of the Wicksell connection, but in a way that eliminated the quantity of money's capacity to influence anything. His adoption of the exogeneity assumption nevertheless opened up the *GT*'s analysis to more overtly Monetarist modifications at the hands of others.¹⁵

¹³ Patinkin (1974) discusses the links between the theory of liquidity preference and the Cambridge versions of the QTM that preceded it, paying particular attention to the place of the rate of interest in the relationship.

¹⁴ On the passive endogeneity of money in the *Treatise*, see Keynes (1930 vol. 1), pp. 216-20, where it is clear that he is describing what he believes to be the workings of the actual monetary system. In the Preface to the *General Theory* Keynes does not repudiate the *Treatise*'s analysis of the monetary system, suggesting only that "technical monetary detail falls into the background" (p. vii) in the new work. Thus, his use there of the exogenous money assumption is best interpreted as an analytic simplification deployed to maximise the clarity of his argument rather than a contradiction of his earlier views. See Laidler (1999a), pp. 132-4, for a fuller discussion, including an explanation of why I believe Keynes's case for passive endogenous money in the *Treatise* to be flawed.

¹⁵ This feature also underlay Leijonhufvud's (1981) retrospective complaint that the Wicksellian descent of macroeconomics might have proceeded more smoothly had the *Treatise*'s sharp focus on the role of the rate of interest in co-ordinating saving and investment been explicitly preserved in a subsequent but pre-*GT*, and

Before pursuing this particular matter, however, mention must be made of the monetarist element in *How to Pay for the War*, (Keynes 1940), written only four years after the publication of the *GT*. This monograph is normally and correctly categorised as an application of the *GT*'s accounting framework to the policy issues created by the conditions of chronic excess aggregate demand generated by the outbreak of World War 2, and its most salient concept, the *inflationary gap* is usually assigned to the Keynesian theory of fiscal policy. All this is true enough, but it does not alter the important fact, downplayed by Roy Harrod (1951) Ch. 10, and following him Peter Spahn (2019b), but explicitly noted by Keynes' biographer Donald Moggridge (1992) Ch. 24, that the inflationary gap also measures the amount of money that the government would need to create to fulfill its expenditure plans by forcing the required volume of savings out of private agents as it outbid them for available output. This concept is therefore directly related to the analysis of money creation as a source of government revenue discussed in Chapter 2 of the conventionally monetarist *Tract on Monetary Reform* (Keynes 1923), and later revived, not least by Friedman (1971) himself, in the monetarist literature of the '60s and 70s.¹⁶

VII *IS-LM*

Whatever Keynes might have intended as the *GT*'s central message, there can be no denying that its major legacy was the so-called *IS-LM* model, which would become dominant in macroeconomics by the 1950s. Its incorporation of Keynes's assumptions about expectations made this framework a comparative static equilibrium device, easy to deploy, but incapable of encompassing any of the dynamic disequilibrium processes that were central to earlier work on the Wicksell Connection, so its place in this tradition was easy to overlook.¹⁷ The only trace, but a vital one, in the *IS-LM* model of this connection's multitude of complicated questions about how a market economy might cope with co-ordinating forward-looking saving and investment decisions, and what might happen if it failed to do so, was to be found in its simple implication that, to the extent that the interest rate alone could do this job, variations in output would ensure that it was successfully completed. But this observation prompts the query: "To what extent might that be?" - to which *IS-LM* can yield more than one reply. As we shall see, everything depends on certain characteristics of the three behaviour relationships that it encompasses – the

hypothetical, *Z model* of the determination of real income employment that paid less attention than did the *GT* itself to the indirect influence of the quantity of money (and hence the price level and money wages) on these variables.

¹⁶ And, it is also related to Robertson's (1926) treatment of forced saving, particularly its "induced lacking" variant. Note that the *inflationary gap*'s first application to United States problems was by Friedman (1943). As Edward Nelson (2020, vol. 1, pp. 93-96) notes, however, it is not clear that Friedman was even aware of the Keynesian origins of the concept when he first deployed it. Friedman's slightly later and still well-known "Monetary and Fiscal Framework for Economic Stability" (Friedman 1948), in which an automatic link between the budget balance and the expansion and contraction of the money supply plays a central part, is also usually classified as essentially Keynesian.

