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Systemic financial fragility and the monetary circuit: a stock-flow consistent Minskian approach

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Abstract. In the last few years, a number of scholars has referred to the crop of contributions of Hyman P. Minsky as 'required reading' for understanding the tendency of capitalist economies to fall into recurring crises. However, the so-called 'financial instability hypothesis' of Minsky relies on much-disputed assumptions. Moreover, Minsky's analysis of capitalism must be updated on the basis of the deep changes which, during the last three decades, have concerned the world economy. In order to overcome these theoretical difficulties, the paper supplies a simplified, but consistent, re-formulation of some of the most disputed aspects of Minsky's theory by cross-breeding it with inputs from the current Post-Keynesian literature. This allows us to analyze (within a simplified stock-flow consistent monetary circuit-model) the impact of both 'capital-asset inflation' and consumer credit on the financial 'soundness' of a monetary economy of production,.

Keywords: Financial Instability; Stock-Flow Consistency; Monetary Theory of Production

JEL Classifications: B50, E12, E32, E44

Contents

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1. Introduction

In the last few years, many financial analysts (see, first and foremost, Magnus 2007) and a number of heterodox (and even 'dissenting' orthodox) economists (see, for instance, Kregel 1997, 2008; Papadimitriou and Wray 2008; Tymoigne and Wray 2008; Vercelli 2009a, 2009b; Wray 2008; see also Passarella 2010, 2011) has referred to the contributions of Hyman P. Minsky as fundamental for understanding the tendency of capitalist economies to fall into recurring crises. In fact, according to many observers, both the 'dot-com' crash of 2000-2002 and the burst of the so-called 'subprime loan' crisis at the beginning of the summer of 2007 would confirm many of Minsky's forecasts: the development of financial fragility of the economic system that arises from a previous period of 'tranquil growth'[1]; the increase in the probability of a credit crunch and of a widespread debt-deflation being observed; the gradual loosening of economic units' safety-margins and the reduction in the time elapsing between one crisis and another; finally, the bankruptcy of big financial institutions and the ensuing 'obligation' of governments and central banks to implement (or enforce) policies which it is hoped will avoid deep depression – in Minsky's words, to prevent 'it' happening again (see Passarella 2011)[2].

It should be plain, however, that the traditional representation of Minsky's implicit model contains – as many authors have pointed out – some serious internal logical problems (see, first and foremost, Lavoie 1986; Lavoie and Seccareccia 2001; Toporowski 2008; Bellofiore and Halevi 2009, 2010). The main conundrum stems from Minsky's belief that the leverage ratio (on the investment in capital goods) of the business sector *as a whole* must eventually rise during the boom phase of the economic cycle. Yet, from a *macroeconomic* point of view, the increase in net retained profits (in the form of bank deposits) that derive from earlier investment-expenditures on capital-equipment may offset the higher debt (in form of bank loans) of non-financial firms. This counter-intuitive outcome is known in the Post-Keynesian literature as the 'paradox of debt' and it can be regarded as the Kaleckian equivalent of the well-known Keynesian 'paradox of thrift'. Furthermore, Minsky's analysis of capitalism must be updated in the light of radical changes which have been experienced in recent years by the main capitalist economies. Notice that, during the last few decades, not only has total debt for the non-financial firm sector *not* increased, but also that inflation in the money values of capital-assets could allow industrial corporations to finance their investment in capital goods by issuing equities. Paradoxically, this could produce effects that give 'stability' on firms' balance-sheets (see Toporowski 2000, 2010; Bellofiore and Halevi 2009, 2010; Bellofiore, Halevi and Passarella 2010), although these very effects are temporary and intrinsically uneven.

Given these premises, this paper aims to rescue Minsky's vision by means of strengthening and cross-breeding Minsky's implicit model with inputs from both the 'French-Italian approach' to the Monetary Theory of Production and the more recent Post-Keynesian literature[3]. In order to do so, section 2 of the paper will introduce the reader to the mechanics of financial instability theory, showing why this latter cannot be regarded as a *general* theory of the business cycle. Sections 3, 4 and 5 will present a fairly straightforward, but consistent, re-formulation of some disputed aspects of Minsky's theory within a simplified monetary circuit model. In sections 6 and 7, we will use this model in order to analyze the impact of both 'capital-asset inflation' and consumer credit on the financial 'soundness' of the economy. Some concluding remarks will be provided in the last part of the paper (section 8).

