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Aggregate Demand, Money and Finance in the New Consensus Macroeconomics: a Critical Appraisal

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Title Aggregate Demand, Money and Finance in the New Consensus Macroeconomics: a Critical Appraisal

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Abstract: This paper critically assesses the "New Consensus Macroeconomics" (NCM) theory and its recent developments. Building on the Wicksellian 'two-interest-rates model', the NCM highlights the role of interest rates in the transmission mechanism of monetary policy, whereas monetary aggregates are treated as residual variables. However, in contrast with Wicksell's theory, banks and financial institutions are usually neglected in the NCM theory. As a result, the financial instability and recurrent banking crises of modern economies have received little attention in modern macroeconomics. This paper has three main goals. First, it aims to provide a critical analysis of the original NCM model and some recent developments. Second, it aims to show that few amendments to it are sufficient to account for the financial instability and banking crises of real-world economies. Third, it shows that some important policy-making conclusions logically follow once the role of banks, credit, and finance is properly accounted for.

Key words: New Consensus Model, Keynesian Economics, Hysteresis of Output, Endogenous Money, Financial Accelerator

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1. INTRODUCTION

In the early 1990s a convergence of views in mainstream macroeconomics emerged (e.g. Woodford 2009, p. 2). Such 'New Consensus in Macroeconomics' (NCM hereafter) quickly spread to economic modelling in academia as well as policy making in institutions around the world (e.g. Taylor 2000, p. 90; Tovar 2009). On the *methodological* side, the NCM claims to be a 'new neoclassical synthesis' incorporating important elements of New Keynesian economics and real business cycle/neoclassical economics (Goodfriend and King, 1997; Dixon, 2008; Fontana, 2009; McCombie and Pike, 2013). More precisely, there are five formerly controversial issues about which there would be now agreement among mainstream economists and which are embedded in the NCM: 1. macroeconomic analysis should be micro-founded, that is, macroeconomic models should be explicitly based on inter-temporal general-equilibrium foundations (or 'first principles'); 2. quantitative policy analysis should be based on econometrically-validated structural models; 3. when evaluating the effects of alternative policy measures, the impact of these on the expectations of agents should be explicitly considered (to account for the well-known Lucas' critique); 4. the main source of log-run changes are real disturbances, rather than monetary shocks; 5. monetary policy is only effective in the short-run. Similarly, five are the key *analytical* components of the NCM, notably:

> First, the long-run real GDP trend, or potential GDP, can be understood using the growth model that was first developed by Robert Solow and that has now been extended to make "technology" explicitly endogenous. Second, there is no long run trade-off between inflation and unemployment, so that monetary policy affects inflation but is otherwise neutral with respect to real variables in the long run. Third, there is a short run trade-off between inflation and unemployment with significant implications for economic fluctuations around the trend of potential GDP; the trade-off is due largely to temporarily sticky prices and wages. Fourth, expectations of inflation and of future policy decisions are endogenous and quantitatively significant. Fifth, monetary-policy decisions are best thought of as rules, or reaction functions, in which the short-term nominal interest rate (the instrument of policy) is adjusted in reaction to economic events. (Taylor 2000, p. 90)

As we will thoroughly argue in section 4, the emerging consensus concerns also the specific way in which the macroeconomic policy should be conducted. Yet, a careful analysis of the benchmark model shows that the NCM maintains some bonds with the neoclassical approach and, especially, with its later theoretical spin-offs, including the 'real business cycle' (RBC hereafter) school. Within the NCM, as in the old mainstream, expansionary fiscal policy leads to higher inflation and real interest rates in the long run, with no real effects on output and unemployment. The old-fashioned neoclassical principle of the 'neutrality of money' is, therefore, still confirmed in the long run. The main novelty compared to the early neoclassical approach is the rejection of money supply targeting in favour of money being a residual of inflating targeting policy (via interest rate smoothing) by central banks (Fontana, 2007, 2011).[1]

However, both the money market and the financial institutions are not mentioned, let alone modelled (Arestis 2009, p. 11). So the two questions of the origin of 'financialization' and of why today's economies are prone to financial instability and recurrent crises remain unsolved. This sounds rather odd if one considers that this is the class of models which are being adopted by the most part of central banks around the world (e.g. Adolfson *et al*. 2007, Tovar 2009; the standard model for the Euro Area is provided by the path-breaking work of Smet and Wouters 2003). Actually, some interesting attempts to account for financial asymmetries as possible triggers or amplifiers of the business cycle were made between the early 1980s and the late 1990s. We refer, particularly, to the literature on the 'financial accelerator mechanism' (FAM hereafter) pioneered by Ben Bernanke and other New Keynesian scholars (see, mainly, Bernanke 1981, 1983; Bernanke and Gertler 1989; Bernanke *et al.* 1996, 1998). After the collapse of *Lehman Brothers* and the subsequent crisis, Bernanke's seminal works have been rediscovered and further developed in order to account for the post-2008 deep recession coupled with the protracted but modest decline in inflation, as well as to model additional monetary policy transmission mechanisms (see, among others, Tovar 2009, Christiano *et al.* 2013, and Del Negro *et al*. 2014). However, these brand-new contributions still rely on the same techniques of modelling which have been introduced by the RBC school.[2] The working of a market economy is thus likened to a

non-monetary 'dynamic stochastic general equilibrium' (DSGE) (e.g. Clarida *et al.* 1999), where labour and goods markets always clear, though several 'frictions' are added. These enable households to supply the desired quantity of labour and set wages, whereas firms supply goods and set prices, but the resetting process is not instantaneous. Not surprisingly, the new class of models shares also the most part of weaknesses of the other DSGE models.

Against this background, the paper is organized as follows. Sections 2 and 3 provide an outline of the analytical core of the NCM model. The hypothesis of the 'rational expectations' and the concept of the 'natural equilibrium' are shown to be the main theoretical pillars of the NCM. In this regard, the NCM is still very akin to the old 'monetarist' theoretical framework, the only difference being the choice of the degree of empirical relevance versus logical coherence of the models. In Section 4 we deal with the monetary side of the NCM, by showing that this is characterized by some controversial features. On the one hand, the adoption of a weak endogeneity of money (that is money is a residual of IT as opposed to the hard endogeneity of money in the Post Keynesian/Monetary Circuit theory) represents an advance with respect to the 'monetarist' claim to target some monetary aggregate (Fontana and Palacio Vera, 2002). On the other hand, banks and financial markets are neither included nor mentioned in the NCM, which relies essentially on a non-monetary framework (Tovar, 2009). This is the reason why it can hardly be employed in (qualitative) long-term forecasting of the macroeconomic dynamics of today's financially-sophisticated capitalist economies. In Section 5 we provide an overview of a somewhat 'heretical' branch of the NCM, which is based on the works of the current chair of the Federal Reserve, Ben Bernanke. This branch aims to address the issue of the impact of changes in the financial structure on the real economy. In Section 6 we discuss a 'double-amended' NCM model in order to show that few small adjustments are sufficient to obtain a dynamics of fundamental variables which is in contrast with standard NCM policy prescriptions. In sections 7 and 8 we critically review post-2008 developments in mainstream macroeconomics by showing that a new class of New Keynesian formal models have been implemented, aiming to recover and improve the seminal insights of

Bernanke. Although the theoretical advancements made by this new class of models are still insufficient to grasp the dynamics of real-word capitalistic economies, we argue that some interesting (unwanted) consequences could arise in policy making. Finally, some further remarks are provided in Section 9.

2. MACROECONOMIC PHISIOLOGY OF THE BENCHMARK DSGE-NCM MODEL

As has been clearly pointed out by several authors, the macroeconomic core of the NCM can be described through three reduced-form (or aggregate) equations, namely an aggregate demand equation, an inflation equation, and an interest rate rule. Each macroeconomic equation, in turn, is strictly 'micro-founded' where that is taken to be optimising behaviour under constraints. More precisely, every relationship among aggregate magnitudes is derived from the constrained inter-temporal optimization of an individual utility function. This function underpins the behaviour of a single, sovereign, completely rational representative agent with perfect foresight, who maximises its utility over an infinite horizon (by combining labour supply/leisure time and consumption/saving in each period).[3] In simple algebraic terms, the reduced-form benchmark model is:[4]

(1) $$Y_t^g = a_0 + a_1 Y_{t-1}^g + a_2 E\left(Y_{t+1}^g\right) - a_3\left[r_t - E\left(\pi_{t+1}\right)\right] + \varepsilon_1$$

(2) $$\pi_t = b_1 Y_t^g + b_2 \pi_{t-1} + b_3 E\left(\pi_{t+1}\right) + \varepsilon_2$$

(3) $$r_t = \left(1 - c_3\right)\left[RR_t^* + E\left(\pi_{t+1}\right) + c_1 Y_{t-1}^g + c_2\left(\pi_{t-1} - \pi^T\right)\right] + c_3 r_{t-1} + \varepsilon_3$$

where: a_0, a_1, a_2, a_3, b_1, c_1, $c_2 > 0$; $(b_2 + b_3) = 1$; and $0 < c_3 < 1$.[5]

Equation (1) corresponds to the old IS curve. It shows that the output gap – viz. the difference between the (logarithm of) actual output and its 'natural' or potential or long-run level – depends negatively on the expected real interest rate.[6] It depends also positively on the past and expected future output gaps.[7] Equation (2) corresponds to the 'accelerationist' (or expectations-augmented or New Keynesian) Phillips curve, acting as the aggregate supply function. It shows that the inflation rate depends positively on the output gap (and also on the past inflation and the expected future inflation), signalling demand pressures.[8] For this reason, it is sometimes called the 'inflation-adjustment (IA) line' (e.g. Romer 1999;

and Taylor 2000). As the inflation rate accelerates whenever the actual (growth rate of) demand and output exceeds the natural (rate of growth of) output, equation (2) can be considered as the equivalent of the NAIRU principle (e.g. Arestis and Sawyer 2002, p. 536; Lavoie, 2006, p. 169). Equation (3) is the monetary policy rule or the reaction function of the central banker. It incorporates the well-known 'Taylor rule' (e.g. Taylor 1993, 1999), according to which the *change* in nominal interest rate set by the central bank must be a positive function of the 'natural' real interest rate, the expected future inflation rate, the past output gap, and the past inflation gap (that is, the deviation of the actual inflation in previous period from its target value).[9] In formal terms, it is usually drawn from the minimisation of the 'loss function' of the central banker, where the losses for each period are a weighted average in quadratic terms of the deviation of inflation from its target rate and of current output relative to its potential level (Woodford 2003, p. 381). However obtained, since prices are supposed to be sticky in the short-run and changes in expected inflation are taken into account, when steering the nominal rate, central banks are effectively setting the real interest rate (Romer 2000, p. 155). Two points are worthy to mention here. First, the interest rate policy rule replaces the traditional *LM* curve in the IS-LM-AS model, along with its assumption that the central bank targets the money supply. In the NCM the central bank is able to influence the short-run real interest rate and money is a residual. Second, the short-run stickiness of prices also explains the limited effectiveness of monetary policy. In the long run price are by definition flexible and hence central banks are unable to influence the real interest rate. Therefore, monetary policy is effective in the short run but neutral in the long run. Finally, notice that combining equation (1) with equation (3) gives a negative sloped relationships between inflation and output gap, acting as the aggregate demand function of the model (see, among others, Romer 2000; Taylor 2000; Fontana and Setterfield, 2009).[10]