¹⁷ Not to all observers, though: the title – *Money, Interest and Prices* - of Don Patinkin's (1957) pioneering attempt to establish *IS-LM*'s links to Walrasian general equilibrium theory, indicates his awareness that it embodied Wicksellian (not to mention Monetarist) themes.

consumption function, the demand for money function, and the investment function, particularly the first two.

Keynes' (1936) own first-approximation answer, the one that would eventually find its way into the introductory textbooks in the form of the once famous 45 degree diagram, was that this extent is so large that the role of the interest rate in co-ordinating saving and investment can be ignored entirely.¹⁸ This followed from his belief that the variable in question was essentially fully engaged in maintaining equilibrium between the supply of money and an unstable and highly interest-sensitive demand for it, while his confidence that output variations alone were up to this task depended on a complementary belief in the existence of a stable relationship between consumption expenditure and income. But the main purpose of the *IS-LM* framework's very first diagrammatic exposition (Hicks 1937) had been to show that it could also accommodate ideas very different from these, which produced diametrically opposite conclusions, not least for the conduct of policy. In the 1950s, Milton Friedman would systematically exploit this opportunity on behalf on the Monetarist tradition, which he presented as fundamentally opposed to the "Keynesian" version of IS-LM, with its residual Wicksellian element.¹⁹ Here, Friedman's (1953) insistence on giving priority to the accuracy of an economic theory's empirical predictions over the rigour with which they were deduced from "first principles" or even plausible prior beliefs was fundamental.

VIII *Friedman's Monetarism*

Friedman (1957) set out the *permanent income hypothesis* (PIH) of consumption, the crowning product of a long collaborative effort by researchers mainly associated with the *National Bureau of Economic Research* (NBER). (cf. Jennifer Burns 2022) to find a model of consumption capable of explaining a wide variety of data that Keynes' (1936) "fundamental psychological law" had been unable to deal with. The stability of the slope of the Keynesian IS curve, and the predictability of the effects of changes in autonomous expenditure, either private or public, on its location, both depended on the existence of a stable parameter linking current saving to *current* income, but Friedman's PIH, supported by a massive body of evidence showed that that no such stable parameter, and hence no stable IS curve, existed in the actual economy. And as an important by-product, its use of the *error learning* mechanism to give empirical content to the concept of permanent income in time series applications provided macroeconomists with a

¹⁸ By starting its exposition of the mechanics of income determination in the middle of Keynes's own story, this famous diagram was responsible for removing any mention of the role of money in the economy from introductory macroeconomics, despite Keynes' own insistence that his economics was about things that could only happen in a monetary economy.

¹⁹ The next few paragraphs frame Friedman's Monetarist critique of "Keynesian Economics" in IS-LM terms. Friedman himself remained reticent about his underlying theoretical framework until (1974), when it was revealed as a version of IS-LM. Note, however, that Brunner and Meltzer, whose version of Monetarism became increasingly influential from the late-1960s onwards, explicitly rejected the IS-LM framework, because of its inability to accommodate what they argued was the all-important role of the market for bank credit in the determination of the supply of money. See e.g. Brunner and Meltzer (1972).

usable, albeit mechanical, method for modelling expectations of a type that had eluded Keynes's Wicksellian precursors.

The publication of *A Theory of the Consumption Function* came only a year after Friedman's (1956), "Restatement" of the *QTM* as an equation describing the demand for real (that is price level adjusted) money balances (in Keynesian vocabulary, liquidity preference) as a stable function of a few variables. This theoretical manifesto was then supplemented by an empirical study (Friedman 1959), which appeared to establish the relationship's long run stability, showed that permanent rather than current income (as in Keynes' 1936) determined the scale of real money holdings, and also appeared to show no evidence of any influence of the interest rate on their value.²⁰ This last finding was soon successfully challenged (cf. Laidler 1966, Friedman 1966), but, once detected, the influence in question still showed no sign, even in the 1930s, of the extreme sensitivity that Keynes had relied on to deduce the irrelevance of any monetary variables for the determination of the level of income.

