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# **On stock-flow consistent approaches and the like: the ‘rediscovery’ of model building**

Cavalieri, Duccio

University of Florence

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**DUCCIO CAVALIERI**

(University of Florence)

**ON STOCK-FLOW CONSISTENT APPROACHES AND THE LIKE:  
THE ‘REDISCOVERY’ OF MODEL BUILDING.**

**1. A Copernican revolution in the theory of economic policy?**

There have been in recent times in the theory of monetary and fiscal policy frequent claims of substantial changes implying an abandonment of old-fashioned views and the adoption of new and better methodological perspectives. ‘Stock-flow consistent approaches’ (SFCA) to macroeconomic modelling, ‘modern monetary theory’ (MMT) and the like have been described as an epochal methodological revolution. Are they really such? Or are they ingenuous rediscoveries and doubtful ‘remakes’ of past theories? This is the controversial subject of the present essay.

SFCA and MMT are two popular schools of thought. They have been boasted by their promoters as innovative and heterodox post-Keynesian new generation methodologies, suited to provide a rigorous and internally consistent accounting framework for the analysis of a modern economic system, as a whole.<sup>1</sup> But they have also been criticised as collections of familiar truisms: those that everything comes from somewhere and goes somewhere else, that flow variables cumulate over time into stock variables and that any source of income must have a counterpart, so that in a closed economy the financial inflows and outflows of the various sectors should sum up to zero.<sup>2</sup> In the present essay we shall examine these features and distinguish SFCA from MMT.

Let us first consider SFCA. It has been characterized as a post-Keynesian innovative macroeconomic approach based on stock-flow relationships, on the analysis of flows of funds

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<sup>1</sup> For this characterization, see Godley and Lavoie, 2007, and Wray, 2012.

<sup>2</sup> See Palley, 1994, for the charge of boasting as significant methodological innovations familiar truisms, resulting from well known national accounting identities.

between sectors, of interrelated sector balance sheets, of income statements and double-entry matrices. Its essence was authoritatively described by its proposers in these terms:

*“The method will be to write down systems of equations and accounting identities, attribute initial values to all stocks and all flows as well as to behavioural parameters, using stylized facts so well as we can to get appropriate ratios (e.g. for the proportion of the national income taken by government expenditure). We then use numerical simulation to check the accounting and obtain a steady state for the economy in question. Finally we shock the system with a variety of alternative assumptions about exogenous variables and parameters and explore the consequences”.*<sup>3</sup>

This concise description recalls a familiar method, that of system analysis, an interdisciplinary scientific methodology that has been seemingly applied by SFCA exponents and their fellow travellers without even mentioning it.<sup>4</sup>

System theory is a fundamental part of the general theory of knowledge suited to be used in the analysis of the interdependent structural relationships among the interacting components of complex dynamic systems, in a holistic and evolutionary perspective, contrasting with methodological reductionism. It has an epistemological and ontological nature and provides a powerful methodology for problem solving in macroeconomics, management sciences and other disciplines, involving the use of mathematical, statistical and econometric techniques and of control theory<sup>5</sup>. The analyst adopts a strategic point of view, which enables the policymaker to take reasoned decisions in presence of changing circumstances.

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<sup>3</sup> Godley and Lavoie, 2007, p. 9.

<sup>4</sup> The methodology of system dynamics modelling was developed in the first half of last century to handle complex dynamic problems involving heterogeneous types of interacting agents, by Bogdanov, Bertalanffy, Wiener, Vernadsky, Forrester, Bellman, and was recently further developed by Aoki, Yoshikawa and others. Useful handbooks on system dynamics modelling are those of Richardson and Pugh, 1989, and Hannon and Ruth, 2012.

<sup>5</sup> See van den Bosch and van den Klauw, 1994, Leigh, 2002, Richardson and Andersen, 2010.

As SFCA modelling, system dynamics implies a multi-stage approach. Once the problem to be analysed has been specified, a flow-chart – a detailed causal loop diagram – is usually initially traced to describe the qualitative nature of the problem in a non-mathematical way, by use of state variables (stocks), action variables (flows) and topologic directional connectors (lines and arrows). Continuous lines are used to indicate physical flows and broken lines for money flows.

The next stage of the process is the construction of a mathematical model suited for a quantitative analysis, that is of a set of simultaneous accounting identities and behavioural equations. The model can then be used to make simulation experiments, in computer language. The further stage is particularly important, as it consists in making a dynamic behavioural hypothesis and in its testing and validation. The penultimate stage of the process of system dynamics implies debugging and checking the model, to be sure that it is well constructed. This is usually made by testing the sensitivity of the model to possible shocks and its dynamic stability. The last stage is that of assessing the predictive capacity of the model.

Let us now compare SFCA and system dynamics. They use the same multistage modelling procedures and the same simulation approaches. Both of them involve the definition of problems in dynamic and sequential terms, the identification of stock and flow variables, feedback thinking and computer simulations. And both of them recognize the importance of nonlinearities and make use of difference equations in discrete time and of continuous differential or integral equations. Where is the difference? How innovative is the SFCA methodology?