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[1] This definition derives from Joan Robinson (see Minsky 1986: 176, quoted in De Antoni 2009: 3).

[2] For an opposite but influential opinion, see Davidson: he argues that the current crisis 'is not a Minsky moment' (Davidson 2008: 669-670).

[3] As for the French-Italian approach to the Monetary Theory of Production – also known as the 'Theory of Monetary Circuit' (but it would be better to talk about 'theories', instead of 'theory') – we refer the reader to the Introduction to this Special Issue.

2. Structure and limits of the 'financial instability hypothesis'

As is well known, the 'financial instability hypothesis' (FIH hereafter) of Minsky is grounded on the simple, but powerful, idea that, during periods of tranquil growth, each economic unit (and *hence* the economy as a whole) endogenously moves towards financial fragility. Although it is not an easy task to find a macroeconomic variable that could describe the fragility of a set of interrelated balance-sheets, the so called 'formal Minskian literature'[4] (FML hereafter) – as well as Minsky himself – has often used the investment 'leverage ratio' of the corporate sector for this purpose[5]. However, as one might expect, the trend of the leverage ratio cannot be (*ex ante*) determined starting from the analysis of the behaviour of the 'representative' investing firm, since that trend (*ex post*) arises from decisions taken by firms *as the whole*. This conundrum highlights a possible missing link between micro (or individual) and macro (or systemic) levels in Minsky's theoretical model[6].

In order to shed light on this point, let us consider the following system of four equations in four unknowns (P_{Gf}, ΔA_f, ΔL_f and P_f). The system describes an artificial, 'pure credit', closed capitalist economy where firms borrow in order to fund their investment plans:

(2.1) $P_{Gf} = p\Delta K$

(2.2) $\Delta A_f = \theta_f P_{f(-\omega)} + p_{Ef}\Delta E_f$

(2.3) $\Delta L_f = p\Delta K - \Delta A_f$

(2.4) $P_f = P_{Gf} - i_L L_f$

where P_{Gf} is the amount of total profits (of the business sector) gross of bank interests, p is the price of the homogeneous output (including capital goods), ΔK is the current real investment in capital goods, ΔA_f is the amount of internal funds, θ_f is the percentage of retained earnings, P_f is the amount of total net profits, $\omega \geq 0$ measures the (possible) time-lag between investment and profits[7], p_{Ef} is the current unit price of equities, ΔE_f is the quantity of new equities issued by firms, ΔL_f is the current borrowing of firms and i_L is the overall rate of interest (including all other charges imposed by banks) payable to banks[8].

Equation (2.1) reproduces the macroeconomic equation of profit of Kalecki (1971) in a closed economy without government sector, once we have assumed that households save nothing except their capital incomes (equal to the amount of that portion of firms' profits that are distributed as dividends)[9]. Equation (2.2) shows that the internal funds (which the non-financial business sector has available for it to fund the investment) are the sum of retained net

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[4] The definition is drawn from Dos Santos 2005.

[5] See, for example, Lavoie 1986-87. A more recent work which uses the product of the leverage ratio and the mismatching ratio as a better proxy for indicating the degree of financial vulnerability is that of Passarella 2010.

[6] As Toporowski has effectively argued, the point is that 'even if rising investment entails rising indebtness, it also entails rising liquidity and bank deposits held by companies … with the asset side [of firms' balance sheets] becoming more, not less, liquid as debt-financed investment proceeds' (Toporowski 2008: 734).

[7] As has bee argued, the very existence of this delay could be considered as one of the most controversial hidden hypotheses that sustains Minsky's theory (see Passarella 2010, 2011). The point is that, at the macroeconomic level, this assumption can be justified on the basis of the deferred spending out of capital income on consumption. In the presence of a positive time-lag between profits and capitalists' (here shareholders') consumption, 'it is possible, as an approximation, to say that profits follow investment with a time-lag' (Sordi 1986: 8; derived from Kalecki 1971). However, except for this case, the presence of a time-lag between investment and profits must be regarded as a mere microeconomic hypothesis, and such a hypothesis cannot, of course, be immediately extended to the whole business sector.