These two modifications transformed IS-LM from a system that displayed traces of Wicksellian ancestry into a Monetarist model completely devoid of them. Specifically, the level of real income was now determined by the stock of real money balances, and hence could be expanded either by an increase in the nominal quantity of money, or by a fall in the price level, while the effects of shocks to private investment, whatever their source, or of changes in government expenditure, were absorbed by changes in the rate of interest. And if nominal monetary expansion were to be used to bring such a system to full employment, then any continuation would see the traditional *QTM* come into its own as an explanation of the price level's response.²¹ In such an economy, provided the authorities got the quantity of money "right", the private sector could be left to co-ordinate saving and investment and there would be no need for the latter to be "socialized".

These evidence-based modifications of Friedman's, however, did not make a complete empirical case for a Monetarist reformulation of IS-LM. This transformation also depended upon the supply of nominal money being exogenous, not as an analytic simplification, but as a fact, or at least an achievable property, of the real world. It is here that *The Monetary History of the United States 1867-1960* (Friedman and Schwartz 1963) comes into the story. Friedman and Schwartz

²⁰ In short, Friedman's demand for money function boiled down to an application of the PIH to real balances treated as a durable good.

²¹ As what would become the "Great Inflation" of the 1970s began to gather steam in the 1960s, the ability of this version of IS-LM to at least encompass rising prices made it an increasingly attractive alternative to its fixed price Keynesian alternative. The fixed price assumption would also prove to be an all too analytically attractive simplification when formal models in the tradition of Leijonhufvud's *Economics of Keynes* were constructed in the 1970s, by, for example Robert Barro and Herschel Grossman (1971) and Edmond Malinvaud (1977), leaving these models with nothing to say about this increasingly important feature of the real world.

summed up their narrative of almost a century of monetary experience as showing that “while the influence running from money to economic activity has been predominant, *there have clearly also been influences running the other way, particularly during the shorter run movements associated with the business cycle*” (Friedman and Schwartz (1963) p.695, italics added), a conclusion that does not quite complete the case for a Monetarist version of IS-LM.²² In particular, the “Great Contraction” of 1929-33 which, along with its aftermath, had long seemed to form the empirical foundation for Keynesian economics, had turned out to be one of those episodes during which, to a significant extent, “influences r[an] the other way”.

To be more specific, the fault that Friedman and Schwartz found with Federal Reserve policy in those years was not (*pace* a host of later critics) that it had actively induced a collapse of the money supply, but rather that, out of a mixture of confused thinking and timidity, it had failed to prevent such a contraction occurring. In this crucial case, their argument for the empirical relevance of the Monetarist assumption of an exogenous money supply was thus not directly descriptive but counter-factual. They claimed only that, had policies in the style of the expansionary open market operations finally undertaken in 1932 been pursued earlier, with more vigour and for longer, they would have succeeded in reversing the money supply’s violent collapse whose proximate cause was a cumulative failure of the public’s confidence in the banking system after the initial shocks of 1929-30. This judgement should be taken seriously, but it is a judgement nevertheless, not a fact, and it was not shared by such contemporary observers as Paul Douglas (1933) or indeed Keynes himself (1936), p. 207.²³

This is not the place to adjudicate the perennial debate about the causes of the Great Contraction. What is important for this paper’s narrative is that as the 1960s progressed, Friedman and Schwartz’s conclusions about the predominant exogeneity of money proved widely enough persuasive that their version of Monetarism became an intellectual force to be reckoned with, threatening for a while to consign to history the remnants of the Wicksell Connection, as embodied in the Keynesian brand of IS-LM.

IX *Brunner and Leijonhufvud on Information and Coordination*

Though Friedman and his associates at Chicago and the NBER undoubtedly pioneered the Monetarist revival, its spread in the 1960s was not due to their efforts alone. It was, after all, Karl Brunner (1968), whose UCLA program of research into “Econometric Studies of Monetary Theory” formally began in 1962, not Friedman, who actually put the word itself into everyday

²² This work was not that of Friedman and Schwartz alone, but also drew on the efforts of colleagues and students, notably Philip Cagan (1965), a book which had been substantially completed several years before its eventual publication.