## **2. A neglected lineage.**

Modelling a dynamic system in economics requires first of all the specification of the system boundaries in time and space and of its stock and flow structure, that is of a set of equations which should describe how the flow variables are integrated over a time interval into the stock variables. To represent structural relationships and to evidence causal links, system dynamics makes use of stock-and-flow diagrams containing three types of conceptual elements: state variables (stocks),

reckoned at a single point in time and affected by the past behaviour of the system; action variables (flows), that influence the state variables; and data connectors (arrows, or causal loops).

Production takes time, and so does selling the product. Different productions take different times. Time is an exogenous variable which crosses the system boundaries in the model. A correct specification of the time boundaries of the model and of the time-horizon of simulations is essential. A similar remark can be made as concerns the level and extent of aggregation in homogeneous sectors. Their size is an important analytical dimension.

The use of social accounting matrices (SAM) as a conceptual framework for macroeconomic modelling is not a novelty. It has been practiced since a long time in system dynamics approaches. There is a wide literature on the subject.<sup>6</sup> A SAM is an expanded input-output square matrix in which transactor payments and receipts are respectively reckoned in columns and rows. For each account or subaccount the sum of all payments must equal the sum of all receipts. A last row is used to show the combined capital account and one row can be dropped for reasons of redundancy.

In SFCA the use of SAM is a peculiar one. Production is demand-driven and there are no capacity constraints on the supply side. Whatever is demanded within a period is supposed to be produced and sold in it. There can be no inventories of unsold products. This conceptual framework can be used to study the effects of exogenous changes, such as an increase in government expenditure or a rise in exports, through a multiplier analysis. A validation procedure is needed to test the internal consistency of the theoretical hypotheses and the behavioural assumptions of the model.

Particularly important is a correct parameter identification, that is the initial attribution of numerical values to the parameters of the variables in the simultaneous behavioural equations that reflect the motivations of economic agents and the constraints they must face. There are countless equivalent sets of plausible numerical values of structural parameters. The results of the model are sensitive to their choice. They should possibly be based on observation, and reflect empirical or

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<sup>6</sup> A basic reference is Thorbecke, 1985.

experimental statistical data, rather than be rationally estimated by system methods and calibrated on the base of a benchmark year social accounting matrix. In any case, they should not be assumed as scale invariant. System dimensions are relevant.

A specific problem arises from the SFCA ambiguous reference to a steady state equilibrium implying constant relations between stocks and flows, to which the economic system is supposed to tend in the very long-period. Can the long-run configuration of the economy be taken as predetermined. Is this rational? Multiple and unstable equilibria, suited to be described by probability distributions, and chaotic behaviour should not be excluded.

We know that it is easier to compare different policies implying steady states. But is this a sufficient justification? Is there really a need to condition the analysis to the existence of steady-state equilibria, in which the rates of flows and the levels of stocks are stabilized? How should this take place: through changes in government expenditure, or in interest rates?

Other problems in SFCA are related with the opening, the closure and the solution of the models. A basic assumption of theories of endogenous money supply is that at the outset there should not be an initial stock of money. Credit money creation, endogenously determined, should take place later, in form of interest bearing loans, fictitious deposits and overdrafts. It would not, however, be free of exogenous connections. The existence of fiat money should be presupposed, to meet reserve requirements.

The equilibrium closure of the model can take different forms, that depend on the specific nature of the behavioural equations of economic agents, clustered in homogeneous functional categories and unrealistically supposed to obey constant behavioural rules<sup>7</sup>, to have complete information and rational expectations. In SFCA agents do not learn from experience and do not adapt their conduct to changing circumstances and government policies.

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<sup>7</sup> Key closure rules are those concerning the adjustment mechanism relating savings and investments, or the attainment of the balance of payments equilibrium under fixed or flexible exchange rates regimes.

To solve the model, its equations must be written in structural form; not in the easier to estimate reduced form, in which the values of endogenous variables depend only on those of the exogenous variables and on possible lagged values of endogenous variables. The solution of models in reduced form can provide information on the sign of functional relationships, though not on their magnitudes.

Other analytical shortcomings of SFCA must also be mentioned. The relations between the macro and the microeconomic levels of analysis are not specified; the degree of industrial concentration and that of capacity utilization of firms are ignored; banks are not distinguished from non-banking financial institutions; and there is no room for heterogeneous agents' conduct at the microeconomic level. The central bank is supposed to act as a price-setting monopolist in the money market, that is to fix its nominal lending interest rate (the rental price of base-money) and to be then committed to provide commercial banks on demand, at that rate, with any amount of base-money they need to meet possible reserve requirements. Because of this alleged accommodative lending behaviour of the central bank, the supply of money is considered of endogenous nature. This can be questioned. Clearly endogenous, at the macroeconomic level, is only the real supply of money, that is the nominal supply divided by an index of the price level.

Solving the model involves further assumptions, such as the convergence of the economy from its given initial conditions to a steady-state long-run equilibrium. What happens if the model does not converge to a steady state equilibrium solution? There are, thus, in SFCA various problems to be solved. SFCA is a useful methodological instrument for macroeconomic modelling, but no more. It is neither a methodological revolution nor a must. And it is not the only stock-flow consistent approach to macroeconomic modelling. DSGE neoclassical and new Keynesian models are also stock-flow consistent.