Plainly, the closure of the model (1)-(3) requires the specification of the nature of expectations, that is, of the form of the set of functions $E(\cdot)$. In this regard, NCM authors admit that expected values of inflation and output may deviate from actual values in the short run. This discrepancy, in turn, may temporarily push the economic system out of its

natural equilibrium state (or natural growth path).[11] Consequently, there is some room for public intervention in the short run, though mainly through the 'scientific' steering of the target interest rate, and just in order to anchor agents' inflationary expectations. By contrast, agents' forecasts could not be *systematically* wrong over time. The assumption that agents know the right economic model and can use all information efficiently (i.e. the rational expectations hypothesis) remains the first theoretical pillar of the NCM, as it was in the old one. Exogenous non-systematic shocks may affect the equilibrium in the long run: in equations (1) to (3) this random component is 'captured' by ε_i (with i = 1, 2, 3). But, apart from this, every systematic economic policy is doomed to leave real magnitudes (notably, output and employment rate) unchanged. For instance, the only long-run effect of a long-lasting expansive fiscal stimulus would be an increase in inflation and (both nominal and real) interest rates (Fontana, 2009d). This result is the NCM equivalent of the old well-known principle of the long-run neutrality of aggregate demand-driven macroeconomic policies.

The trend (over 100 periods) in output gap, inflation rate and interest rates within the artificial NCM economy outlined by equations (1) to (3) is portrayed in Figure 1. A glossary of variables and parameter values of the model is provided in the final Appendix (see Model I). As we mentioned, inflation and output expectations are always fulfilled in the long run, but may be wrong in the short run. This is the reason why we assume that expected values equal actual current values in the simulation of equations (1) to (3).[12] This clarified, a shock (+10%) to the autonomous demand – viz. a permanent increase in a_0 due to a fiscal stimulus, in our example – has been imposed in period 25. As NCM authors would argue, because of the *price stickiness*, a positive effect of the fiscal stimulus on the economy occurs.[13] However, it is shown to be absorbed after a (relatively low) number of periods, whereas the increase in both inflation and interest rates is of permanent nature.[14] An important corollary is that an expansive fiscal policy can affect neither the long-run volume of output nor its long-run growth rate, but only its *composition*.[15] The traditional 'crowding-out' effect of government intervention on private spending, due to the increase in the real interest rate remains confirmed. In this regard, the only difference between the NCM and

the traditional approaches turns out to be the different opinions about the *lifetime* of the imperfections and asymmetries characterizing the real world economies, i.e. about the 'actual length' of the short run.[16]

3. NATURAL EQUILIBRIUM AND THE ROLE OF DEMAND IN THE NCM

In addition to rational expectations, the other theoretical pillar of the NCM is the natural (or long-run or trend) equilibrium. This latter is defined as the state towards which a fully competitive economy would tend in the long run, namely, *when* inflation expectations of agents are utterly fulfilled. In the natural equilibrium state, output volume and employment rate are mainly determined by *three fundamentals*: i. the quantity of labour-force and capital (i.e. the stock of resources); ii. the system of preferences of individual agents (i.e. the utility function of consumers or households); iii. the available technology (i.e. the production function of firms). Against this background, the mechanics of the NCM model is rather straightforward: a departure of output from its natural volume (or natural growth rate) causes inflation to change, which in turn leads the central bank to move the short-run nominal interest rate, and given the stickiness of price, the short-run real interest rate such that to bring current output back to its normal level.[17] The institutional structure of the economy, including prevailing conditions on the labour market, is sometimes considered,[18] but the natural or potential level of output is always independent of aggregate demand changes, including fiscal and monetary policy led changes.

Yet, the concept of the natural equilibrium has been the subject of a long-lasting debate in economics since the mid-1970s. In our opinion, the notion of the natural equilibrium raises two major criticisms. Firstly, such a concept strictly relies, in turn, on the very rational expectations hypothesis. The reason is that the long run is defined as the *hypothetical* state in which the expected price level (or the expected inflation) exactly matches the actual price level (or the actual inflation). In the real world economies, this could occur just by chance. However, the original definition of 'long run' has been subjected to a semantic shift over time, ending up meaning a period which is long enough to allow market forces to fully deploy.[19] Such a shift is not neutral, since it entails that crises

affecting the real-world economies cannot be long-lasting states. By contrast, it would suffice to take cognizance of the fact that real-world economies are always marked by radical uncertainty, to regard the long run as a mere abstract hypothesis and the short run as the normal condition, requiring a permanent intervention of public authorities. Secondly, real world economies are essentially *non-ergodic* and *path-dependent* systems. This means that sample moments like averages and variances do not necessarily converge on their true values over time (Davidson, 1978; Hanngsen, 2006). In addition, economic variables do not progress steadily toward an exogenously-given unique and stable equilibrium. They can reach several (sub-optimal) equilibria, and each of the equilibrium achieved depends, partly to least, on the dynamic process of getting that position. To put it differently, real world economies do not swing around the equilibrium state like the clock pendulum. The reason is quite straightforward: once productive capacity has been wasted, workers have not been trained, and investments have not been undertaken, it is not possible to turn back to the previous potential output, as if nothing happened (Setterfield, 2002). On the whole, it is not clear *how* (that is, the specific path through which) the natural equilibrium would be reached in the long run. The achievement of such an optimal equilibrium is simply postulated. But, if there is no *exogenously-given* long-run equilibrium, policy measures aiming to achieve the full employment of productive factors entail a 'crowding-in' effect, instead of a 'crowding-out' effect.[20] In other words, to the extent that it is admitted that the potential output is *not* independent of the short-run effective demand, the NCM usual story does not hold (Fontana, 2010).

In order to clarify this point, we can use a simplified version of the previous 3-equation NCM model. The new model is defined as follows:

(4) $$Y_t = \alpha_0 - \alpha_1 \left(r_{t-1} - \pi_{t-1} \right) + \varepsilon_1$$

(5) $$\pi_t = \pi_{t-1} + \beta_1 \left(Y_{t-1} - Y_{t-1}^n \right) + \varepsilon_2$$

(6) $$r_t = \pi_t + RR_t^* + \gamma_1 \left(\pi_{t-1} - \pi^T \right) + \gamma_2 \left[Y_t - E\left(Y_{t+1}^n \right) \right] + \varepsilon_3$$

where α_0, α_1, β_1, γ_1, $\gamma_2 > 0$. The main difference with the previous model is that equation (4) now determines the actual output volume (or the actual growth rate) of output, instead of

its gap with the natural volume (or the natural growth rate), Y^n.[21] In addition, for the sake of simplicity, equations (4) and (5) are assumed not to be forward-looking. As we have already mentioned, the variable RR^* in equation (6) is the real rate of interest assuring the (*ex ante*) matching of savings and investment at the natural level of output. It corresponds to the Wicksellian 'natural rate of interest' and can be derived by using equation (4) in equation (6).[22] Then, by imposing that the actual inflation rate equals the target rate and that the output gap is nil, we obtain:

(7) $$RR_t^* = \left(\alpha_0 - Y_t^n\right) / \alpha_1$$

If the central bank sets the value of RR_t^* in accordance with equation (7), then the economy adjusted at its natural equilibrium, and the system (4)-(5)-(6)-(7) behaves like the system (1)-(2)-(3). The only long-run effect of an increase in government expenditure will be an increase in nominal and real interest rates. This ends up crowding out the private sector expenditure over time. Furthermore, if one assumes that there is no lag in the effect of the real interest rate on output, as reported in equation (4), the actual inflation rate equals the target rate in the long run.

Yet, as we have already mentioned, the assumption that the level of potential output (or its growth rate) is an exogenous variable has been criticized by several authors. Labour productivity (think to the impact of workers' learning by doing, technological innovations and investment in fixed capital) and the availability of labour-force (think to migration flows) are strictly linked to the current level of demand and output (e.g. Setterfield 2002; León-Ledesma and Thirlwall 2002; Lavoie 2006; Fontana and Palacio Vera, 2007; McCombie and Pike 2013; Sawyer 2013). All these factors affect the future potential output of the economy. Following Lavoie (2006, p. 182), the reduced-form NCM model should, therefore, be amended by introducing an additional equation:

(8) $$Y_t^n = Y_{t-1}^n + \phi_1\left(Y_{t-1} - Y_{t-1}^n\right) + \varepsilon_4$$

with: $\phi_1 > 0$ Equation (8) says that the short-run volume of effective demand affects the long-run potential or natural output.[23] This «introduces the possibility of multiple equilibria, that make long-run supply forces dependent on short-run disequilibrium

adjustment paths induced by effective demand» (Lavoie 2006, p. 181; see also Flaschel 2000; Fontana and Palacio Vera, 2007). A simulation of the system of equations (4)-(5)-(6)-(7)-(8) is reported in Figure 2. As usual, parameter values of the model are provided in the final Appendix (see Model II). This time, a positive shock on α_0 entails a permanent increase in the natural volume (or natural growth rate) of output.[24] Two obvious corollaries follow: i. to the extent that *hysteresis* of output is accounted for, discretional fiscal policy is effective also in the long run; ii. in the presence of a negative shock to the aggregate demand, a long-lasting effect might emerge on the natural unemployment level.[25,26]