[8] Notice that if we assume that firms pay off their debt at the end of each period, then current interest payable to banks is: $i_{L(t)}L_{f(t)} = i_{L(t)}\Delta L_f$, where $L_{f(t)}$ is the debt of firms at time t.

[9] This restrictive simplifying hypothesis will be relaxed in the following sections. Notice also that firms' investment decisions, in turn, respond to the change in the level of activity, and hence in the expected level of demand, according to the 'accelerator' principle. On this point, see Minsky (1959), Minsky and Ferri (1992) and Palley (2009). For the sake of simplicity, we will disregard this aspect hereafter.

profits and the amount of (new) equities issued by firms[10]. Equation (2.3) shows that firms' external funds (i.e. bank loans) must allow firms to fund the purchase of capital goods which cannot be financed adequately from internal resources alone. Finally, equation (2.4) shows that total net profits gained by the corporate sector are the difference between total gross profits and total interest-payments on bank loans. In this respect, we assume that bank loans are negotiated at the beginning of the period and paid back (together with the interest charged on those loans) at the end of the same period. Notice also that, for Minsky, the interest rate on bank loans is an increasing function of the debt-financed investment, because of the 'lender's risk' borne by the banks. This risk – which is embedded in the cost of borrowing – affects net profits and hence affects the level of investment that is undertaken by each firm. However, for the sake of simplicity, we will disregard this aspect hereafter.

At a first approximation, we have proposed to label as the 'pure Minskian hypothesis' (see Passarella 2011) the case where the amount of new equities is negligible ($\Delta E_f = 0$) and where there is a positive time-lag – for instance, one-period lag ($\omega = 1$) – between profits and investment[11]. This means that the internal funds that are available at the beginning of a given period are equal to the net money profits which have been 'accumulated' at the end of the previous period. Against this 'Classical-Ricardian' context, we can solve the system by the amount of external funds:

$$(2.5)\quad \Delta L_f = p\Delta K - \theta_f \left(p_{(-1)} K_{(-1)} - i_{L(-1)} L_{f(-1)} \right)$$

Then, substituting (2.2) and (2.5) into the equation of the marginal leverage ratio (i.e. the marginal debt-to-investment ratio), one obtains:

$$(2.5')\quad \lambda_f = 1 - \theta_f \left(1 - i_{L(-1)}\lambda_{f(-1)} \right)(1+g)^{-1} \qquad \left(\text{with: } 0 \le \lambda_f \le 1, \text{ for } g \ge 0 \right)$$

where g stands for the rate of growth of the total investment in capital goods[12] and $\lambda_{f(-1)}$ is the past leverage ratio.

Equation (2.5′) shows that the leverage ratio for the business sector depends positively on the growth rate of investment, g, on the past rate of interest on bank loans, $i_{L(-1)}$, and on the past leverage ratio, $\lambda_{f(-1)}$, whereas it depends negatively on the share of profits that are retained, θ_f. More precisely, the leverage ratio achieves its maximum value (namely, $\lambda_f = 1$) when there are no retained profits ($\theta_f = 0$). By contrast, if there is a non-negative rate of growth of investment, then the leverage ratio achieves its minimum value (namely, $\lambda_f = 0$) when investment stays constant ($g = 0$) and when profits are always entirely retained (whence $\theta_f = 1$ and $\lambda_{f(-1)} = 0$). In more intuitive terms, we can assert that the marginal leverage ratio increases whenever debt-financed investment, pushed by profit expectations, grows at an *accelerating rate* (namely, whenever g grows)[13], given both the rate of interest and the share of retained profits. It should be clear, then, that Minsky's hypothesis of a growing leverage ratio (on the investment of the whole corporate sector) cannot be the foundation of a *general* theory of the business cycle. This hypothesis can only describe the particular case of a *debt-financed investment-led boom*, given some restrictive (and disputed) hypotheses. The FIH – interpreted as the idea that 'euphoric' profit expectations eventually lead to growing leveraged aggregate investment – can be regarded either as a *consistent but not general theory* or as a

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[10] For the moment, the question of *where* the funds that are required to purchase these shares come from is left aside. Notice, however, that if one assumes that wage-earners are the only purchasing sector and also assumes that they do not hold either cash balances or other financial assets, then: $p_{Ef}\Delta E_f = S_h = (1 - \theta_f)P_f$ and, hence, in the absence of any delay, we obtain: $\Delta A_f = P_f$.