In spite of these considerations, some policy conclusion of SFCA can be easily shared. The main one is that monetary policy alone cannot maintain full employment and a low inflation rate for a sufficiently long period, unless it is appropriately supported by fiscal policy.

Fiscal policy, however, should be carefully used. It affects people's spending behaviour and can determine crowding out effects and a misallocation of loanable funds, if it is practiced above full employment.

### **3. SFCA and MMT: a comparison.**

MMT, or neo-chartalism, should not be confused with SFCA. SFCA is essentially a set of methodological rules to be used for descriptive and forecasting purposes, MMT is something more. It has a prescriptive nature. It is a policy proposal to escape from austerity by unbalancing the government budget.<sup>8</sup>

As SFCA, MMT has been presented by its proponents as a stock-flow consistent innovative post-Keynesian approach. A methodology that would have uncovered how money really works in a modern sovereign economy.<sup>9</sup> It is claimed that MMT brought the government sector into the simple triangular agent-based monetary circuit involving firms, banks and households, with the intention to highlight a prominent responsibility of the government in policy making.

The fundamental proposition of MMT is that in a sovereign country with fiat money and a flexible exchange rate there are no financial constraints on government deficit spending. The government sector would not be financially constrained. It would not need to tax or borrow to collect financial resources. In other words, it would be technically self-funding. It would never risk to run out of money, because of its power to print money and be solvent.

It is maintained that as a consequence of this alleged unlimited ability to pay without bearing costs, the government of a sovereign country could act as a job guarantee and an employer of last

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<sup>8</sup> MMT is also known as 'Mosler's economics'. Warren Mosler is a hedge fund manager, co-founder of MMT. He is a financial supporter of the headquarters of the SFCA circle, the Levy Economics Institute of Bard College, N.Y., a research institution and influential policy think-tank.

<sup>9</sup> See Wray,: "To put it simply, we have uncovered how money 'works' in the modern economy" (Wray, 2012, preface, p. 9).



resort, at a minimum wage rate. For MMT, below full employment government deficit spending does not matter, since there are no financial limits to printing state money.

MMTers claim that no financial crisis would be so severe that it cannot be faced by a sufficiently large increase of government deficit spending. This is technically correct, but hides a dangerous illusion. Financial limits do not exist, and they should not be legally imposed, but real limits are always present, for the scarcity of productive resources. Their inobservance causes inflation.<sup>10</sup>

Two basic hypotheses of MMT are that there cannot be taxation without previous government spending which should provide the private sector with the fiat currency required to pay taxes, and that there is a need for a 'consolidation' of the activities of the Treasury and the central bank, which have distinct functions but can work in association for stabilising purposes.

MMTers maintain that the consolidated budget of the government sector of a monetary sovereign country can be permanently in deficit. They say: 'Never mind of budget deficits'. They are useful, they stimulate the economy and enrich people, as they increase private wealth, and do not have to be repaid.

Let us therefore consider how the financing of a budget deficit can take place. There are three principal methods: printing money, taxing, and borrowing.<sup>11</sup> Printing creates new base-money. It may be substituted or complemented by taxation, that is by a destruction of base-money, and/or by issue of Treasury bonds, that is by creation of new financial assets. It is important to understand how these operations intersect and how they affect the lending rate.<sup>12</sup>

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<sup>10</sup> The productive or unproductive quality of government spending should also be considered. Unproductive spending would increase the risk of inflation.

<sup>11</sup> There is also a further alternative: that of doing nothing to finance the current budget deficit, add it to the pre-existing debt, pay interests on it, manage it and shift the burden of the debt on future generations.

<sup>12</sup> Government borrowing or printing new money will probably lead to an interest rate increase and thus determine a crowding out effect on private investments. But while government borrowing drains liquidity from the market, and thus has a deflationary effect, printing new money is inflationary.

Treasury bonds must be sold to the private sector, which for this purpose needs additional reserves, that the monetary authority should supply. Government spending adds to commercial banks reserves and to people's demand deposits, but borrowing by selling new Treasury bonds drains liquidity from the market. The relevant point thus is how these two operations involving opposite movements of funds should be coordinated over time.

What is the direction of this particular monetary circuit? Does government spending necessarily come first and taxation or bond issuing follow later on, as assumed by MMT, or vice versa? In the first case, there would be a provisional increase of net private financial wealth; in the second case, a provisional decrease. But the final effect would probably be neutral.

MMTers make large use of the accounting structure of SFCA and of its modelling methods. But MMT should not be regarded simply as a special branch or application of SFCA, paying special attention to the role of financial markets. Unlike SFCA, which has an analytical nature and is fundamentally descriptive and policy-neutral, MMT is an ideologically committed normative approach entailing specific policy recommendations. As a permanent budget deficit of the public sector, the assignment to the government of the role of 'job guarantee' and employer of last resort, and the reject of any proposal of getting growth through austerity.