4. MONETARY POLICY AND THE NATURE OF MONEY IN THE NCM

As we have anticipated in section 1, the consensus emerging in the late 1990s among mainstream economists was not confined only to the methodology to be adopted in modelling. It concerned also the specific way in which a 'scientific' policy should have been conducted in practice. In a sense, the very concern about both the analysis and the driving of the real-world monetary policy seems to be one of the main differences between NCM and RBC authors.[27] According to Allsopp and Vines (2000, p. 2), there are five elements of NCM in the economic policy: 1. the main purpose of the intervention should be to provide a 'nominal anchor' to inflation expectations; 2. this purpose is better pursued by an independent central bank; 3. the main instrument of monetary policy is the short-term interest rate in the unsecured money market; 4. the steering of the interest rate should also account for stabilization purposes; 5. fiscal policy is admitted, but its adoption affects the effectiveness of the monetary policy, so that it should be employed for short-run stabilization purposes only (and then through automatic stabilisers rather than discretionary fiscal policy). Plainly, points 1 and 2 can be regarded as a success of the old classical economics pre-analytical view. The emphasis on both the credibility of announcements of monetary authorities and the benefits of a 'conservative' central bank chair (in the wake of Rogoff 1985) is now shared by the vast majority of mainstream economists, be they either RBC or (new) Keynesians. Accordingly, the behaviour of monetary authorities must be expressed in the form of a 'policy rule', viz. a predictable

reaction function depending on few economic variables. The rationale is to anchor agents' inflation expectations in the medium to long run (e.g. Taylor 1994; Allsopp and Vines 2000). If the central bank credibly signals its intent to maintain inflation low in the future – it is usually argued – then it can also reduce the current rate of inflation with less cost in terms of output reduction than might otherwise be required (Clarida *et al.* 1999, p. 1670). A noteworthy corollary is that it is desirable to shift monetary policy's decisions from national governments to politically-insulated bodies.[28]

By contrast, points 3 to 5 differentiate the NCM analysis from that of the real business cycle (RBC) and other neoclassical approaches. In particular, point 3 entails the (partial) rejection of the exogenous money theory, and the replacement of a money growth rule with a real rate of interest targeting rule. Within the NCM, high-powered money «is not a variable the central bank is targeting, but rather one it is manipulating to make interest rates behave in the way it desires» (Romer 1999, p. 162). In this sense, the NCM proposition that central banks have the power to determine real interest rates is consistent with Post Keynesian argument that money supply is endogenous and demand-led. According to Woodford (2009, p. 13) monetary policy needs not be theoretically identified with the control of the money supply, mainly because «at most of the central banks with explicit commitments to an inflation target, monetary aggregates play little if any role in policy deliberations». The same position has been anticipated by Romer (2000), according to whom, over the 1980s-1990s, a number of developments in both economic theory and institutional environment challenged the traditional IS-LM-AS model. On the theoretical side, the main issue was that different interest rates were relevant to different parts of that model.[29] Furthermore, it was necessary to replace the price level with the inflation rate, and to shift the focus from monetary aggregates to the steering of the interest rate in conducting policy. This, in turn, was seen as the consequence of a long-lasting change in the actual institutional environment: «the dominance of interest rates over monetary aggregates in the conduct of monetary policy – it was argued – is not a recent phenomenon. In the United States, for example, only in the 1979-1982 period did monetary aggregates play a significant role in policy» (Romer 2000, p. 155).

Yet, in the NCM benchmark model, like in the monetarist one, the two principles of the ineffectiveness of the fiscal policy and of the neutrality of money still hold in the long run. As we have shown in section 2, an expansionary *fiscal policy* would eventually lead to an increase in the inflation rate, an even higher increase in the nominal interest rate, and therefore an increase in the real interest rate, without any positive impact on the real output. Similarly, a restrictive *monetary policy* would eventually lead to lower inflation rates, without any 'negative' impact on the real interest rate and the real output. In other words, in the long run, money returns to be the 'golden veil' exogenously put on real items. The reason of this theoretical ambiguity is that – as has been observed by Fontana and Palacio Vera (2002) and Fontana and Setterfield (2010) – NCM authors regard the 'endogeneity' of money as a historical accident, rather than as an intrinsic feature of a monetary economy of production. Money is taken as an endogenous magnitude just because of the need to model the actual behaviour of central banks, which manage to steer the real interest rate thanks to real-world imperfections and asymmetries. To put it differently, money is endogenously created «in the sense that the stock of money is a 'residual' based on the demand for money» (Arestis and Sawyer 2006, p. 848). But, in the absence of any institutional 'friction', the supply of money would be an exogenous magnitude. This conclusion should not sound that surprising: NCM authors, like old and new monetarists, keep on assuming that the central bank is able to fine-tuning the monetary base – though just in order to make interest rates behave in the way the central bank desires. It is true that some NCM authors, such as Allsopp and Vines (2000, p. 7), show somewhat more than a mere functionalist approach to the analysis of the nature of money, by explicitly recognizing that: i. «nearly all 'money' is the product of the private banking system»; ii. the «short-term interest rate [...] influences the behaviour of commercial banks by determining the *price* at which they lend»; iii. «[s]ince nearly all money is 'inside money', stories of the monetary transmission mechanism based on the real balance effect [...] are also unrealistic»[30]. However, even in this case, there is no room for a thorough analysis of the role of credit-money as the fundamental institution of the capitalist economy, let alone for an analysis of the process of money creation. This also explains why

the spectre of the loanable fund theory continuously reappears in the NCM. Even looking at the non-formal modelling literature, no clear distinction between banks (as capitalist institutions which create credit-money *ex-nihilo* and whose liabilities are commonly accepted as means of payments) and financial intermediaries (operating as mere clearing houses) is ever made (e.g. Sawyer 2013; and Passarella Veronese 2014). Overall, the predominance of internal money over external money is simply recognized as an *empirical fact* to be accounted for through a different closure of the model (viz. through the exogenous setting of the target interest rate, instead of some target monetary aggregates).[31]

This very functionalism in the theory of money goes along with the epistemological reductionism of the NCM in policy. As explained by Clarida *et al.* (1999, p. 1668) «how monetary policy should respond in the short run to disturbances that buffet the economy [should be considered as] the essence of the contemporary debate over monetary policy». Notice that, here, the instability is none other than the result of an exogenous shock affecting the aggregate demand level: in the absence of external shocks, no (expansionary) intervention is admitted, as the economy will stabilize around its own natural growth path anyway. Yet, recent financial twin-crises in the US and the current economic recession affecting the Euro Area have resoundingly contradicted this assumption, by forcing central banks to adopt repeated 'unconventional' measures.[32] Furthermore, the existence of natural equilibrating tendencies is not the only shaky assumption of the NCM. As we have mentioned, the NCM relies on the hypothesis of price stickiness, because it is only when prices are not perfectly and instantaneously flexible that the central bank can affect real variables through the steering of the (real) interest rate. However, differently from demand shocks, monetary shocks do not entail significant aggregate real effects, because (if money is internal) prices endogenously vary in response to changes in the amount of money. This point still seems not to be fully understood by the most part of NCM authors.

5. FINANCIAL INSTABILITY IN THE NEW-KEYNESIAN MODELS

As has been argued, NCM models employed by central banks' staff for long-run forecasting

purposes have limited explanatory power for the current economic situation (e.g. Foley and Farmer 2009; see also Krugman 2009, Buiter 2009, and Spaventa 2009). In spite of the intentions of NCM proponents, the main problems of NCM models concern the very aptitude of the benchmark model to grab fundamental aspects of the working of today's financially-sophisticated capitalist economies, such as their tendency to financial turmoil and to prolonged recessions. Yet, still in the spring of 2000, one of the founding fathers of the NCM, John Taylor, released a paper in which he declared that the benchmark model «fits the data well and explains policy decisions and impacts in a realistic way» (Taylor 2000, p. 93). Unfortunately, the first of the two financial crises which hit the US economy in the decade 2000-2010 was breaking out at the same time, triggered by the burst of the 'dot-com' bubble.[33] The point is that NCM models, like all DSGE models, «assume a perfect world, and by their very nature rule out crises of the type we are experiencing now» (Foley and Farmer 2009, p. 685).[34] As Lucas stated, recent crises were not predicted because DSGE models predict that such events cannot be predicted, since DSGE simulations are not an «assurance that no crisis would occur, but [...] a forecast of what could be expected conditional on a crisis not occurring» (Lucas 2009). In this regard, one of the main issues (which is theoretical, but also pregnant with practical consequences) with the DSGE-NCM is that its benchmark model eventually relies on both the 'efficient market hypothesis' (EMH hereafter) and the 'Modigliani-Miller theorem' (M&MT hereafter), in the medium to long run at least (e.g. Passarella Veronese 2014).[35] As a result, given an *enough long* period of time, money and finance would not affect output and employment, but only inflation and interest rates. This again is not surprising: if an autonomous investment function of firms is ruled out of the model, then conditions of financing of investment (and current production) cannot, by definition, influence the real economy.[36] However, such a theoretical result is glaringly confuted by the whole empirical evidence.

The explicit analysis of the possible interaction between the real economy and the prevailing conditions in finance and credit-markets is the subject of a somewhat 'heretical' sub-class of New Keynesian theories and models, mainly developed by Bernanke, Gertler and Gilchrist during the 1980s-1990s (e.g. Bernanke 1981, 1983; Bernanke and Gertler

1989; Bernanke *et al.* 1996, 1999). We refer to the FAM literature and modelling, where the assumptions of informational asymmetries between firms or entrepreneurs and financial intermediaries make both the EMH and the M&MT inapplicable. More precisely, the *two chief hypotheses* underpinning the FAM are: i. informational asymmetries entail higher costs of 'external' finance, as compared to 'internal' funds, in the form of agency costs (linked to the monitoring by the lender and bankruptcy risks);[37] ii. *ceteris paribus*, the higher the amount of 'collateralizable' net worth of firms, the lower will be the (expected) agency costs. At the macroeconomic level, *two implications* follow: i. to the extent that net worth of firms moves pro-cyclically (in the wake of cash-flows and asset prices), the premium on external finance rises in recessions and reduces in booms, therefore increasing investment fluctuations and enforcing cyclical persistence; ii. not only demand shocks, but also shocks affecting net worth of firms (as occurs in a debt-deflation crisis) can trigger real fluctuations (e.g. Bernanke and Gertler 1989). Thus, during recessions (booms) the fall (rise) in firms' net worth increases (decreases) the premium on external funds, while increasing (decreasing) the need for finance, therefore reducing (boosting) investment and output. This is the core of the FAM: an initial shock to demand, however small, is likely to be amplified by the change in balance-sheets of firms and, more generally, by conditions in finance and credit markets. Plainly, such dynamics is «intrinsically nonlinear», since the final impact of the FAM on output depends on the current level of internal finance of firms. More precisely, the deeper the economy is in recession, the lower is the internal finance, and hence the stronger will be the autoregressive movement in output (e.g. Bernanke and Gertler 1989, pp. 14-15; Bernanke *et al.* 1996, pp. 3-4). This, in turn, will negatively affect demand for inputs of firms, which will be accumulating an excess of inventories, while reducing the employment level and/or real wages bargained with workers (e.g. Greenwald and Stiglitz 1993, p. 109).