[11] For the sake of simplicity, we assume also that households' savings are held in the form of non-interest-bearing deposits.

[12] Notice that Minsky hypothesizes that this rate (which we assume to be exogenous) is an increasing function of firms' long-run profit expectations and a decreasing function of the perceived risk on investment (the 'borrower's risk'), given the conditions of production of capital goods.

[13] Or, more generally, when debt-financed investment grows more quickly than the amount of internal funds. This point, clearly highlighted by Corbisiero (1998) and then re-invigorated by Passarella (2010), had been previously (partially) acknowledged also by Lavoie when he asserted that 'an increase in the growth rate of capital requires […] a larger leverage ratio [and] corresponds precisely to a *boom* situation' (Lavoie 1986-87: 261).

general but not macro-consistent insight[14].

3. Basic assumptions and the accounting framework

In our opinion, Minsky was aware of the fact that his hypothesis of a growing leverage ratio (during the up-swing) cannot be the *only* foundation of a general theory of the financial fragility and the crisis. He thought, on the one hand, that financing investment by the issuing of new shares was, in any event, a de-stabilizing factor, because of the extreme volatility in the quotations on equity markets[15]; on the other hand, he was of the view that the interconnection of firms' balance-sheets and cash-flows – together with the practice of *stiffening* the temporal structure of liabilities during the ascending phase of the cycle – were enough to explain the reason why the economic system becomes more and more fragile (even in the presence of stable or quite low aggregate leverage ratios)[16]. Notice also that, during the phases of high economic growth, fusion, mergers and takeovers, insofar as they are financed by debt, determine an increase in the global leverage ratio (see Passarella 2010: 80).

Nonetheless, as some authors have emphasized, during the last few decades (the years of the so-called 'Great Moderation'), not only has total debt for the non-financial businesses *not* increased, but also inflation in the money-values of capital-assets has seemed to allow 'industrial' firms to finance their activity by means of share-issues. Paradoxically, this could have effects that are stabilizing (and not destabilizing, as Minsky would have expected) on firms' balance-sheets (see Toporowski 2000, 2010; Bellofiore and Halevi 2009, 2010; Bellofiore, Halevi and Passarella 2010). Furthermore, the emergence of 'wealth effects' linked to the possession of assets whose market-prices were increasing more and more has allowed U.S. households to support both the economy of the U.S. and the rest of the world economy by means of a constant flow of imports from Europe and Asia. The reason is that this inflation process has 'uncoupled' the dynamics of consumption from the dynamics of labour incomes. Consequently, the leverage ratio for non-financial businesses could remain quite stable, just as the debt ratios of households and financial businesses (namely, pension funds, insurance companies, hedge funds, private-equity funds and investment banks) were increasing more and more. These are all factors that we need to consider explicitly in our model.

As has been recently argued, models having reference to the formal Minskian literature 'can be phrased as special cases (or "closures") of a particular stock-flow consistent accounting framework' (Dos Santos 2005: 711)[17]. Hence, in the next two sections, the question of the financial resilience of a monetary economy of production will be developed within a stock-flow consistent social accounting structure where three sectors are explicitly considered: (i) households (or wage-earners), which sell their labour-power to firms in return for a money-wage and purchase consumer goods and financial assets (i.e. deposits and equities); (ii) 'non-financial' firms, which produce a single homogeneous output by means of labour and use the same output-good as an input; (iii) a macro-sector including a central bank and commercial banks (which lend credit-money to both the non-financial business sector and the household sector) *plus* other non-bank financial operators (who create 'quasi-money' or

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[14] In formal terms, what we have labelled 'the pure Minskian hypothesis' (Passarella 2011) is the set of the following implicit restrictive assumptions: (i) investment is financed by loans and by retained earnings, but not by shares ($\Delta E_f = 0$); (ii) there is a positive time-lag ($\omega > 0$) between profits and investment, with the supposition that investment in capital goods grows at an accelerating rate ($g > 0$, $dg/dt > 0$); (iii) the share of retained profits, θ_f, is decreasing or quite stable (namely, 'ratchet effects' are nil or are of a low order). An auxiliary hypothesis is that the effective interest rate on loans made by banks tends to increase during the upswing ($di_L / dt > 0$).