In spite of its name, MMT is not a theory; even less a post-Keynesian theory. It is not intended to provide a unified body of knowledge and is not in line with Keynes' own views. Keynes opposed the classical myth of the annual balancing of the budget, but did not favour a permanent and unlimited deficit spending. He advocated deficit spending only during a recession, followed by a budget surplus during the subsequent boom, in such a way to balance the budget over the business cycle. Keynes was conscious of the risks of continuous deficit spending. MMTers, seemingly, are not. They argue that whenever the government sector prints new base-money and spends it, people are richer and happier, since government spending adds to net private financial wealth.

This is a naïve and dangerous misconception. Government spending by printing money to is not costless. It causes inflation and the purchasing power of people's savings is reduced. There is no such thing as a free lunch.

As an approach which favours government dirigisme, MMT is not ideologically neutral. But it should not be considered left-leaning because some of its leading exponents are such and full employment and economic welfare for everybody as primary goals. There are neoliberal and neoconservative variants of MMT implying less statist presence, no seigniorage prerogatives of the government sector and no preference for fiscal over monetary policy

#### **4. Circuit theories: a crucial criticism.**

SFCA is considered by Lavoie and others as suited to provide a formal accounting legitimization to agent-based 'monetary circuit theories' (MCT), which should describe the creation, circulation and destruction of endogenous scriptural credit money. That is of a type of money devoid of intrinsic and legal tender value; thus unfit to be intentionally kept as a stock of liquid store of wealth.<sup>13</sup> This is surprising because circuit theories are concerned with endogenous money, unlike SFCA and MMT, both of which highlight the role of the government sector in the creation of exogenous money. In my opinion, they should rather be seen as mutually exclusive.

In MCT three categories of interacting agents – firms, commercial banks and households (firms' workers) – are considered, in sequential order. It is assumed that at the outset bank loans, implying interest payments, are demanded and obtained by firms, that use the credit money to start their production activity. In a second stage, output is produced and output nominal prices are determined following a mark-up rule, which includes a profit margin. Then households are

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<sup>13</sup> See, for instance, this statement by Godley and Lavoie: "The transactions flow matrix sets the monetary circuit theory – about which so much has been said by French and Italian post-Keynesian school, the so-called circuitistes – within a comprehensive accounting framework, which will help to justify the story told and the claims made by these post-Keynesians" (2007, p. 47).

supposed to spend the wage bill purchasing firms' goods produced in the period and thus to allow the return to firms of some money.

The relevant question is: the return to firms of how much money? The answer is straightforward: at most – in the limit case in which workers do not save and have no liquidity preference, but spend all their money buying firms' products – the amount of the wage bill, which is less than the money value of output at mark-up prices. That is at most the money needed to repay the principal of their debts to the bank system. Though not to pay also the interests accrued in the meantime on the outstanding loans, as required for a regular closure of the circuit. This is the obtrusive 'profit, or interest, paradox', systematically neglected by circuit theorists.

Let us have a look at the sequence of events typically considered by circuit theorists. They assume: 1) that firms borrow by banks some money – created *ex nihilo* by bank loans and implying interest payments – and use entirely this money as working capital, to pay production costs, including predetermined wages; 2) that this money is thus transferred from firms to households; 3) that when production is completed, firms set output prices under a mark-up rule, which includes a profit margin, and sell their products. It is also assumed: 4) that firms will get as receipts from the sale of output the whole amount of money spent to pay wages and other production costs, plus profits (this is erroneous); 5) that firms will be able to return the money previously obtained to banks, including interests, and thus to extinguish their debts; 6) that banks will then use interest payments to cover current costs and to purchase goods and firms securities.

Let us consider these assumptions. Assumptions 1) and 2) and 3) do not need an explanation; they are sufficiently realistic. The crucial assumption, 4), is counterintuitive; it is entirely unjustified, because wage-earners can save part of their income and hold it, in liquid form, or in bank deposits and financial investments in equities. Assumption 5) follows tautologically from assumption 4) and is also unjustified. Assumption 6), on the spending behaviour of bank revenues, is irrelevant for the closure of the circuit; it concerns its reopening.

Assumptions 4) and 5) cannot be theoretically justified. How can workers, rewarded with a predetermined wage bill, be able to purchase firms' products at prices that include a mark-up over prime costs? Under such conditions, firms as a whole can get back at most the money they initially paid for inputs. No more.

This is, in essence, the profit or interest paradox. Attempts to solve this awkward paradox have been made in various directions by circuitists and their fellow-travellers. It was initially suggested to consider, instead of a single-period monetary circuit, a set of overlapping circuits, implying lagged reimbursements of bank loans in the long period (Parguez). Only part of the outstanding loans would thus be retired in each period. As pointed out by Rochon, this is not a solution. It does not involve the closure of the circuit, but a continuous deferment of the closure. A solution explaining the existence of profits should be found within a single period of production.

As an alternative, it was suggested to assume that additional liquidity will be provided exogenously, by the State, through budget deficits, or by the rest of the world, through the balance of payments. This is certainly possible, but is a typical *deus ex machina* solution and implies a burden which cannot be born for a long time.