Significantly enough, references to an exogenously-given natural volume (or rate of growth) of output are rather rare in the FAM literature. On the one hand, it is clearly stated that the methodological starting point of the FAM model is the benchmark DSGE model. Notice that this may produce a possible 'short circuit' in the theory of money adopted. The

point is that it is sometimes assumed that the role of banks is just to «collect deposits from households and lend to entrepreneurs» (Del Negro *et al*. 2014, p. 9). But this hypothesis, recalling the old loanable funds theory of money, is clearly at odd with the assumption that money supply and credit are residually-determined and demand-driven (as implicitly stated by the Taylor rule). The introduction of frictions in the money market can be here regarded as a way to reconcile two otherwise very different monetary takes. On the other hand, FAM authors openly «abstract [...] from long-term financial relationships» (Bernanke and Gertler 1989, p. 15) in their works. This is remarkable for it that price flexibility is no longer regarded as the natural or long-run condition of the system, but just as the «limiting case» – as Bernanke *et al.* (1999, p. 6) call it – analysed in RBC works. In other words, the long run is implicitly regarded as an ideal path, rather than as an actual historical tendency of capitalist economies. But if the relationship between price stickiness and price flexibility is to be reversed, short-run sub-optimal equilibria become the rule, and so does public intervention. This hint of heterodoxy is strengthened by the repeated reference of FAM authors to Fisher (1933)'s debt-deflation theory and also by some veiled reference to Minsky's (and Kalecki's) theory of the increasing risk of investment activity.[38] In fact, lender's agency costs discussed by FAM authors can be easily compared to the Minskian 'objectivation' of the lender's risk into interest rates, fees and commissions firms have to pay on external funds (e.g. Minsky 1986). The heterogeneity of agents is another unorthodox feature of the FAM models: although they do not clearly distinguish banks from other financial intermediaries, FAM authors «step outside the convenient representative-agent paradigm [since] the distribution of wealth affects the dynamics of the economy in a nontrivial way» (Bernanke *et al.* 1996, p. 3-4). The reason is that a reallocation of lending in recession from firms whose net worth is decreasing to a safer alternative is likely to occur, triggering a 'flight-to-quality' (or 'flight-to safety') process. This, in turn, increases the financial fragility of economic units. Against this background, it is argued that large corporations are likely to be less hit by the greater cost (or difficulty) in obtaining credit in downturns compared to small firms. An important corollary is that «recessions that follow a tightening of monetary policy are perhaps most likely to involve a flight to quality,

because of the adverse effect of increased interest rates on balance sheets and because of monetary tightening may reduce flows of credit through the banking system» (Bernanke *et al.* 1996, p. 6; see also Bernanke and Blinder 1988). To put it differently, monetary policy affects output and other real magnitudes not as much because prices are sticky (as is assumed in the benchmark NCM model) as because the access to external finance has a crucial impact on investment demand (and production plans) of firms. In this sense at least, the Post Keynesian and monetary circuit argument that 'finance to production matters'[39] seems to have eventually been accepted by a part of the mainstream, even though the differences in terms of policy implications and, above all, underlying working mechanisms of models are still rather relevant.[40]

6. FINANCE MATTERS: A FURTHER AMENDMENT TO THE NCM MODEL

In the wake of the standard DSGE methodology, the FAM model is usually obtained through a process of micro-foundation of the macroeconomic dynamics.[41] As we have mentioned, this is put in practice by considering a production (or investment) technology that involves asymmetric information between entrepreneurs (who have direct access to the technology) and lenders (who have not). In addition, it is assumed that lenders incur agency costs in order to observe returns on firms' investment. Such costs, in turn, are assumed to be a decreasing function of the soundness of borrower's balance-sheet, viz. of net wealth of firms. Finally, since net worth is likely to move pro-cyclically, agency costs will behave counter-cyclically, therefore improving lending conditions in booms and worsening them in recessions. Thus, the (macroeconomic) «accelerator effect of income on investment» (Bernanke *et al.* 1996, p. 27) is brought back to a simple (microeconomic) *principal-agent* scheme.

However, since the beginning of this paper, we have chosen not to conduct our analysis from the optimizing behaviour of some single individual agent. We will maintain this policy in the current section as well.[42] Furthermore, for the sake of simplicity, we will not introduce any heterogeneity among firms (for instance, between large corporations and small firms), but only between borrowing firms and lending banks. This said, the simplest

way to include the FAM discussed in Section 5 within the benchmark NCM model discussed in Section 2, without referring to first principles, is to replace equation (1) with the following:

(9) $$Y_t^g = a_0 + a_1 Y_{t-1}^g + a_2 E\left(Y_{t+1}^g\right) - a_3\left[r_t - E\left(\pi_{t+1}\right)\right] + a_4 h_{t-1} + \varepsilon_1$$

in which:

(10) $$h_t = h_{t-1} + \omega Y_t^g + \varepsilon_4$$

where $h > 0$ is the net worth of investing firms, $\omega \geqslant 0$ is the share of aggregate (retained) profits and capital gains in total output (gap), and a_4 is the sensitivity of total output (gap) to change in credit-worthiness of firms, through a change in investment financing. The basic idea underpinning equations (9) and (10) is that investment activity, and hence current output, are crucially affected by the financial soundness of the (consolidated) balance-sheet of firms. More precisely, the lower (higher) the amount of internal funds accumulated by firms over the previous periods, the lower (higher) will be current investment and output. Notice that changes in internal funds can affect production decisions both through the self-financing of investment (direct channel) and through the degree of credit-worthiness of firms (indirect channel). Whatever the prevalent channel, the result is a strengthening and extension of the (however temporary) effect of current demand on output and employment levels. Such effect is portrayed in Figure 3.

Table 1. Four different versions of the NCM-DSGE model.

	No role of finance	*Role of finance (accelerator)*
Temporary effect of demand	(I) Benchmark NCM	(III) Standard FAM
Permanent effect of demand (hysteresis)	(II) Emended NCM	(IV) Emended FAM

In Table 1 all of the four versions of the (New Keynesian) DSGE model we have mentioned in this paper are reported, notably, the benchmark NCM model (I), the augmented NCM model (II), the benchmark FAM model (III), and the emended FAM model (IV) –. Model (IV) is a

modified version of model (II) discussed in Section 3. It takes into account the cumulative effect of change in financial-asset prices on investment activity, as occurs in model (III). Yet, unlikely model (III), model (IV) does not involve any exogenously-given natural level of output towards which the economy is assumed to move (though just in an unlikely long run). In algebraic terms, it has been obtained by replacing equation (4) of model (II) – provided in Section 3 – with the following:

(11) $$Y_t = \alpha_0 - \alpha_1 \left(r_{t-1} - \pi_{t-1} \right) + \alpha_2 h_{t-1} + \varepsilon_1$$

where $\alpha_2 > 0$ and:

(12) $$h_t = h_{t-1} + \omega \left(Y_t - Y_t^n \right) + \varepsilon_4$$

Consequently, equation (7) must be replaced by the following:

(13) $$RR_t^* = \left(\alpha_0 - Y_t^n + \alpha_2 h_{t-2} \right) / \alpha_1$$

The model shaped by the system of equations (11)-(5)-(6)-(13)-(8)-(12) is a synthesis of models (II) and (III): like in model (III) changes in conditions of finance and credit markets amplify real shocks and can also trigger a boom/recession; in addition, like in model (II), long-run levels of output and employment are affected by the current state of effective demand (see Figure 4).[43] The second feature is what distinguishes it from the standard FAM model.

Yet, on closer inspection, the fact that the financial accelerator is none other than a way to introduce a long-lasting (though not ever-lasting) hysteresis of output in the benchmark NCM model is recognized, between the lines, by FAM proponents too. In the absence of information asymmetries – they argue – investment demand can be safely assumed to be fixed over time, in the first approximation at least. By contrast, «when information asymmetries are present, investment demand will vary and be history-dependent» (Bernanke and Gertler 1989, p. 20). Notice that this entails that the main task of central banks is not as much the stabilization of inflation expectations, through the steering of the target interest rate, as the *strengthening of agents' balance-sheets, through the stabilization of financial asset (viz. collateral) markets*. The point is that, while steering the target interest rate, the central bank is in fact settling the solvability threshold of firms (and banks) operating in the system (e.g. Brancaccio and Fontana 2013). Interestingly enough,

an unconventional stabilization policy has been pursued by Ben Bernanke since the beginning of the subprime crisis, while the European Central Bank has been pursuing a much more conservative policy.[44] Whether such unconventional policy is linked or not to the unconventional framework (viz. the FAM model) developed by Bernanke and its colleagues over the 1980s-1990s, is an interesting open question. Unfortunately, as the European crisis proceeds, it becomes clearer and clearer that a pro-cyclical fiscal policy is also necessary to support employment and output. By contrast, NCM prescriptions, with the focus of monetary policy solely on inflation expectations are disappointing (Arestis and Sawyer 2006, p. 859). An active fiscal policy, coupled with a direct intervention on the composition of output, is also necessary. In this regard, models (II), (III) and (IV), obtained through a simple amendment to the benchmark NCM model, give a further theoretical support to this Post Keynesian insight.

7. THE CURRENT STATE OF MACRO: A POST CONSENSUS MODEL?

The repeatedly wrong predictions, and especially the failure in providing a plausible explanation of the US crisis and the subsequent global financial instability and economic recession, represented a serious blow for the reputation of the NCM. In a sense, the proclaimed consensus around the benchmark NCM model was very short-lived and unsuccessful (e.g. Dullien 2009). This notwithstanding, the analytical core of that model is still «seen by many to be relatively unscathed (but with the imperative to build in assumptions that allow for debt default and bankruptcy)» (McCombie and Pike 2013, p. 521). To be fair, attempts to make the benchmark model more realistic were made far before the onset of the subprime crisis. The most popular way is to modify the benchmark model in order to allow for a fraction of households or consumers who cannot access financial markets. As these non-Ricardian consumers cannot borrow or save in order to smooth consumption, they follow a simple 'rule of thumb', namely, they always spends all current labour income on current consumption. It turns out that, «if the weight of such rule-of-thumb consumers is large enough, a Taylor-type rule must imply a (permanent) change in the nominal interest rate in response to a (permanent) change in inflation that is

significantly above unity, in order to guarantee the uniqueness of equilibrium. Hence, the Taylor principle becomes too weak a criterion for stability when the share of rule-of-thumb consumers is large» (Galì *et al*. 2004, p. 740). Furthermore, the presence of non-Ricardian consumers is shown to affect significantly the reaction of economy to fiscal policy shocks. For instance, an increase (decrease) in government spending entails now a remarkable increase (decrease) in output, in the short to medium run at least (e.g. Galì *et al*. 2007). Notice that this conclusion has been further strengthened by post-crisis findings about the actual size of the government-spending multiplier, which turns out to be much larger than one when the zero lower bound on the nominal interest rate binds or, anyway, when the nominal interest rate is constant (e.g. Christiano *et al.* 2009). In short, the introduction of financial constraints is sufficient to make 'neoclassical' models produce 'Keynesian' results: here is the essence of both yesterday' and today's New Keynesian economics (i.e. of the majority shareholder of the NCM).