[15] This could be one of the reasons why he considered the new shares as only 'one class of outside funds' (Minsky 1975: 107; quoted in Lavoie 1986-1987: 260).

[16] Notice that, insofar as one assumes this point of view, the criticism that the 'fallacy of composition' has been perpetrated in Minsky's theory can be avoided: the fact that the aggregate leverage ratio does not grow does not automatically entail that the system as a whole is a 'hedge' economy, but only that the aggregate leverage is not a good indicator of financial 'unsoundness'. Indeed, *individual* financial fragility could, in any case, transmit from speculative units to hedge ones. On this point, see also Toporowski 2008.

[17] Although, in principle, it should be valid for any consistent model, the definition 'stock-flow consistent' refers to a specific set of Post-Keynesian simulation models mainly developed by Wynne Godley (see Godley 1996, 1999a, 1999b; Lavoie and Godley 2001-02; Godley and Lavoie 2007a, 2007b). These models are usually structured in three steps: '(1) do the (SFC) accounting; (2) establish the relevant behavioral relationships; and (3) perform "comparative dynamics" exercises' (Dos Santos 2005: 713). The present article confines itself to developing step (1) and, in part, step (2). On problems and limits of the current crop of stock-flow consistent models, see Michell 2010.

'derivatives'). Both the government and foreign sector can be ignored at this stage of our analysis.

More precisely, we will adopt an accounting structure (which represents the analytical 'skeleton' of the circuit model) where all interest rates and rates of return (on bank loans, i_L, on bank deposits, i_D, and so on) are set at a level that remains fixed during a given accounting period and the corresponding interest-payments and returns are paid at the end of the same period. Furthermore, it is assumed that: (i) households hold financial assets (bank deposits and equities), but do not purchase directly 'capital' goods; (ii) non-financial firms not only purchase real assets and issue equities, but can also decide to hold financial assets; (iii) banks and intermediaries issue financial assets (i.e. newly issued equities which are bought by households and newly-issued 'derivatives' which are bought by firms) and hold a percentage of non-financial businesses' capital stock. Finally, following both Minsky (1986) and other Post-Keynesians (see, for instance, Dos Santos 2006), we reject the traditional distinction among commercial banks, on the one hand, and investment banks *plus* other non-bank financial intermediaries, on the other hand, by including all these actors in the same sector – that is to say, the sector labelled 'Banks and NBFI' (where the acronym 'NBFI' stands for 'Non-Banking Financial Intermediaries')[18]. Notice that this allows us to consider the deep changes which have occurred (especially) in the U.S. banking system during the last twenty years. However, unlike Dos Santos, we assume here that households are able to obtain bank loans in order to finance consumption, even beyond the limit of their disposable income[19]. More specifically, we will assume that the amount of bank loans received by households is an increasing function of their wealth and hence of the inflation in the stock market. The reason is that in the last few decades, Anglo-Saxon households have been embedded in the frenzy of financial markets by virtue of their holdings of shares, of their 'stakes' in supplementary pensions, and so on. This process has allowed households to borrow (also) on the basis of the value of their own financial (and real-estate) assets.

Previous assumptions are summarized in a consistent set of sectoral balance-sheets where every financial asset has a counterpart liability, and the budget constraints of each sector describe how the balance between flows of expenditure, factor income and transfers generate counterpart changes in the stocks of assets and liabilities (see Lavoie and Godley 2001-02)[20]. More precisely, TABLE 1 presents the nominal balance-sheet matrix of a 'pure credit' economy and TABLE 2 is the corresponding transaction-flow matrix. For instance, row 2 of TABLE 1 shows that bank credit can be granted to both firms (which need it in order to finance investment in capital goods, but also to pay a wage-bill to workers) and households (which use it in order to finance their extra-consumption); whereas row 4 of TABLE 2 shows the flow of interest-payments going from private sector to banking sector. Furthermore, TABLE 3 shows the uses and sources of funds – that is to say, shows the *monetary budget constraint* faced by each economic sector. More precisely, TABLE 3 demonstrates 'how the sectoral balance sheets are modified by current flows' (Dos Santos 2005: 719). Notice that loans borrowed by firms are defined in 'residual' and 'revolving' terms (namely, as the external resources that firms need to fund non-self-financed investment in new capital goods and/or current production), whereas bank lending to households is of a different 'nature', since it entails an additional and (potentially) lasting indebtness. The very ratio of households' borrowing to their net worth is an indicator of their financial fragility. Finally, notice that the difference between row 9 in TABLE 2 and row 6 in TABLE 3 must be zero, since 'every flow comes from somewhere and goes somewhere' (Godley 1999b: 394).