Lavoie noticed that it was necessary to assume that "the initial finance provided by banks to allow production is in all cases larger than the final finance requirements of firms at the end of the period", thus pointing out that the initial bank loans should be larger than firms' immediate financial needs.<sup>14</sup> In this spirit, Zezza has gone so far to propose that the initial bank loans should cover the wage bill and interests.<sup>15</sup>

Keen denied the existence of a profit paradox, arguing that "capitalists can borrow money, pay interest, and still make a profit", since the flows initiated by the money borrowed by the firms over a year can circulate several times in one year. But he noticed that "the rate at which the bank transaction account turns over each year has to exceed the rate of interest on loans and the rate at

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<sup>14</sup> See Lavoie, 2001, p. 14.

<sup>15</sup> Zezza, 2012, p. 159.

which the workers' deposit account turns over has to exceed the rate of interest on deposits"<sup>16</sup>. He took these assumptions as reasonable, but they are not.

Other proposals made by circuitists and their fellow travellers were to assume that even workers can get bank loans; that some firms go bankrupt and do not reimburse their debts, while other firms make profits; to consider firms' unsold commodities as an investment in inventories; to suppose that firms can reimburse their debts in kind; or that money can enter the circuit also through different bank loans, granted to households for consumer credit. None of these proposals to ensure a proper setting of the reflux phase. There is here a real problem; not a pseudo-problem.

The problem was correctly perceived by Marx, who recalled a sort of reflux law of credit money formulated by Tooke and Fullarton, by which credit money was destroyed when bank loans were repaid and undesired excess liquidity was not held. In the introduction ('Einleitung') to *Grundrisse* (1857-58) and in *Capital*, volume II, Marx significantly pointed out that "the class of capitalists cannot extract from the circulation what has not previously been thrown in"<sup>17</sup>.

## **6. A theoretical perspective of monetary theory and policy.**

Post-Keynesian economists have paid large attention to the behaviour of the central bank and the whole banking system in a modern monetary economy. Their approach is that of money endogeneity, suggested by Kaldor to contrast monetarism and developed later on by Basil Moore and others. Banks are supposed to act as an efficient transmission mechanism of monetary policy and to accommodate systematically people's demand for credit.

The fundamental issues of the controversy which opposes money exogeneists to money endogeneists are the direction of causality in monetary theory and the controllability of monetary policy in an institutional framework characterized by the presence of both outside (fiat) and inside

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<sup>16</sup> Keen, 2010, p. 10 and 16.

<sup>17</sup> Marx, *Capital*, vol. 2, chap. 17, section 1. Ignoring this unequivocal statement, some circuitists have tried to enrol metaphorically Marx among the precursors of circuit theories. This is an evident misinterpretation of Marx's theory.

(credit) money. What is lacking is a shareable theory of the behaviour of the central bank and the banking system. Do commercial banks receive the reserves of base-money they need, implying interest payments, from the central bank and then lend out credit money with a mark-up rental price to their customers, or not? Is the central bank lending behaviour a purely passive and ‘accommodationist’ one?

We shall hereafter try to recall – in a new Keynesian heterodox perspective, with nominal price rigidities, uncertain expectations about the future and non-neutrality of money – the basic guidelines of a realistic and unambiguous theory of banking behaviour. This task implies a refusal of new classical real business cycle theory and a confirmation of the theoretical and practical relevance of monetary and fiscal policy.<sup>18</sup>

We object to the idea of an infinitely elastic money supply schedule. We propose to make a step up in the analysis of the problem, by considering the possibility of an active reaction function of the central bank and of a heterogeneous behaviour of individual banks as concerns the adoption of a reaction strategy to government monetary policy.

It is indeed widely known that some banks first make loans and then look for the required reserves. The strategies adopted by banks differently capitalized, having different portfolio quality and with different risk-taking propensity or aversion, can be either accommodative or not. In general, highly capitalized banks tend to be more risk-averse. In this way, they incur in minor losses in the case of a possible economic downturn. There is a positive relationship between the amount of capital of a bank and its level of risk aversion. A high level of capitalization provides a valid shelter in recession times. Low capitalized banks are more exposed.

An accommodative lending behaviour of the banking system may be considered normal during expansionary cyclical phases; but the empirical evidence suggests that an activist and

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<sup>18</sup> For the general lines of the new Keynesian perspective on monetary theory and policy, in which aggregate demand plays a determinant role, see Clarida, Galí and Gertler, 1999, and Walsh, 2010, ch. 8.

restrictive lending behaviour by low capitalized banks usually tends to take place during a recession. Banks' severity in screening risky borrowers obviously increases in hard times.<sup>19</sup>

Our position does not involve a fully endogenous view of money supply and an accommodationist behaviour of the central bank. We think that when a commercial bank makes a loan to a creditworthy borrower, a fictitious deposit of equal amount, representing a bank liability, is created in the borrower's account. The loan is a bank asset, the deposit a bank liability. The bank customer can withdraw the money borrowed, in the whole or in part. When the loan is repaid, the debt winds up and both the asset and the liability cancel out, for the lending bank and for the borrower.