²³ But see below on the evidence generated by the crisis of 2008-10 when the Fed. successfully resisted a collapse of the money supply . As noted in Laidler (2012), it was Friedman’s explicit view that throughout the Great Contraction the Fed. had always had the power to control the supply of money but failed to exercise it. Among contemporary observers, Lauchlin Currie (1934a and b) came closest to sharing this position, but Currie would also come to believe that by failing to exercise this power during the earlier years of the Contraction, the Fed. created conditions which eliminated it as the depression deepened and dragged on.

circulation.²⁴ Brunner, along with his collaborator Allan Meltzer, are of particular importance to this paper's topic, because, in the 1960s, and quite unlike Friedman, they emphasised the link between their empirical work on the supply and demand for money and theoretical analysis that was also developing at that time of money's fundamental role in enabling agents to economise on the generation of the market information needed to co-ordinate their economic activity (cf. Brunner and Meltzer (1964, 1971).

That these ideas should enter the Monetarist literature of the time from UCLA, rather than Chicago or the NBER, is not surprising, as Pierrick Clerc (2018) has explained. This department was also the home of (among others) Armen Alchian and Axel Leijonhufvud. The former was a seminal figure, along with Edmund Phelps, in the development of the "new microeconomics" that, in the 1960s, was seeking to formulate theories of (principally labour-) market behaviour that emphasised problems arising from imperfect information; while Leijonhufvud's *Keynesian Economics and the Economics of Keynes* (Leijonhufvud 1968) recast the *GT*'s comparative static analysis in dynamic terms, dealt with inter-temporal co-ordination failures in an explicit manner only conceivable in a non-Walrasian monetary economy, and, above all gave a new lease on life to the Wicksell Connection by rescuing it in the nick of time from its suffocating confinement within the static IS-LM model.

In the 1960s, then, Brunner and Meltzer the Monetarists and Leijonhufvud the Wicksellian all started from the same premise that the monetary system's capacity to cope (or not) with problems of information and co-ordination was of crucial importance. Viewed from today's perspective, this fact is striking. But from the perspective ruling in the 1960s, another fact, namely that they initially moved off from their common starting point in very different directions, not least when it came to matters of policy, loomed far larger. While Brunner and Meltzer joined Friedman, and before him Fisher, in identifying disturbances to the supply of money as the dominant source of instability in the economy, and argued that absent these, its private sector was inherently stable, Leijonhufvud followed Keynes, and before him Wicksell, in arguing that the scope for private investment decisions to be subject to autonomous disturbances was large, and that the monetary economy's responses to such shocks were likely to amplify rather than dampen their real consequences if it was left to its own devices.

This dramatic initial divergence would quietly begin to reverse itself in the '70s. In that decade Brunner and Meltzer, while frequently reaffirming their belief in the inherent stability of the economy's private sector, nevertheless abandoned their *strong monetarist hypothesis* about the monetary causes of economic fluctuations in the face of empirical evidence, accepting that real shocks, particularly, but perhaps not exclusively, from fiscal policy, were also sometimes their cause; and they also began to stress the special information problems that arise not from the

²⁴ Though, as Michael Belongia and Peter Ireland (2023) show, serious work (e.g Brunner and Ted Balbach 1959) preceded this formal beginning.

spatial separation of agents, but from the passage of time.²⁵ Moreover, their already longstanding insistence of the importance of the credit market in the processes determining the supply of money – see e.g. Brunner and Meltzer (1972) - created a natural, albeit unexploited, space within their version of Monetarism for the analysis of inter-temporal allocative issues.²⁶

For his part, Leijonhufvud (1977) would enter the heart of Monetarist territory with an account of the social costs of inflation far more penetrating than anything that had preceded it from any camp; and with support from Peter Howitt (1978), he also expanded his earlier analysis to account for the fact that real world economies often generate lengthy periods during which fluctuations around what seemed to be a reasonably well co-ordinated equilibrium were relatively minor (Leijonhufvud 1973). He even went so far as to suggest that one of the determinants of the breadth of the economy's *corridor of stability* was the magnitude of agents' holdings of money which might act as *buffers* against the effects of smaller shocks to the system, an approach to the theory of the demand for money not so different from that which Friedman himself was at least flirting at the time.²⁷