4. The budget-constraint of firms and the leverage ratio

Let us examine how the leverage ratio on the investment of the non-financial business sector is affected both by the autonomous consumption of households and by inflation in the value of

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[18] However, we can keep on assuming that only banks are able to create credit-money, whereas the other kinds of financial units can only create 'quasi-money' (i.e. derivatives and other financial instruments).

[19] On this point, see also Palley (1994) that emphasizes the role of consumer debt within a Minskian context.

[20] In a sense, the SFC modelling is the best way to develop the Minskian notion of the 'firm' as a balance sheet of assets and liabilities (in a world marked by radical uncertainty), as opposed to the traditional notion of the firm as a (completely rational and foresighted) individual agent who 'merely' combines the factors of production.

capital assets – two of the main features of 'Money-Manager Capitalism'. Total net profits for the corporate sector, considered as a whole, can be derived from the third column of TABLE 2:

$$(4.1) \quad P_f = C + p\Delta K - W - i_{L(-1)}L_{f(-1)} + i_{B(-1)}B_{(-1)}$$

where B is the amount of generic 'bank bonds' and i_B is their rate of return[21].

Notice that the aggregate consumption is equal to households' total income (including financial gains, but net of interest payable to the banks) *plus* consumer credit (namely, bank loans granted to households), *minus* households' savings, that is:

$$(4.2) \quad C = W + \left(F_{fh} + F_b + i_{D(-1)}D_{h(-1)} - i_{L(-1)}L_{h(-1)} \right) + L_{h(-1)} - S_h$$

where F_{fh} is the amount of dividends paid out by non-financial firms to households, F_b is the amount of dividends paid by banks and NBFI, D_h is the amount of deposits held by households, L_h is their amount of loans[22], and S_h is their current saving.

If, for the sake of simplicity, we assume that the rate of interest on both deposits and bank bonds is negligible ($i_D = i_B = 0$), then, substituting (4.2) into (4.1), we obtain:

$$(4.1') \quad P_f = p\Delta K + \hat{C}_h - i_{L(-1)}L_{f(-1)} \qquad \left(\text{with: } \hat{C}_h = C - W = F_{fh} + F_b + L_{h(-1)} - i_{L(-1)}L_{h(-1)} - S_h \right)$$

where $\hat{C}_h$ is the (positive or negative) gap between households' consumption and the money wage-bill paid by firms.

On the other hand, additional internal funds that are available to finance firms' investment-expenditures related to each period can still be calculated as the sum of retained profits (F_{uf}) and the value of new shares (see TABLE 3, second column, row 4 and 5) – that is:

$$(4.3) \quad \Delta A_f = F_{uf} + p_{Ef}\Delta E_f = \theta_f P_f + p_{Ef}\Delta E_f$$

If, in the spirit of Minsky, one assumes that firms need bank credit in order to purchase (the residual part of) capital goods, then the marginal external funds that the corporate sector as a whole needs in order to realize planned investment are:

$$(4.4) \quad \Delta L_f = p\Delta K - \Delta A_f$$

Substituting the identity (4.1') into (4.3), and then this latter into (4.4), we obtain the amount of marginal external funds (namely, new bank loans) that the non-financial business sector needs:

$$(4.5) \quad \Delta L_f = \underbrace{p\Delta K}_{[iii]} - \underbrace{\theta_f \left(p\Delta K + \hat{C}_h - i_{L(-1)}L_{f(-1)} \right)}_{[i]} - \underbrace{p_{Ef}\Delta E_f}_{[ii]}$$