We maintain that bank loans do not create genuine but fictitious bank deposits ('loan deposits'). Bank loans and fictitious deposits are created simultaneously, by double-entry bookkeeping. Hence commercial banks do not need reserves to make loans. They create out of nothing the endogenous money they lend, on their costumers' demand, subject to reserve requirements set by the monetary authority, in the interest of bank depositors. The reserve regime reduce banks' lending activity, by obliging banks to hold idle reserves, which subtract liquid resources to productive uses.<sup>20</sup>

We do not share Palley's idea that in the course of time the horizontalist position has gradually changed its characteristics and dissolved into the structuralists's view, nor the statement that structuralists took over where horizontalists stopped, filling their omissions and oversights. The two approaches are antagonist and mutually exclusive. They are not different approaches to one and the same theory, the endogenous theory of money supply. Structuralists' alleged fully endogenous money supply position is indeed doubtful. It should be proved, not simply asserted. In our opinion,

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<sup>19</sup> See Thakor, 1996, Furfine, 2000, Ehrmann and others, 2003, Gambacorta and Mistrulli, 2003.

<sup>20</sup> Today full reserve banking – the 100% reserve regime, advocated by Irving Fisher, which would ensure to the state an exclusive 'seigniorage' prerogative – seems hardly conceivable, but it has been re-proposed by Cochrane, Martin Wolf and others, to contrast an easy creation of credit money by the banking system and to achieve greater financial stability.



structuralism can only be considered as partially endogenous, because the central bank cannot be forced to provide as a lender of last resort additional reserves to the banking system.

## **6. The weak endogeneity of money supply.**

The monetary authority is a monopolist in the money market. As such, it can choose whether to control the quantity of money and take its rental price for granted, or to control the rental price and banks' reserve requirements and take the quantity of money as endogenously determined. Monetarists opt for the first option. They are, so to speak, 'money-supply exogeneists' and 'interest rate endogeneists'. They consider the central bank as the monopoly supplier of reserve balances and the supply of money as the key policy instrument, whose quantity is determined by the amount of money-base, under direct control of the central bank, times the value of a money multiplier, the reciprocal of the reserve requirement ratio, supposed stable. In their opinion, the velocity of circulation of money is constant and nominal income adjusts to equalize the demand for money to the supply, exogenously determined.

Post-Keynesians, on the contrary, are 'interest rate exogeneists' and 'money-supply endogeneists'. They assume that the direction of causality goes in the opposite direction, from the demand for money to money supply, which in their AD/AS models is endogenously determined, being the result of a passive, accommodative behaviour of the central bank and the whole banking system.

To establish the nature of the nominal supply of broad money one has to consider the length of the time horizon and the transmission mechanism of monetary policy to aggregate demand and other macroeconomic variables. While in the short-run the supply of money can be considered exogenously determined, in the medium and long-run endogenous credit money tends to assert itself as the dominant component of money supply, subject to the limits imposed by reserve requirement obligations. Fully endogenous is only the real supply of money – the nominal supply divided by an index of price level.

As concerns the transmission mechanism of monetary policy, in post-Keynesian theories it is supposed to take place through the impact of changes in money supply on interest rates and then through the complex effects of changes in interest rates on consumption and investment expenditure and, through the Keynesian multiplier, on aggregate demand and the level of income. In monetarist theories the transmission is more direct. It is based on wealth effects, due to the price changes originated by the attempts of economic agents to adjust their liquid balances to the desired levels, restoring the portfolio equilibrium between real and financial assets in the presence of changes in the supply of money, by varying the amount of the expenditure in goods and services. In the long-run this should ensure a neutrality of money, through a non-neutrality in the short-run.

The distance between the theoretical stances of monetarists and post-Keynesians on the nature of the transmission mechanism of monetary policy on aggregate income and expenditure, however, should not be overemphasized. There are not today, under inconvertible paper money regimes, transmission mechanisms that do not imply changes both of prices and of interest rates.

The bi-directionality of the causal order between real and monetary variables is generally recognized. There are different views only on the time-length of changes in interest rates, which monetarists regard as destined to be rapidly offset by price changes, whereas post-Keynesians do not.

In the 'old view of money', the supply of money was under full control of the monetary authority. Its amount was determined by multiplying the quantity of base-money, exogenously created by the monetary authority, by a stable money multiplier. The schedule of the supply of money was represented by a vertical line in the quantity of money-interest rate Cartesian space. Fundamentalist post-Keynesians, on the contrary, regarded the rental-price of base-money as set by the central bank, that would then be committed to create base-money out of nothing and to lend on demand at that price any amount of money to commercial banks. Bank reserves would therefore be created by the central bank on demand, after loans are made by commercial banks. At their turn commercial banks would be committed to satisfy the forthcoming demand for loans by credit-

worthy costumers at the lending rate set by the central bank, augmented by a reasonable mark-up. The whole banking system would thus act as price-setter and quantity-taker.

The traditional view according to which the monetary authority could control the stock of base-money, established after the first world war, was dismissed and it was maintained that not only the supply of base-money, but the whole process of money creation had to be treated as endogenous. The overall supply of money was therefore generally considered demand determined and represented by an infinitely elastic horizontal line, set at the current level of the interest rate. Banks were regarded as financially unconstrained. This was the description of a limit case, not the norm.