X *The Rise of New Classical Economics*

But no merger between the Wicksell Connection and Monetarism into an all embracing non-Walrasian theory of the monetary economy would be consummated. Instead, its tentative progress was disrupted by the New Classical Revolution. Lucas's (1972) demonstration that Walrasian micro-foundations for short-run macroeconomics were not only feasible, but also simpler (once some new mathematical techniques had been acquired) rapidly caught on, interest in non-Walrasian alternatives faded, and Monetarism and the Wicksell Connection, still separate, each found its own way to the sub-discipline's fringes.²⁸

At first Monetarism showed signs of flourishing after 1972, because it seemed to many observers that Lucas (1972) had simply provided a more rigorous formulation of Friedman's version of the doctrine, whose lack of attention to micro-foundations of any sort had simultaneously kept it cut off from the Wicksell Connection and open to such an alternative extension. In the spirit of Monetarism, Lucas's *Money supply surprise* model attributed fluctuations in output to unanticipated exogenous changes in the money supply, and price level changes both to these and

²⁵ See Brunner (1978, pp. 73-9). On information problems associated with the passage of time, rather than the spatial dispersion of agents, see, eg. Brunner, Alex Cukeirman and Meltzer (1983)

²⁶ See also fn. 19 above. Their analysis of these matters attracted few followers, perhaps because the comparative static modelling techniques available to them were not suited to their exposition and made their arguments difficult to grasp. The issues that Brunner and Meltzer raised about the role of bank lending in the creation of money were in fact similar to those analysed by Fisher (1911) in his treatment of the dynamics of "transition periods", and Cassel (1928), not to mention Ralph Hawtrey, beginning in (1913).

²⁷ See Laidler (1984) for an account of this approach. Friedman still alluded to it as late as 1987 in his *New Palgrave* essay on The Quantity Theory of Money (Friedman 1987). As Nelson (2021) has exhaustively shown, however, the end product of Friedman's work in macroeconomics would be a complete and consistent equilibrium model, so there can be no denying that he never fully accepted this essentially disequilibrium idea.

²⁸ I have discussed this part of the story at more length in Laidler (2021 and 2022)

to anticipated variations as well, while Monetarism's already well established aversion to activist monetary policies gained new support from its deployment of the *Rational Expectations Hypothesis*, (*REH*) whose basic idea that expectations were to be modelled "as if" agents had access to the same information as the economist modelling their behaviour, was quickly and widely recognised as a major step-forward from mechanical error learning.²⁹

But these first impressions were deceptive, because Lucas's micro-foundations, necessary for the rigorous deployment of the *REH*, required that all markets in the economy be continuously cleared, and this requirement in turn implied a temporal sequencing for the responses of prices and output to money supply shocks that flatly contradicted the stylised facts of the traditional Monetarist case. A growing body of empirical work soon made the importance of this contradiction all too apparent.³⁰ Moreover, from the mid-1970s onwards, real world anti-inflation policies, only loosely based on Monetarist ideas, but also bearing Monetarist labels, had been implemented in a number of jurisdictions with results that fell far short of expectations. Though the credibility of traditional Monetarism should not have been damaged by either of these factors, guilt by association ensured that it was – severely. They set in motion a growing distrust of any model that granted an active role to the supply of money in determining anything, which would culminate two decades later in this variable being definitively returned to purely passive status by Woodford (2003). Or, to come back to the feline metaphor deployed earlier, by the beginning of the new millennium, Christopher Dow's monetarist cat was once again *in extremis*.

As to the Wicksell Connection, newly supplemented during the 1970s with the idea of the corridor of stability, the empirical failure of Lucas's system might have presented it with an opportunity to contest the latter's still recent dominance of mainstream macroeconomics. But before it could regain more than a foothold, Fynn Kydland and Ed Prescott (1982) launched *real business cycle theory* (*RBC*) as a new macroeconomic variation on the Walrasian theme, and those many young economists who had already invested heavily in learning the techniques of equilibrium modelling with rational expectations in order to follow Lucas's lead quickly availed themselves of this new opportunity to exploit them. *The Keynesian Recovery* optimistically anticipated by Peter Howitt (1986) failed to materialize, and though work on non-Walrasian macroeconomics, both monetarist and Wicksellian, by no means ceased in the 1980s, it was to remain very much a minority taste for three decades.³¹

²⁹ Later versions of Leijonhufvud's family tree developed by his successors show NCE emerging from Friedman's Monetarism. This is certainly how things looked to many contemporary observers, but perhaps it would be more accurate to introduce Walras into the array of modern macroeconomics' 19th century ancestors, and then add another line of descent running from him to Lucas through Vilfredo Pareto, J.R. Hicks, Paul Samuelson, Kenneth Arrow and Gerard Debreu.