In the aftermath of the crisis, the attempts to improve or update the benchmark model have multiplied. Their results are rather controversial though. More precisely, two are the main flaws of the standard NCM framework which New Keynesian DSGE modellers have focused on: 1. the presence of systematic errors in inflation forecasting; 2. bound to the former, «the absence of an appropriate way of modelling financial markets [...] or financial frictions» (Tovar 2009, p. 6). Starting from point (1), the overestimating of deflationary effects of the crisis made by the benchmark model has been usually regarded as the consequence of the underestimating of price stickiness. This is captured by the so-called 'Calvo parameter' in the New Keynesian Phillips curve.[45] The underrating of the degree of price rigidity, in turn, would be the consequence of the lack of financial frictions in the benchmark model. By contrast, once these frictions are introduced in the model, this latter is shown to *ex post* accurately 'predict' the behaviour of the US economy since 2008, including the weak drop in inflation rate. Intuitively, the rationale is that financial frictions make the Phillips curve 'flatter' (i.e. reduce b_1 in equation 2, or β_1 in equation 5, in our simplified models). The US crisis could be, therefore, interpreted and modelled as the result of aggregate demand shocks in the presence of a flat aggregate supply (e.g. Del

Negro *et al*. 2014, p. 19-21).

This brings us to point (2), namely, to the debate about the proper way of accounting for financial markets and financial frictions. We have mentioned that one of the standard ways of modelling the impact on the economy of the financial structure, within a DSGE model, is to introduce non-Ricardian agents who can neither borrow nor save. Another increasingly-popular *escamotage* is to allow for volatile 'risk premia', whose fluctuations are indeed regarded as the most important shocks driving the business cycle. Actually, the implementation of this insight closely follows the work of Bernanke and Gertler (1989) and Bernanke *et al*. (1999). It admittedly represents an attempt of developing the original FAM approach. This is the reason why we propose to dub this new class of models as the 'New FAM' approach. In fact, FAM and New FAM models share the same principles, the major difference being the highest accuracy of modelling and econometric techniques of the New FAMs. In this regard, a recent but already-fundamental contribution has been provided by Christiano *et al*. (2013). It is assumed that firms (or entrepreneurs) combine internal funds with bank loans to acquire raw (physical) capital. The production process is likened to a process in which entrepreneurs convert the *raw* capital into *effective* capital under 'idiosyncratic uncertainty' or 'risk'. For whether the raw capital turns into highly effective capital or becomes worthless, is assumed to be mostly up to chance. Finally, it is argued that a jump in risk triggers responses in the New FAM model which (*ex post*) resemble actual recessions. The underlying rationale is the interest rate on loans includes a 'premium' covering the costs of default by the entrepreneurs who are unsuccessful. When the risk is high, the premium charged by banks is high and credit extended to entrepreneurs is low. The rest is a well-known story.

> With fewer financial resources, entrepreneurs acquire less physical capital. Because investment is a key input in the production of capital, it follows that investment falls. With this decline in the purchase of goods, output, consumption and employment fall. For the reasons stressed in [Bernanke *et al*. 1999], the net worth of entrepreneurs – an object that we identify with the stock market – falls too. This occurs because the rental income of entrepreneurs falls with the decline in economic activity and because they suffer capital losses as the price of capital drops. Finally, the overall decline in economic activity results in a decline in the marginal cost of production and thus a decline in inflation. So, according to

> the model the risk shock implies a countercyclical credit spread and procyclical investment, consumption, employment, inflation, stock market and credit. These implications of the model correspond well to the analogous features of US business cycle data. (Christiano *et al*. 2013. p. 2)

In short, fluctuations in risk premia over the risk-free interest rate should be regarded as the main trigger (or amplifier) of the business cycle. Once this mechanism is introduced in the benchmark DSGE model, this is shown to accurately reproduce US cyclical fluctuations since the mid-1970s (e.g. Gilchrist *et al*. 2009; also Merola 2013).

Notice that a similar way of introducing pro-cyclical effects of finance is to link it to the «inappropriate responses by financial market participants to changes in the time dimension of risk, especially in its systematic component. These responses primarily reflect the mismeasurement of changes in the absolute level of risk over time, but also the incentives that are faced by individuals and institutions» (Borio *et al*. 2001, p. 49). As a result, there is an underestimation of risks in booms and an overestimation in recessions, so that bank provisions and capital ratios fail to increase in economic booms and to reduce in recessions. This, in turn, strengthens the pro-cyclicality of bank profits, thereby pushing banks to increase lending in booms and reduce it in recessions (on this point, see also Borio 2006). Finally, it has also been shown that New Keynesian DSGE models can be further emended to account for Fisher's debt deflation and Minsky's deleveraging crises. On this basis, it has been argued that «countries can have sound domestic fiscal and monetary policies and competitive, open markets and still reach a point of high leverage at which a financial crisis occurs» (Mendoza 2010, p. 1965). This potentially provides support to a broad scope for government and central bank interventions (e.g. Eggertsson and Krugman 2012).

8. STRENGHTS AND WEAKNESSES OF THE NEW FAM MODELS

A weakness of the DSGE-FAM model «is that it only addresses one aspect of many possible financial frictions» (Tovar 2009, p. 7). As we have mentioned, alternative ways of modelling the impact of financial factors, within the benchmark framework, have been developed in the last few years, including the introduction of collateral constraints, currency risk premia

in open economies, Minsky-Fisher devices, and other financial frictions (for a survey, see Brunnermeier *et al*. 2012, and Roger and Vlcek 2012). Other augmented FAM models have been obtained through the explicit inclusion of a heterogeneous, monopolistically competitive banking sector (e.g. Hafstead and Smith 2012). However, it seems to us that the vast majority of these approaches share the main weakness of the old benchmark NCM-DSGE model. We refer to the claim that it would be possible to regard financial instability and long-lasting slumps as simple outcomes of market frictions (i.e. imperfections, asymmetries or rigidities in labour, goods and financial markets), rather than as endogenous by-products of the capitalist dynamics. The point here is not as much the need to model an 'artificial' economy by defining an equilibrium state and then assessing its reaction to exogenous shocks (in fact, this method is shared also by part of the 'critical' literature), as the controversial and unrealistic assumption that, in the medium run, free market forces would drive the economy towards a *unique exogenously-given and socially-optimal equilibrium*. It is this very feature, coupled with the assumption of perfect rationality of agents, that has led to the introduction of several «ad-hoc assumptions about why agents do not adjust their plans instantaneously and why prices are rigid». However, the use of lags in price setting is rather controversial, as «the inconsistency was brushed under the carpet. Why is it that in a world where everybody understands the model and each other's rationality, agents would not want to go immediately to the optimal plan using the optimal price? [...] Calvo pricing is an ad hoc assumption forced unto the model to create enough inertia so that it would fit the data better» (De Grauwe 2010, pp. 416-17). Similar considerations hold for the other limitations to optimizing behaviour introduced in New Keynesian DSGE models, such as the presence of rule-of-thumb consumers or other financial constraints. Both relevance' and consistency's sakes would require either the outright abandoning of micro-foundations or the introduction of different micro-foundations, for instance, the explicit acknowledgement that agents' behaviour is guided by heuristics. The latter is the way proposed by behavioural economists (e.g. De Grauwe 2010). The former is the way followed by macro-economists adopting other unorthodox methods of modelling (for instance, the 'stock-flow consistent' approach of Godley and Lavoie 2007).

New FAM and other recent New Keynesian models can, certainly, be criticized for their *ad hoc* assumptions coupled with an 'equilibristic' theoretical bias, as well for their claim to explain the business cycle through one single variable (notably, a high Calvo parameter or a sharp change in the risk premium). However, as we mentioned in Section 6, old and new FAM models potentially lead to a different rule of central banking. Although seldom pointed out, this aspect should not be underestimated. The point is that, once it is admitted that lending is driven by creditworthiness of borrowers, and thereby by the soundness of agents' balance-sheets, it turns out that *the stabilization of the market value of assets (especially those used as collaterals) should be the priority* of the central bank. Notice that this requires the outright abandoning of the Ricardian equivalence.[46] In fact, the work of Bernanke as the chair of the Federal Reserve has seemed to be inspired by this awareness, partially at least. In addition, some attempts have been made to extend DSGE-FAM models in order to consider balance-sheet effects in the banking sector. For instance, Choi and Cook (2004, p. 21) show that, under certain circumstances,[47] «a monetary policy that targets inflation can ameliorate the destabilizing effects of sticky prices». By contrast, a different policy rule, aiming to stabilize the balance-sheets of the banking system, may lead to greater economic stability (as remarked also by Argitis 2013). The importance of collateral constraints for borrowing has been also remarked (e.g. Iacovello 2005, and Gerali *et al*. 2010; Gerlter and Karadi 2011), though it is still a largely unexplored line of research (e.g. Tovar 2009). Yet, seldom is it recalled that the vast majority of refinancing operations in the inter-banking market are conducted through REPOs, with government bonds acting as collaterals. But, if this is the case, then the support of government bonds, and not price stability, should be regarded as the overriding concern of central banks during recessions. Notice that the replacing of risky private assets with low-risk government bonds (guaranteed by central banks) would further strengthen the soundness of firms' balance-sheets (this is the 'portfolio effect' pointed out by Minsky 1986), thereby contributing to smooth the business cycle. To put it differently, «deficit-financed government spending can, at least in principle, allow the economy to avoid unemployment and deflation while highly indebted private sector agents repair their balance sheets» (Eggertsson and Krugman

2012, p. 1471). It remains to be understood whether, in order to account for these features of today's financially sophisticated capitalist economies, more accurate DSGE models are either a useful instruments for policy-making or just a further «privately and socially waste of time», as Buiter (2009) defined them. Today, more than ever, the debate is open.