Other post-Keynesians, the ‘structuralists’, took a less fundamentalist and more realistic stance in their opposition to the monetarism. They considered the economic system in its totality, focusing on the complex interrelations between its elements, and paid particular attention to economic agents’ liquidity preference and to the dual nature of money, a means of payment (a flow variable) and a store of wealth (a stock variable). They refused to share the idea of a systematic full accommodationist behaviour of the central bank, maintained that money supply does not necessarily adequate to money demand and regarded money supply as an upward-sloping schedule, instead of a horizontal one. The role of the demand for money was therefore enhanced and that of money supply downgraded. There could be credit rationing, due to banks’ liquidity preference. The search for equilibrium in the money market could be pursued through interest rates adjustments. But they would take some time to produce results.<sup>21</sup>

For structuralists, banks are not financially unconstrained. The central bank can impose collateral requirements and penalty rates and can even refuse to lend. In any case, time would be required for accommodation and in the meanwhile expectations could change and financial

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<sup>21</sup> There could be, however, a technical limit, if the short-term nominal interest rate set by the central bank would fall below zero. This would discourage economic agents from holding inactive excess reserves and could disturb the functioning of the money market.

innovations, such as assets and liabilities management by banks, could take place. This is, in our opinion, a more realistic point of view, which is further enforced if one considers the analytical role played by Keynes's finance motive for holding money, systematically underrated by endogeneists and neo-Keynesians. Cambridge Keynesians accept the idea that loans create deposits and deposits make reserves and think that as long as central banks choose to set their short-term lending rates, rather than to control directly the supply of base-money, the money supply as a whole can be regarded as an endogenous variable. They point out that the ratios between bank loans, deposits and reserves are nearly constant in historical time. Other structuralists take a less fundamentalist stance and support the idea of an upward-sloping supply curve.<sup>22</sup>

The debate between horizontalists and structuralists went on for decades without reaching definitive results and clear policy conclusions. The limit cases of a vertical and a horizontal money supply schedule were gradually dismissed, but no unified post-Keynesian monetary theory ultimately emerged. Most structuralists are prepared to admit that the supply of credit money is only partially determined by the demand for bank loans. Hence not entirely determined. They think that the supply of base-money by the central bank is not always and necessarily accommodative. They prefer to adopt a sequential time framework, instead than a single period one, and they regard the liquidity preference of banks and their asset and liability management propensity as important factors in the analysis of the behaviour of the banking system.

## **7. On the transmission mechanisms of monetary and fiscal policies.**

As a result of this formulation, the endogeneists' fundamental assertions that the central bank is committed to create base-money and that commercial banks create deposits by their loans should not be completely abandoned, but should be correctly interpreted and qualified, with the purpose of reconciling the opposite views of money supply. Both of them include some elements of the other,

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<sup>22</sup> See Dow, 1996, and Chick and Dow, 2002.

in form of exogenous or endogenous constraints.<sup>23</sup> On one hand, the endogenous credit money created and destroyed by the banking system is subject to an exogenous constraint, represented by the given interest rate required by the monetary authority on its loans of reserve money. The sensitivity of the stock of money to interest rates is however questionable, because people's demand for credit money in the form of fictitious deposits and bank overdrafts is not sensibly affected by the level of interest rates. On the other hand, the amount of the exogenous fiat money issued by the monetary authority is determined on the basis of the quantity of reserve money needed by the commercial banks and provided by the central bank or by other banks, through the interbank lending market.

The conventional picture of the credit system is thus unfaithful. Banks are in business to lend, but in a market economy they are not forced to lend.<sup>24</sup> Bank lending is a free activity. This state of things, as one can easily guess, has important policy implications.

The role of banks in the transmission of monetary policy is fundamental. The central bank controls the money supply by raising or lowering the reserve requirement and by buying and selling bonds. Commercial banks create credit money, transform short-term liabilities into longer-term assets and provide securitization. They are not simple intermediaries between savers and borrowers.

The transmission of monetary policy takes place through different channels. The most important are the credit channel, which operates through bank lending, and the bank capital channel, which affects the balance sheet. Other transmission channels are the interest rate channel, the exchange rate channel and the asset price channel, which affects the link between money and equity prices and determines wealth and real balance effects (crowding out effects). Their quantitative significance can be evaluated by calibration and simulation techniques.

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<sup>23</sup> As noticed by Nick Rowe in a Canadian blog (*The Supply of Money is Demand-Determined*, "Worthwhile Canadian Initiative", April 01, 2012).

<sup>24</sup> In Ireland, for instance, banks have been recently recapitalised and since 2012 are obliged by a code of conduct to lend to small and medium businesses in distress.