³⁰ e.g. Robert J. Barro (1968) and John Boschen and Herschel Grossman (1982)

³¹ Among the still under-appreciated highlights of this literature, John Hicks (1989) and Daniel Heymann and Leijonhufvud (1995) stand out.

XI *Woodford's Wicksell Connection*

Meanwhile, within the mainstream of macroeconomics, *New Keynesian Economics*, developed from Lucas's New Classical prototype by way of the substitution of imperfect for perfect competition and the incorporation of a modicum of money wage and/or price stickiness into its structure while still maintaining the *REH*, was able to cope with the empirical evidence that had undermined the prototype in question. It was already available to provide the demand side of a *DSGE* system whose supply side was derived from *RBC*. Incorporating the rate of interest rather than the by-then-discredited quantity of money as its policy variable, this system was tailor-made to satisfy both academic macroeconomics' need for a core model and practical monetary policy's demand for a workhorse framework. The similarity between this system's dominance of the sub-discipline by the turn of the millennium to that earlier exercised by IS-LM is striking, and, as already noted, Woodford's (2003) magisterial monograph *Interest and Prices: Foundations of a Theory of Monetary Policy* would set out its canonical version.³² This title, however, was deliberately chosen to stake Woodford's claim to be expounding a 21st century version of Wicksell's (1898) analysis, so the relationship of the *DSGE* model it expounded to the Wicksell Connection needs some discussion at this point.

The first thing to note here is that this model's Wicksellian forebear was not the one Wicksell himself had used to discuss monetary policy. What Woodford analysed was a new version of Wicksell's imaginary deposits-only pure credit economy. This simpler system, he argued, not without empirical justification, had been transformed by a century of institutional developments from an abstraction into a usefully accurate approximation to the real world. But Woodford's version of the pure credit economy was not quite Wicksell's either. His account of its features paid only passing attention to shocks to the natural rate of interest which lay at the very heart of Wicksell's story. Moreover, with capital and investment being left out of much of his modelling, this rate was usually represented by an exogenous and usually stable rate of time preference. Woodford's analysis instead emphasised shocks to the inflation rate itself and hence to inflation expectations, formally modelled as rational rather than being occasionally mentioned in passing as had been the case in 1898.³³ But above all, his model's responses to the emergence of differences between the nominal values of the natural (or neutral) and market rates of interest differed from Wicksell's in being equilibrium phenomena. Such shocks changed the time path of planned expenditure and output in Woodford's analysis, but no gaps ever opened up between

³² Its evolution into the system expounded by Woodford (2003) is discussed in detail by Peter Spahn (2009, 2019a).

³³ The shocks to the nominal natural rate of interest that Woodford postulates are random disturbances, and his real natural rate is usually assumed to remain constant. Wicksell, whose model was not stochastic, had envisioned long term changes to the real natural rate, arising at rather widely spaced intervals, as being the typical factors disturbing his system. Subsequent literature, especially that following the crisis of 2008-10 would of course pay much more attention to the apparent fact that the natural rate of interest appeared to have fallen and remained low as the first decade of the new millennium had progressed.

them, and it was deviations of current output from its “natural” level that drove inflation away from its expected level in this model, not, as with Wicksell, excess demand.

In short, Woodford’s updating of Wicksell’s pure credit economy eliminated the very feature of the original - namely a discrepancy between planned saving and investment - that had formed the basis of the Wicksell Connection’s central role since 1898 in the explanation of economic fluctuations; and its relationship to this tradition was thus very much the same as that between Lucas’ (1972) New Classical innovations and the Monetarism that had preceded them. As in the latter case, also, what seemed at first sight to be purely technical modifications to an already existing approach turned out on closer inspection to be substantive.