9. FINAL REMARKS

In the mid-2000s, a convergence of views in mainstream macroeconomics was emerged. Such a pervasive consensus (labelled the New Consensus Macroeconomics, NCM) concerned both the state of the discipline (theory, methodology and modelling) and the central-banking around the world. Yet, in spite of the new way of treating monetary policy, the NCM shared a number of problematic features with Monetarism. For instance, in the benchmark NCM model it is still maintained that an expansionary fiscal policy has no lasting effect on output and employment, while it is supposed to lead to higher inflation and (nominal and real) interest rates in the long run. Furthermore, banks and financial markets are not included in the standard theoretical framework, let alone modelled. Unsurprisingly, the chain of events which followed the bankruptcy of *Lehman Brothers* in September 2008 revealed the theoretical fragility of the NCM, as well as its intrinsic inability to forecast prolonged economic and financial crises. The very critical analysis of the reasons of this theoretical and methodological failure has been at the heart of this paper. In this regard, first, we provided a brief introduction to the benchmark NCM model, by showing that it relies on the two-fold assumption that the natural level of output is exogenously-given and money is neutral in the long run. Second, we argued that those assumptions come from a misunderstanding of the role played by banks and financial markets in real-world (capitalist) economies. In addition, we provided an overview of a somewhat 'dissenter' branch of the dominant economic thought. We refer to the works on the so-called 'financial accelerator mechanism' (FAM), which have been pioneered by Bernanke and other New Keynesian scholars since the early 1980s. Unlike the NCM benchmark model, FAM models explicitly aim to incorporate the impact of financial market imperfections on real magnitudes, as such imperfections are regarded as the main trigger of the business cycle.

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Although the distance between FAM proponents and the Post Keynesians (and other radical economists) is still relevant, both in policy and in theory, FAM models certainly represent a progress compared to the benchmark NCM model. In fact, even a few adjustments in the NCM benchmark model, aiming to account for both the hysteresis of output and the role of finance, are sufficient to make the model produce 'heterodox' results. Unfortunately, recent developments in DSGE models are still too bound to the standard NCM, both theoretically and ideologically, to provide a new way of analysing the working of a financially-sophisticated real-world economy. However, some interesting (though unexpected) consequences in central banking can be implicitly derived from New FAM and other New Keynesian 'imperfectionist' models.

ENDNOTES

[1] Two points would be worth to be further analysed here. First, the operation of Central Banks is portrayed in terms of policy interest rate. However, this does not mean that the Central Bank acts as lender of last resort (in the sense of Bagehot). Second, the financial sector is always assumed to be passive and 'stable' in the basic NCM model.

[2] The standard version of the RBC model can be found in Prescott (1986).

[3] According to McCombie and Pike (2013) these are indeed the 'paradigmatic heuristics' (or 'pseudo-assumptions') of the NCM model. In this regard, two aspects are worth of further comments: i. the hypothesis of perfectly rational expectations entails the presence of complete (perfect competition) future markets for every good and service traded in the economy; ii. rational-expectations-based micro-foundations are said to allow NCM modellers to employ 'deep structural' parameters which are assumed to be constant and hence unresponsive of the Lucas' critique (viz. the impossibility to predict the effects of a change in economic policies by using aggregative models and aggregate historical data). Yet, point (i) is clearly unrealistic, whereas point (ii) leads to paradoxical conclusions (such as the irrelevance of an *autonomous* investment function and the impossibility of *involuntary* unemployment) and raises a problem of the fallacy of composition. An analysis of the role of both rational expectations and micro-foundations in the NCM modelling is, however, beyond the aim of this paper. On this point, we refer the reader to Da Silva (2009) and Dullien (2009).

[4] We resume the formulation proposed by Arestis and Sawyer (2004, 2006, 2008) and Arestis (2007, 2009) in their critical appraisal of the NCM. This, in turn, is drawn from the path-breaking NCM work of Clarida *et al.* (1999). More recently, this reduced-form basic model has been recovered and amended by De Grauwe (2010). For the sake of simplicity, we neglect the foreign sector.

[5] Notice that values of 'deep parameters' of DSGE models (i.e. parameters which are supposed not to be affected by policy) are usually obtained through either 'calibration' methods or Bayesian estimation econometric techniques. For a thorough analysis of this as important as controversial issue, we refer the reader to Tovar (2009).

[6] As has been observed, here clearly emerges the separation between demand and supply, with the (growth of) natural output being supply-determined and independent from the level and rate of change of aggregate demand (Fontana, 2010).

[7] Equation (1) is derived by households' consumption equation that arises, in turn, from the single agent's optimal saving allocation. More precisely, it is assumed that agents prefer to smooth consumption over time. Consequently, expectations of higher output next period lead to higher consumption and output today. Similarly, the (real) interest rate level affects the inter-temporal substitution of current vs. future consumption. This, in turn, affects the real unit wage (via the change in the demand of goods and labour services) and, therefore, the supply of labour and output. Consequently, in this model fluctuations in employment and output are «always an *optimal reaction* of households to changes in labour market conditions» (Dullien 2009, p. 13). By contrast, an autonomous investment function of firms is not included in the model, though this is said «not [to] affect any qualitative conclusions» (Clarida *et al.* 1999, pp. 1665-1666).

[8] As has been observed, «[t]here are two assumptions here. The first is that the immediate impact of an increase in aggregate demand falls entirely on output. [...] The second assumption is that when output equals it natural rate and there are no inflation shocks, inflation is steady. This assumption fits the evidence that there is inflation inertia» (Romer 2000, p. 158-59). As in the old IS-LM-AS model, output's impact on inflation «can operate directly through firms' price-setting decision, or indirectly through wages. The lack of complete nominal flexibility [...] can be justified on the basis of adjustment costs, imperfect competition, or contracts» (Romer 2000, p. 152). Coherently, equation (2) is usually derived «in terms of staggered price-setting by firms with some degree of market power» (Taylor 2000, p. 92). In other words, it is obtained from an explicit optimization problem: that of maximizing profits under a constraint on the frequency of future price adjustments (e.g. Clarida *et al.* 1999, p. 1666).

[9] The natural interest rate is sometimes labelled as the 'neutral' interest rate, «since fiscal policy can influence this neutral real rate of interest and so it is not very 'natural'» (Allsopp and Vines 2000, p. 9). Notice that the Taylor rule has been initially obtained as the result of an empirical search (e.g. Taylor 1993, 1994), and not as a normative device. On the 'positive analysis' side, a simple numerical specification of the rule is: $r = 4 + 1.5(\pi - \pi^T) + 0.5Y^g$. Notice also that if the target (real) interest rate did not depend on inflation, its (exogenous) setting would produce explosive inflation or deflation (e.g. Romer 2000; see also Brancaccio and Fontana (2013) for a critical assessment of the taylor rule and its use to explain the 2007 financial crisis and related recession). More precisely, without a policy rule, there would be no 'nominal anchor', and the inflation rate would be increasing, or decreasing, without limit (Allsopp and Vines 2000, p. 11), except for the equilibrium level of output. Furthermore, a policy rule which just relies on current inflation is not sufficient to (rapidly) remove the effects of a demand shock. The output-gap, and hence the expected inflation, must be explicitly included in the reaction function of the central bank to assure the stability of the economic system.

[10] In algebraic terms: $Y_t^g = a_0 + [a_1 - a_3(1-c_3)c_1]Y_{t-1}^g + a_2 E(Y_{t+1}^g) - a_3\{(1-c_3)[RR^* + c_2(\pi_{t-1} - \pi^T)] + c_3 r_{t-1}\} + \varepsilon_1$. Notice that «[m]ovements along this curve occur when inflation [...] changes and the central bank changes the real interest rate, causing real GDP [...] to change». Notice also that this curve is «the relationship between the *inflation rate* and the real GDP, rather than between the price level and real GDP» (Taylor 2000, p. 92).

[11] Actually, the natural level (or growth rate) of output is not necessarily the one at which all markets clear at a competitive equilibrium, assuring the full employment of labour-force. Rather, it is sometimes described as «that level of output at which 'competing claims' are reconciled'» (Allsopp and Vines 2000, p. 5). The former definition corresponds to the Friedman's one, whereas the latter entails the different concept of the 'non-accelerating rate of unemployment' (NAIRU). On this point, see also Dullien (2009).

[12] Since inflation and output (gap) do not vary in the long-run steady state, the assumption that expected future values equal actual current values is fully rational. To put it differently, agents' expectations are here always correct, except when an exogenous shock occurs. Notice that the assumption of adaptive expectations would not *qualitatively* change the results of the simulation. By contrast, the assumption that expected values to be equal to actual future values would be make the model unstable. A critical analysis of rational

expectations in DSGE modelling, along with the proposal of replacing fully rationality with 'trial and error' learning of agents, is provided by De Grauwe (2010).

[13] As has been argued, the «reason for fluctuations in output and employment in DSGE models is hence not that wages are sticky and therefore an adjustment of real wages to shocks cannot take place (as it has been in the fixed-wage version of the old neo-classical synthesis) nor is it that aggregate demand can just fall short of supply because of a lack of an inherent tendency to full-employment output (as claimed by the Post-Keynesians). Instead, the reason for fluctuations is that nominal wages are flexible, but prices are not and hence demand shocks change nominal and real wages more quickly than prices which leads to high-frequency changes in the labour supply. The DSGE model is a model in which nominal wages and quantities adjust instantaneously while nominal prices can only adjust with a lag» (Dullien 2009, p. 14).

[14] Similarly, it is possible to show that a negative shock entails a temporary reduction in output (compared to its natural level) coupled with a permanent reduction in inflation and interest rates.

[15] As a result, «[b]enchmark DSGE models have paid little attention to the role of fiscal policy [...]. This has been partly because of the assumption of Ricardian equivalence. As a result, the distribution of taxes across time become irrelevant and aggregate financial wealth does not matter for the behaviour of agents or for the dynamics of the economy because bonds do not represent net real wealth for households» (Tovar 2009, p. 9).

[16] Fiscal policy also affects the effectiveness of the monetary policy. However, NCM authors usually stress that this «certainly does not mean that fiscal policy should not be used». This, rather, means that it should be used as «a policy tool in controlling inflation and in the stabilization of the economy» (Allsopp and Vines 2000, p. 19), and that monetary policy needs to take into account fiscal policy's effects.

[17] The raise (reduction) in the interest rate when the inflation rate is above (below) target is called the 'nominal-anchor function' of monetary policy; the raise (reduction) in the interest rate in response to a positive (negative) shock affecting the demand is called the 'stabilizing function' of monetary policy (e.g. Allsopp and Vines 2000, p. 11).