Understanding how the transmission mechanisms of monetary policy operate is crucial for answering monetary and fiscal policy questions. The points we want to stress are that the bank lending channel does not imply an accommodative banking behaviour and that the fiscal policy transmission mechanism, which can affect both the demand and the supply side of the economy, is subject to short-run dynamic instability and implies important time lags in the response.<sup>25</sup>

The consequences of this conceptual clarification are far reaching. They will be here recalled in a Keynesian theoretical perspective. Keynes did not refuse categorically the quantitative theory of money, but criticized its cash balances version. He indeed completed the Cambridge quantitative equation  $M = kY$ , where  $k$  is the proportion of  $Y$  held in cash balances, by adding to the transaction and the precautionary demand for money  $L_t(Y)$  and later on the demand for pre-financing real investments. The result of these Keynesian innovations has been the disappearance of the simple proportionality relationship between the demand for money and income, postulated by neoclassical authors, who considered only the commodity market (inclusive of the market of labour-power) and the money market. What Keynes did not accept was the rigid versions of the quantitative theory, where the demand for money was considered a stable function of nominal income.

The reason of Keynes's dissent was a twofold one. On one hand, he thought that in the presence of unemployed resources an increase in the quantity of money would not necessarily cause a rise in prices. It would rather tend to determine an increase in output. On the other hand, Keynes maintained that the impact on the price level of an increase of money supply could be offset by a rise in people's liquidity preference, due to the reduction of the interest rate caused by the increased supply of money. In other words, Keynes thought that changes of money supply  $M$  would affect the values of  $k$  and  $i$ , rather than directly that of the price level  $p$ , which determined  $Y$ . The price level  $p$ , for Keynes, was determined by the cost of production and the profit margin.

The traditional version of the quantitative theory – Fisher's identity  $MV = PT$  – was untenable for Keynes, as it was based on the unrealistic assumption of constancy of the velocity of circulation

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<sup>25</sup> On the effectiveness of fiscal policy, see Auerbach, 2003.

of money  $V$  and of the volume of output  $T$  and on the erroneous view of money as a simple means of exchange (a flow variable). We share his position.

## **8. Some policy implications.**

The policy implications of the present approach are clear. The monetary authority is not forced to adopt a passive and accommodating lending behaviour, but can regulate the supply of money, by observing a systematic policy reaction function, or by relying on discretionary choices. It is this state of things that makes monetary policy a difficult subject.

Conventional economic theory, expressed by the ‘New Consensus’ (NC) on monetary policy, asserts that in the presence of monetary growth targeting an appropriate policy-mix combination of a restrictive fiscal policy and an expansionary monetary policy would stimulate the economy, if there is no deficit in the balance of payments. A combination of a loose fiscal and a tight monetary policy would instead be appropriate in an open economy with flexible exchange rates and no balance of payments deficit. In the long-run no necessary trade-off between inflation and growth of output and employment would arise if the government policy choices were correctly anticipated. Monetary policy would simply affect the price level.

A basic idea of NC is that once a policy rule is adopted to target the nominal rate of interest in the short period, active monetary and fiscal policies are no longer needed, because the economy will automatically move to its long-run equilibrium position. This is pure wishful thinking.<sup>26</sup> As shown by Lucas’s, no systematic monetary policy has real effects, if it is correctly anticipated by economic agents. Only an erratically perceived policy produces real effects. But erroneous perceptions do not last indefinitely; sooner or later they tend to be corrected. The NC position involves a significant paradigm shift from a Keynesian approach. Fundamentalist post-Keynesians support a different

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<sup>26</sup> See the critiques moved to the NC paradigm in Arestis and Sawyer, 2004, Arestis, 2007, and Hein and Stockhammer, 2007.

type of model, one in which money is non-neutral even in the long-run, when the Phillips curve tends to be upward-sloping, rather than vertical.

The basic choice of a policymaker as concerns the intermediate objectives of economic policy is between targeting a monetary aggregate, as money supply or nominal GDP, and targeting interest rates. A distinction must be made, at this regard, between supply and demand shocks. In the case of demand shocks, a monetary targeting rule committing to dynamic consistency should be preferred in the presence of a stable demand for money, as it would cause less variability of output and price levels and would allow to choose between a policy privileging only the growth of output or both the growth of output and price stability, through inflation targeting. In the opposite case of shocks affecting the aggregate supply schedule, the supply of money, exogenously determined, moves in the same direction as aggregate supply. The monetary authority could thus choose a given interest rate and then adjust the supply of money to the demand for money, endogenously determined.

All policy rules, however, have a serious drawback: they are inflexible and may generate time inconsistent results. Hence granting some limited discretionary room to the central bank seems preferable to the adoption of rule-based committed policy making.<sup>27</sup>

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<sup>27</sup> See Sauer, 2007.



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**Abstract: *Stock-Flow Consistent Approaches and the Like: The ‘Rediscovery’ of Model Building.***

*This paper on the theoretical foundations of macroeconomic modelling pursues a need of conceptual clarification of a debated methodological problem concerning monetary and fiscal policies. In the first part of the paper the key features of Stock-Flow Consistent Approaches and Modern Monetary Theory are examined, in a critical perspective. These schools of thought consider the interaction between real and monetary factor at an aggregate level and re-propose with minor changes a well known system dynamics methodology, without implementing it and without even mentioning it. They rely on unrealistic and oversimplifying assumptions. Monetary circuit theories are also criticized. In the second part of the essay the guidelines of an alternative theoretical perspective are presented and their policy implications are discussed. Monetary and fiscal policy are not mutually independent. A reasoned choice of policy-mix is suggested.*

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