Not only did Woodford take the smooth workings of financial institutions for granted, but, following through on the implications of the clearing markets assumptions more thoroughly than had Lucas (1972), he was also quite explicit that the quantity of money was irrelevant to the economy’s functioning. To be sure, he conceded that the latter variable could be tacked on to his system as a passively endogenous variable, but, for once faithfully following Wicksell (rather than the Keynes of the *Treatise*) he presented this treatment as being the empirically relevant one without much argument. Thus, mainstream macroeconomics entered the new millennium equipped with a core model in which agents’ choices, including those about the allocation of resources over time, were always fully co-ordinated, and in which money played no role. Though Woodford certainly drew new attention to Wicksell (1898), therefore, he also implicitly consigned to history all subsequent work on both the Wicksell Connection and Monetarism.

XII *The Crisis of 2008-10*

The crisis of 2008-10 duly followed. As Peter Spahn (2009) demonstrated while it was still in progress, *New Keynesian Economics* in the style of Woodford had nothing useful to say about it. It is usual to refer to this event as a “financial crisis” and, certainly, extreme difficulties and sometimes outright failures of financial institutions were its most immediately visible feature. But to stop here is to ignore the massive inter-temporal co-ordination failure lying behind those difficulties, whose most visible consequences on both sides of the Atlantic were acres of empty and often partially incomplete dwelling units littering the landscape, a collapse in the relative price of housing, and serious fiscal problems for those governments that had come to rely on the residential property market as a key source of revenue. As some Monetarist commentators (e.g. Tim Congdon (2017), Robert Hetzel 2012) have suggested, this crisis probably was triggered by a prior downturn in money growth, just as had happened before the contraction of 1929-33, but in both cases, the violence of an apparently already fragile economy’s response was hard to explain without bringing into the conversation a deeper dislocation in the allocation of resources over time, and hence the Wicksell Connection.

In 2009-10, unlike 1930-33, however, the Fed set an example for other central banks in taking extraordinary steps to prevent a wholesale collapse of the financial system, both domestic and

international. Massive *Quantitative Easing (QE)*, (simply a new term for *open market operations*) was successful in preventing wholesale institutional collapse, the money supply held up, and no Great Depression on the scale experienced in the 1930s ensued. Even so, as Jeffrey Hummel (2012) has stressed, these measures were directly inspired by lessons learned not from Friedman and Schwartz's *Monetary History* but from Chairman Ben Bernanke's own work (e.g. Bernanke 1983) on the failure of bank credit markets during the Great Contraction, and, from the Fed's point of view, QE's effects on the behaviour of the money supply were at best incidental to its undoubted success in keeping these markets functioning.

Even so, evidence generated during the crisis of 2008-2010 also created some renewed interest in Monetarism, because the conduct of monetary policy and its consequences in those years also seemed to strengthen the case for Friedman and Schwartz's counter-factual interpretation of the Fed's role in the Great Contraction.³⁴ But serious discussion of these matter by the likes of Congdon (2017), Hetzel (2012) and Laidler (2013, 2017), among others, was effectively drowned out by serious and very public errors repeatedly made during the crisis by a group of commentators with impeccably Monetarist credentials – including no lesser figures than Allan Meltzer and Anna Schwartz.³⁵ Observing that QE in the United States was leading to a massive expansion of the monetary base, and involved the propping up of a wide range of financial institutions located outside of the boundaries of commercial banking, these commentators denounced such measures as inappropriate, and some of them also predicted imminent runaway inflation if they were not terminated and reversed. But terminated and reversed they were not, and inflation barely picked up, let alone ran away.

These predictions should never have been made. Monetarism has always attributed inflation to sustained and excessive growth of the *money supply*, not of the *monetary base*. It is true that money supply growth has usually moved in rough harmony with base growth, particularly in relatively tranquil times, but this relationship has sometimes failed in periods of extreme monetary and financial turbulence. In particular, it did so dramatically in the United States of the 1930s, and it would do so again after 2007. If Monetarist critics of Fed policy had checked money supply data before predicting inflation, they would have noticed that money growth remained barely positive on average during the crisis, and they would not have predicted a surge of inflation. But apparently they did not and, as a result, they did Monetarism's still fragile reputation serious damage, providing an opportunity to those who had been critical of it long before 2008 to cite monetary experience after that date as yet another instance of its alleged

³⁴ Laidler (2013) discusses this issue extensively.