[18] More precisely, institutions are introduced as constraints ruling economic interactions among agents (such as budget constraints, price-setting rules and policy rules).

[19] This historical concept is what Alfred Marshall would have labelled the 'long period', as opposed to the logical concept of the 'long run'.

[20] This is the result of the monetary nature of capitalist economies. So, according to Eggertsson and Krugman (2012, p. 1506), «a temporary rise in government spending will not crowd out private spending, it will lead to increased spending on the part of liquidity-constrained debtors».

[21] Obviously, the following holds: $Y_t = Y_t^n + Y_t^g$.

[22] The revival of the category of the 'natural rate of interest', developed in the 1920s by the Swedish economist Knut Wicksell, is the reason why NCM authors are sometimes labelled 'Neo Wicksellian' (e.g. Woodford 2003; also Fontana, 2007, 2011). By contrast, the *degree* of Keynesianism of the NCM is most debated. The NCM is usually regarded as being 'New Keynesian' by its proponents (see, among others, Clarida *et al.* 1999; Romer 2000; see also Dixon 2008). Yet, in terms of our 3-equation system, the only one which could be seen to have a (neo) Keynesian 'pedigree' would be equation (2), viz. the Phillips curve. This latter is supposed to have a coefficient on expected inflation equal to $1/(1 + \pi_t) < 1$ and hence to be slightly *upward-sloping* rather than vertical – albeit that, in an economy with low inflation, it could be around 0.90 to 0.95 (Sawyer 2013 and Arestis and Sawyer 2008). This lack of an authentic Keynesian nature of the NCM is usually pointed out by (a part of) the Post Keynesian authors. For instance, according to McCombie and Pike (2013, p. 498), the NCM «essentially consists of a general dynamic stochastic general equilibrium model». Although rigidities are accounted for, «the benchmark is still the real business cycle» (on the same position, see also Goodfriend 2004). For Lavoie (2006, p. 177), the NCM «is simply a variant of monetarism, but without any causal role for money». Consequently, for Dullien (2009, p. 23), «the sympathy that some of the traditional and Post-Keynesian authors show towards DSGE models is rather hard to understand». Notice, however, that for the

central bank to be able to affect the *real* interest rate, prices cannot be completely flexible. Thus, according to other authors, the very assumption that the central bank targets the real interest rate through a policy rule «makes the model Keynesian» (Romer 2000, p. 155). This position is shared by the most part of NCM authors, such as Clarida *et al.* (1999). So, for Romer (2000, p. 168), NCM models «would be recognizable to Keynes, Hicks and their contemporaries». Similarly, Bernanke *et al.* (1999) label the NCM as the 'Dynamic New Keynesian' framework. Other authors stay in the middle ground and explicitly recognize that the NCM is rather a «synthesis between the pre-Keynesian and the Keynesian paradigms [since] classical theory is appropriate in the long run, but that Keynesian theory is appropriate in the short run» (Allsopp and Vines 2000, p. 4). In our opinion, the point is that the assumption of nominal rigidities is seen as a chief feature of Keynes' *General Theory* by the New Keynesians (in the wake of Kahn 1984), but not by the Post Keynesians.

[23] Some authors (notably, Hargreaves-Heap 1980, Cottrell 1984–85, and Blanchard and Summers 1987) have justified equation (8) by recurring to the the notion of the 'hysteresis-augmented natural rate of unemployment'. On this point, we refer the reader again to Lavoie (2006, p. 181).

[24] Similarly, a negative shock entails a permanent reduction in the natural level of output. Notice that, in simulation of Figure 2, a one-period lag has been introduced in equation (4). The higher this lag, the higher is the hysteresis of output. More in general, lags in equations (1) and (4), including fiscal policy parameter (i.e. α_0), are fundamental, as they rule the reaction of the central bank to inflation and output gaps (e.g. Taylor 2000, p. 92; see also Allsopp and Vines 2000, pp. 9-10).

[25] That of 'involuntary unemployment' is an empty concept in the mainstream models, because there cannot be coordination failures leading to lack of effective demand – in the long run at least. Under the original RBC-DSGE basic model, individuals can be unemployed only because they (prefer to) allocate their time to leisure activities, instead of working activities. Under the New Keynesian declension of the DSGE models, viz. the NCM model, unemployment may occur (also) because of the lack of instantaneous price flexibility (that is, because of temporary nominal price rigidities). This, in turn, is seen as the result of 'menu' or other adjustment costs affecting firms' price (or wage) setting. However, in the absence of price stickiness, unemployment would always be voluntary. Therefore, a problem of 'weak incommensurability' between the original NCM model and the proposed amended (Post Keynesian) version of the NCM model still remains (e.g. McCombie and Pike 2013, p. 518).

[26] Plainly, if we drop equation (8) the system (4)-(5)-(6)-(7) behaves as NCM authors would expect, that is, after the shock the economy returns to its long-run equilibrium (with the permanent effect being just on inflation and interest rates).

[27] Sociologically, NCM authors are often policy-concerned scholars, who are mainly interested in practical implications of the theory. Think to the assumption of price stickiness: although it is regarded by its own proponents as not completely satisfactory in theory (because of the lack of rigorous micro-foundations), it has become the cornerstone of NCM modelling, because it «works beautifully in practice» (Krugman 2000). On the epistemological plan, the very concern for practical policy implications of the models (rather than for their theoretical pureness and logical consistency) might be regarded as another 'Keynesian' attribute of the NCM practitioners. For instance, Bernanke *et al.* (1999, p. 6) argue that they take the NCM model as the starting point of their analysis because «it is possible to study monetary policy with this framework». On the controversial link between the NCM and the thought of Keynes, we again refer the reader to note 22.

[28] For a thorough analysis of this aspect, we refer the reader to Major (2012).

[29] More precisely, in the traditional IS-LM-AS model, the real rate of interest affects the IS curve, whereas the nominal rate is relevant to the LM curve.

[30] These sentences also confirm that the main concern of NCM authors is the realism (or the practical use) of the models, rather than their theoretical accuracy. See note 27.

[31] As is explicitly recognized, «many empirical DSGE models, such as the Smets-Wouters model, make no reference to money, though they include an equation describing monetary policy, and imply that the

specification of that equation matters a great deal for the dynamics of both nominal and real variables» (Woodford 2009, p. 13, referring to Smets and Wouters 2003; see also Smets and Wouters 2007).

[32] The role of monetary policy in the NCM has raised several criticisms. Arestis and Sawyer (2006, pp. 849-853) have provided a long list of problematic issues. First, the impact of changes in the rate of interest on inflation is small and unpredictable, whereas the impact on investment and, therefore, on the future capital stock, can be much more remarkable. Second, if inflation is a demand-led phenomenon, then monetary policy is not the most effective way of influencing aggregate demand; if it is not (for instance, because inflation is a cost-push phenomenon), then the NCM does not provide any clear treatment of it. Third, NCM authors assert that the real rate of interest is adjusted by central bank such that the economy moves to equilibrium. However, the corresponding nominal rate of interest could be either negative or positive but too low to be attainable. Fourth, the interest rate could have a too little effect on investment and savings. Fifth, the domestic natural rate of interest could be inconsistent with foreign rates. Sixth, the central bank could not have all the information needed to steer the interest rate at its natural level. In addition, «[t]he validity of the use of a quadratic loss function involving inflation and output gap [as the microeconomic foundation of the interest rate rule] and the assumption that trend output has some optimal properties have both been questioned» (Arestis and Sawyer 2008, p. 776). The reason is that those hypotheses rely, in turn, on the controversial assumption that supply potential is not affected by current demand. Finally, the theoretical and empirical validity of the New Keynesian Phillips's curve is highly disputed as well.

[33] Interestingly enough, according to Taylor, both crises would be the result of the *too low* level of the target interest rate set by the Federal Reserve. This turned out to inflate financial asset and real-estate bubbles, therefore creating the conditions for the subsequent economic and financial meltdown (e.g. Taylor 2007, 2009, 2010).

[34] Notice that Foley and Former (2009, p. 685) explicitly propose to replace DSGE models with agent-based models (ABMs hereafter) which «potentially present a way to model the financial economy as a complex system, as Keynes attempted to do, while taking human adaptation and learning into account, as Lucas advocated». However, it is too early to say whether ABMs could be a helpful alternative to both DSGE models and old-fashioned Keynesian econometric models. Also notice that another way to model the medium-run dynamics of capitalist economies is the stock-flow consistent method (SFC hereafter) developed by Wynne Godley, Marc Lavoie, Gennaro Zezza and the scholars of the Levy Institute. However, a thorough analysis of the current state of formal modelling in economics is beyond the scope of this paper.

[35] According to the EMH, prices of traded assets always reflect all available information. According to the M&MT, under a number of restrictive assumptions, the value of a firm is unaffected by *how* that firm is financed.

[36] As we have mentioned, in the NCM basic model, described by equations (1) to (3), investment merely adjust to fit household inter-temporal preferences. On this point, we again refer the reader to notes 3 and 7.

[37] This cost is also defined as «the inevitable deadweight loss that arises because of asymmetric information» (Bernanke *et al.* 1996, p. 2).

[38] By contrast, explicit cites to Minsky's works are very rare. Among the few exceptions, see Bernanke *et al.* (1999), who refer generically to Minsky's theory, and Bernanke (1983) who quotes Minsky (1977).

[39] As we have already mentioned, another remarkable difference concerns the analysis of the circuit of monetary payments among different social groups (or classes), and the linked distinction between the role of banking sector and that of financial markets. Such an analysis is totally neglected in the FAM framework, where banks are likened to pure financial intermediaries. For an overview of the current state of the 'circuitist' debate, see Passarella Veronese (2014) and Sawyer (2013).

[40] In the NCM, monetary policy is still regarded as the preferential, if not the unique, instrument of public intervention (e.g. Arestis and Sawyer 2008). However, as we will argue in the next section, the recognition of

the role played by marketable financial assets as collateral in financing should logically lead to a change in the main target of monetary policy.

[41] The declared reason is that «[f]inancial contracts and institutions are endogenous, so that results that hinge on arbitrary restriction on financial structure are suspect» (Bernanke *et al.* 1996, p. 4).

[42] As we have already mentioned, the rationale is two-fold: first, capitalist economies are complex systems whose overall behaviour cannot be derived from a process of *aggregation* of behavioural equations of single identical rational agents; second, rational-expectations-based micro-foundations do not actually allow modellers to tackle the Lucas' critique and, therefore, for the *Ockham's razor*, they should be dropped.