This latter is none other than the Kaldorian budget-constraint of firms (see Kaldor 1966), that shows that investment 'must be financed by some combination of retained earnings [i], sale of new equities [ii], and additional borrowing from banks [iii]' (Lavoie and Godley 2001-02:

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[21] We will come back to the role and the meaning of the 'bank bonds' during the next sections. Notice that, for the business sector considered as a whole, the amount of loans employed to fund investment-expenditure entails an equivalent amount of profits (obtained by firms producing capital goods). If we assume that these profits take the form of bank deposits, the net cost of borrowing (for investment) is equal to: $L_{fk}(i_L - i_D)$, where i_D is the rate of return on deposits held by firms. Consequently, interest-payments are 'proportional to the margin between the loan and the deposit rates of interest, rather than the absolute value of the loan rate of interest, as is usually assumed' (Michell 2010: 15).

[22] We will assume that bank loans to households are equal to a percentage of their net worth (i.e. the current value of their stock of assets, including capital gains).

$283)^{23}$. Thus, the marginal leverage ratio (calculated as the marginal debt-to-investment ratio) of the corporate sector is:

$$(4.6) \quad \lambda_f = \left[1 - \theta_f\left(1 + \frac{\hat{c}_h u}{v}\right) - q e_f\right]\left(1 - \theta_f i_L\right)^{-1}$$

where $\hat{c}_h = (\hat{C}_h / pX)$ is the share of households' 'autonomous' consumption in national income, $v = (\Delta K / X_C)$ is the marginal technological capital-capacity ratio, $u = (X/X_C)$ is the rate of utilization of productive capacity, $q = (p_{Ef} / p)$ is the well-known Tobin ratio[24], and $e_f = (\Delta E_f / \Delta K)$ is the quantity of new shares per unit of real investment. Hence, given u and v, the leverage ratio on investment depends positively on the interest rate on bank loans, i_L, whereas it depends negatively not only on the share of retained profits, θ_f, but also on the share of equity-financed investment (i.e. the product $q e_f$), and on the percentage $\hat{c}_h$. This latter measures the (possible) excess of household consumption over wage-bill per unit of national income.

More generally, equation (4.6) shows that, *ceteris paribus*, the higher the autonomous consumption and the higher the possibility to fund the purchase of capital assets by resorting to the financial market (i.e. by issuing new equities), the lower will be the investment leverage ratio. Furthermore, it is easy to verify that the non-financial business leverage ratio is affected not only by the decisions of 'industrial' firms (considered as a whole), but also by the behaviour of the other economic units in the economy. All these latter, somehow or other, affect the 'soundness' of non-financial business sector balance-sheets[25]. For instance, an increase in the share of autonomous consumption of households, insofar as it increases the net profit of non-financial firms, allows these latter to reduce their need for external funds. Analogously, inflation in equity-prices allows firms to replace bank borrowing with 'cheaper' long-term capital, and hence allows them to reduce the investment leverage ratio[26]. Finally, notice that, in the presence of 'capital-asset inflation', banks could be forced to shift towards consumer-credit and change their nature into fee-related businesses, insofar as they no longer have the non-financial business sector as their main category of customer. This process could be not only the result of spontaneous euphoria, but also the outcome of a specifically expansive monetary policy pursued by the central bank[27].

5. The monetary circuit in 'Money-Manager Capitalism'

We know that a distinctive feature of a growth-oriented productive system – such as the one analyzed by Keynes and, in the wake of him, further analyzed by Minsky (until the 1980s at least) – is the major role of banks in the financing of production (and investment in capital goods), where security market plays a passive role in channeling household saving towards production firms. However, as Mario Seccareccia has asserted in a recent (unpublished) work,

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[23] We regard bank debt as the residual term to close the gap between investment and equity finance *plus* retained earnings (see Lavoie and Godley 2001-02; see also Dos Santos and Zezza 2008).

[24] As is well known, this ratio measures the inflation in the stock market in comparison with the 'capital' goods market, and hence the profitability of the investment in capital goods (see Tobin 1971).