³⁵ See for example Meltzer (2009), Schwartz (2009). The type of criticism embodied in these examples was continuous and conspicuous, sometimes expressed in "open letters" to Newspapers such as the *New York Times* and *Wall Street Journal* as Ben Bernanke (2022, pp. 142-3, 162-4) documents in his account of the conduct of monetary policy during this period.

failings.³⁶ Unlike the Wicksell Connection, then, Monetarism remained marginalised after the financial crisis, not by the force of any logical argument or careful empirical analysis but of a careless, though widely un-noticed as such, mistake. So, as economies recovered slowly and painfully from the *Great Recession* that followed the crisis, most economists, not least policy makers, continued to ignore the behaviour of the money supply.

XIII *The Inflation of 2021-23*

The inflation of 2021-23 duly followed. As we all know, the Covid Pandemic that began in 2020 created unprecedented policy challenges everywhere it reached, and these were met by all manner of improvised expansionary fiscal and monetary measures intended to at least blunt its impact on real output and employment. To put matters in the vocabulary of *How to Pay for the War*, which is tailor made to describe this episode, fiscal responses to the pandemic created huge inflationary gaps in many jurisdictions that were in short order filled by increases in the monetary liabilities of central banks, a policy option not even contemplated in Woodford's (2003) discussion of the *Foundations of a Theory of Monetary Policy*. Caught once more without any currently fashionable theory to guide it, monetary policy in effect followed the inflationary example of the UK during World War 1, as described by Keynes in Chapter IX of his 1940 pamphlet. In contrast to 2007-9 when *QE* had provided reserves to often nervous banks, which then gratefully accumulated them, this time it created money that was put directly into circulation among the non-bank public as governments made their emergency expenditures.

As events unfolded, central banks routinely published data on the behaviour of money, but ignored their implications for the conduct of policy. When inflation began to show signs of life in 2021, they brushed these off as transitory effects of pandemic-created supply chain bottlenecks, and repeatedly reassured the public that policy interest rates would remain at rock bottom until late 2023 at the earliest. Warnings sounded by a few Monetarist commentators that these interest rate targets would soon turn out to be incompatible with the continued pursuit of the inflation targets to which those Central Banks were already committed were summarily rejected. Fed Chairman Jerome Powell's pronouncement, made on February 24th 2021, that "there was a time when monetary policy aggregates [sic] were important determinants of inflation and that has not been the case for a long time" provides an early example of this response, and he was still repeating this message a year later (c.f. Hanke and Hanlon 2022), while Governor Andrew Bailey of the Bank of England (Bailey 2022) could not have been more explicit in rejecting "the argument that in our response to Covid the Bank's Monetary Policy Committee . . . stoked inflation". A crucial experiment bearing on the relationship between money growth and inflation, one which at the time of writing is still in progress, was therefore allowed to proceed.

³⁶No less a figure than Bernanke (2022) himself would avail himself of this opportunity, as Charles Goodhart (2023) has recently complained. Bernanke was nevertheless careful to explicitly absolve Milton Friedman himself of any posthumous blame for the failures of monetarist commentary in 2009-2010.

XIV *A Link Still Missing . . .*

The results of the experiment seem to be favouring Monetarism, though far from conclusively as yet. For example, Claudio Borio, Boris Hofmann and Egon Zakrajsek (2023) find strong evidence of a statistically significant relationship between money growth and inflation since 2020 in a number of countries, but they stop short of speculating about the question of causation. Still Christopher Dow's cat seems to be sitting once more on the sub-discipline's porch. Whether it will now be invited inside, into the company of the by now almost respectable Wicksell Connection is an open question. Perhaps it will be, not only because of its recent forecasting successes but also because the fact that it shares a common intellectual basis with that Connection in non-Walrasian micro-theory is now so widely recognised. But if this is what ought to happen, there can be no guarantee that it will. The history that this paper has sketched is littered with episodes in which Monetarism and the Wicksell Connection were driven apart and then kept apart by analytic mistakes, misinterpretation of evidence, and also perhaps by deeply held differences in scientific (but with political overtones) assessments of the likelihood of the monetary economy always and everywhere being self-stabilizing. There is ample precedent for such accidents to continue to happen.

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