[43] Notice that in equation (12) we have assumed that current net wealth of firms is equal to the stock of previous wealth augmented by a share of output gap, instead of total output.

[44] As has been observed, «EMU can be seen as a crucial example of the application of this 'new consensus' [in macroeconomics]» (Arestis and Sawyer 2013, Ch. 1, p. 11). In practice, although the 'two-pillar' model adopted by the ECB cannot be regarded as a pure 'inflation targeting' model, within the EMU «[m]onetary policy is tasked with the control of inflation, and fiscal policy is downgraded to at most the role of automatic stabiliser in the context of an overall balanced budget» (Arestis and Sawyer 2013, Ch. 2, p. 26).

[45] According to Calvo (1983)'s approach, «in each period, a firm is only allowed with the probability of $(1 - \theta)$ to reset its price. Thus, θ can be interpreted as a measure of price stickiness» (Dullien 2009, p. 7). Notice that this is none other than a way to make the model reproduce the inertia observed in the empirical data on prices. The rationale is that firms would be constrained in adjusting prices instantaneously.

[46] We refer the reader again to endnote 15.

[47] More precisely, Choi and Cook (2004) analyse the case of those developing economies which face a mismatch in the currency denomination of their liabilities (denominated in foreign currency) and assets (denominated in domestic currency), coupled with sticky prices.

APPENDIX: GLOSSARY OF VARIABLES AND PARAMETER VALUES

Model I

Symbol	Description	Type	Value
Y^g	Output gap (level)	Endog.	0.00*
π	Inflation rate	Endog.	-
r	Nominal rate of interest	Endog.	-
RR^*	Equilibrium (or natural) real rate of interest	Endog.	-
π^T	Inflation rate targeted by the central bank	Exog.	2.00
ε_i	Stochastic components (with i = 1, 2, 3)	Exog.	0.00
a_0	Parameter of output gap function reflecting (also) the fiscal policy stance	Param.	200.00
a_1	Sensitivity of current output gap to past output gap	Param.	0.10
a_2	Sensitivity of current output gap to expected future output gap	Param.	0.10
a_3	Sensitivity of current output gap to (expected) real interest rate	Param.	(-) 500.00
b_1	Sensitivity of current inflation rate to current output gap	Param.	0.001
b_2	Sensitivity of current inflation rate to past inflation rate	Param.	0.50
b_3	Sensitivity of current inflation rate to expected inflation rate	Param.	0.50
c_1	× $(1 - c_3)$ Sensitivity of nominal interest rate to past output gap	Param.	0.001
c_2	× $(1 - c_3)$ Sensitivity of nominal interest rate to inflation gap	Param.	0.10
c_3	Sensitivity of current interest rate to past interest rate (degree of 'smoothing')	Param.	0.50
$E(\cdot)$	Expected value at time t	Funct.	-

*Note: * steady state and initial value.*

Model II

Symbol	Description	Type	Value
Y	Current output growth rate	Endog.	-
Y^n	Natural output growth rate	Endog.	≈ 0.01*
π	Inflation rate	Endog.	-
r	Nominal rate of interest	Endog.	-
RR^*	Equilibrium (or natural) real rate of interest	Endog.	-
π^T	Inflation rate targeted by the central bank	Exog.	0.02
ε_i	Stochastic components (with i = 1, 2, 3, 4)	Exog.	0.00
α_0	Parameter of output function reflecting (also) the fiscal policy stance	Param.	0.01
α_1	Sensitivity of current output gap to (past) real interest rate	Param.	0.50
β_1	Sensitivity of current inflation rate to (past) output gap	Param.	0.01
γ_1	Sensitivity of nominal interest rate to past inflation gap	Param.	0.01

γ_2	Sensitivity of nominal interest rate to expected output gap	**Param.**	0.01
ϕ	Hysteresis effect	**Param.**	0.10
$E(\cdot)$	Expected value at time t	**Funct.**	-

*Note: * steady state and initial value.*

Model III

Symbol	Description	Type	Value
h	Neat wealth of firms (value of collaterals)	**Endog.**	-
α_4	Sensitivity of investment to net wealth of firms	**Param.**	0.15
ω	Share of retained profits and capital gains in total output	**Param.**	0.50

Note: Descriptions and values of other values and parameters are those of Model I.

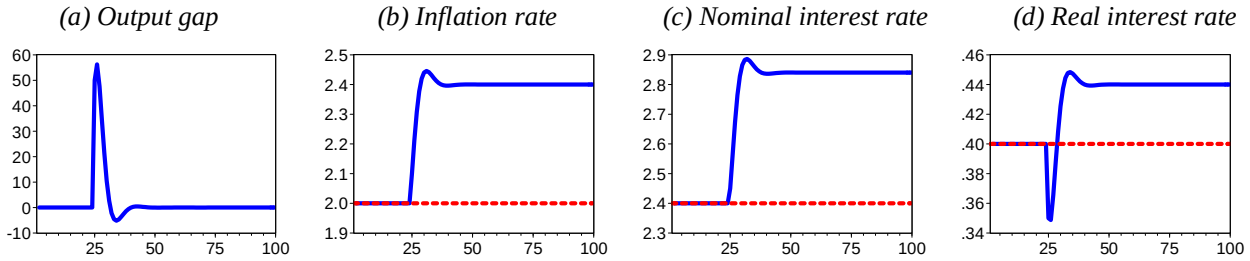
Model IV

Symbol	Description	Type	Value
h	Net wealth of firms (value of collaterals)	**Endog.**	-
α_2	Sensitivity of investment to net wealth of firms	**Param.**	0.50
ω	Share of retained profits and capital gains in total output	**Param.**	0.50

Note: Descriptions and values of other values and parameters are those of Model II.

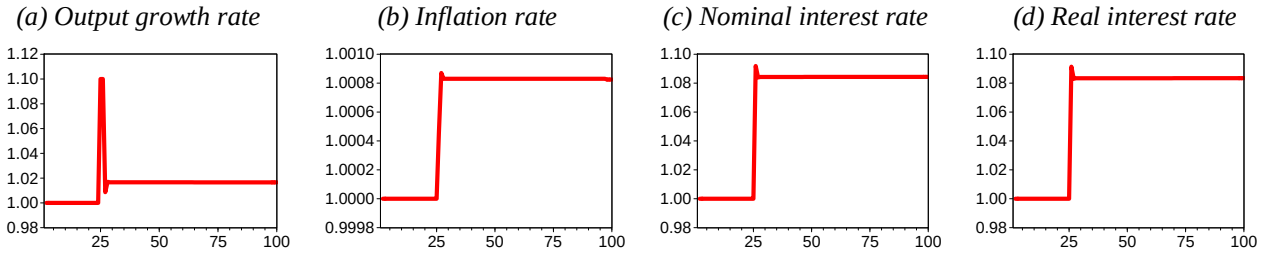
FIGURES: SIMULATIONS OF FOUR REDUCED-FORM DSGE MODELS

Figure 1 Response of benchmark model (Model I) to a permanent increase in gov. spending



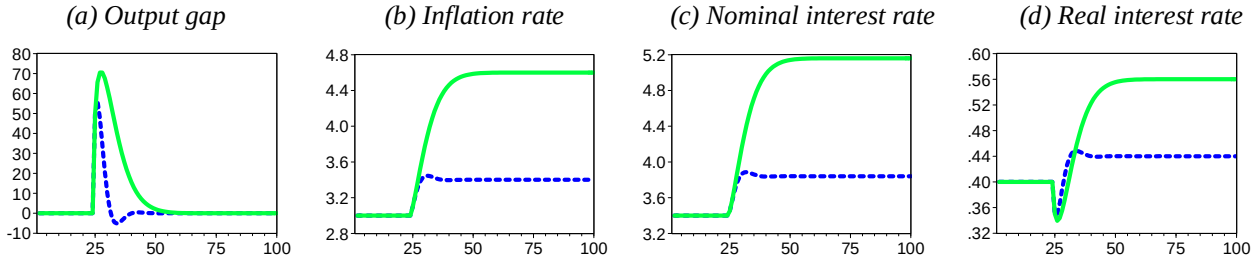
Notes: red dotted line = baseline; blue line = reaction to shock. Output gap is measured in conventionally-taken monetary units, whereas the other variables are expressed in percentage points.

Figure 2 Response of the amended NCM-DSGE model with hysteresis (Model II)



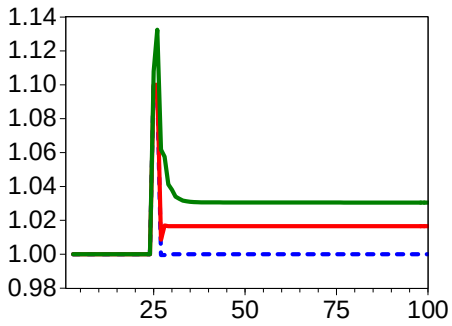
Notes: all values are compared to baseline.

Figure 3 A comparison between the benchmark NCM and the FAM model (Model III)



Notes: blue dotted line = benchmark DSGE-NCM model; green line = FAM model. Output gap is measured in conventionally-taken monetary units, whereas the other variables are expressed in percentage points.

Figure 4 A comparison between Model I, Model II and Model IV



Notes: blue dotted line = benchmark DSGE-NCM model (Model I); red line = hysteresis-augmented NCM model (Model II); green line = hysteresis-augmented FAM model (Model IV). All values are compared to baseline.

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THE ABSTRACT OF THE PROJECT IS:

The research programme will integrate diverse levels, methods and disciplinary traditions with the aim of developing a comprehensive policy agenda for changing the role of the financial system to help achieve a future which is sustainable in environmental, social and economic terms. The programme involves an integrated and balanced consortium involving partners from 14 countries that has unsurpassed experience of deploying diverse perspectives both within economics and across disciplines inclusive of economics. The programme is distinctively pluralistic, and aims to forge alliances across the social sciences, so as to understand how finance can better serve economic, social and environmental needs. The central issues addressed are the ways in which the growth and performance of economies in the last 30 years have been dependent on the characteristics of the processes of financialisation; how has financialisation impacted on the achievement of specific economic, social, and environmental objectives?; the nature of the relationship between financialisation and the sustainability of the financial system, economic development and the environment?; the lessons to be drawn from the crisis about the nature and impacts of financialisation? ; what are the requisites of a financial system able to support a process of sustainable development, broadly conceived?'

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4	Fondation Nationale des Sciences Politiques	France
5	Pour la Solidarite, Brussels	Belgium
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