[25] More precisely, besides firms' sales-revenues (which are affected by $\hat{c}_h$), households directly affect both the amount of new equities issued by the non-financial business sector (ΔE_{fh}) and the market value of stocks (p_{Ef}), as well as indirectly affect the share of retained earnings (θ_f). This happens, for instance, insofar as managers are driven to maximize the shareholder-value of their firms. Moreover, commercial banks and NBFI directly affect the overall rate of interest on loans (i_L), as well as ΔE_{fb} and p_{Ef}, and indirectly affect θ_f. The central bank, in turn, can indirectly affect the effective rate of interest paid on bank loans (i_L) and, consequently, firms' dividend policy (θ_f), as well as prices on the stock market (p_{Ef} and ΔE_f), and so on.

[26] One might be tempted to think that capital-asset inflation cannot induce *macroeconomic* changes but can only produce *microeconomic* effects, since capital gains realized by some units (households or firms) offset capital losses suffered by other units. However, this is not true whenever: (i) there is asymmetric information, so that units realizing capital gains react more quickly than units suffering capital losses; (ii) capital gains and losses entail a redistribution of income among different sectors (for instance, from households to firms); (iii) bank loans are linked to the value of assets, allowing units to realize capital gains *immediately*.

[27] In the U.S. this has become a self-feeding process: the change in the banking model has concurred to produce the inflation in the prices of the capital-assets which, in turn, has concurred to modify the banks' customer profile.

since the end of the 1970s financial markets have taken on a central role in Western economies. In fact, 'growing profits and retained earnings associated with a relatively weak business investment have slowly transformed (or "rentierized") the non-financial business sector itself into a net lender' (Seccareccia 2010: 4) that seeks higher financial returns on its internal funds. At the same time, households' saving has fallen drastically: since the 1990s, the household sector in many Anglo-Saxon countries has increasingly become a net borrower, rather than a net lender (that has been long considered as households' 'traditional' role). On the money-supply side, banks have become 'financial conglomerates' that seek to maximize their fees and commissions by issuing and managing assets in off-balance-sheet affiliate structures. This has produced a change with respect to the *standard* monetary circuit, where the banking system is assumed to finance the activity of the business sector (current production and, at a lower level of abstraction, investment plans). During the so called 'Money Manager Capitalism', the traditional link between non-financial firms and banks 'has been largely severed […] and it is the dynamics of the banks/financial markets axis […] which has taken center stage' (Seccareccia 2010: 6).

In FIG. 1 (at the end of the paper) the simplest version of the monetary circuit is represented by the sequence (1)-(5). For the sake of simplicity, we assume that households use their incomes (i.e. both labour-incomes and capital-incomes) for buying commodities and/or securities issued by corporate sector, with any increase in their holdings of bank deposits being excluded. In short, within a monetary economy of production, the usual (i.e. *logical*) sequence is: (1) banks grant credit to the non-financial firms, enabling them to start the process of production (as well as to finance each single investment plan – but notice that the purchase of capital-goods is an exchange 'internal' to the firms sector); (2) firms use the initial finance to pay a money wage-bill to households in return for the labour-power that those firms need; (3.a,b) once the production process is over, households spend a percentage of their income in the commodity market and hold the rest in the form of financial assets (equities issued by firms, in our simplified model); (4) the liquidity (notably credit-money) that is spent in both the equity market and the commodity market comes back to the non-financial business sector; (5) insofar as the non-financial business sector gets back its monetary advances, it is able to repay (the 'principal' of) its bank debt[28].

As has already been mentioned, the process of financialization has involved a remarkable change in the *historical* structure of the monetary circuit. The strategic position of the banking system and the financial market in the new capitalism is depicted in FIG. 2 (at the end of the paper). On the one hand, the creation of credit-money has been increasingly sustained by households' indebtness, L_h, rather than by the demand for finance of the business sector (see arrow (1) in FIG. 2). On the other hand, households' indebtness has fuelled the transactions on the financial markets (both on the equity market and on the market for 'bank bonds', within our simplified model) because of the demand arising from the growing saving (i.e. money profits) of the non-financial corporate sector (see arrow (3) in FIG. 2)[29]. In short, the sequence which marks the 'new' monetary circuit is virtually opened by the decision of banks to grant credit to households on the basis of their wealth (i.e. the stock of financial assets hoarded by households) (arrow (1)). Households spend both this credit-money and (a proportion of) their income in the commodity market (arrow (2)). Insofar as non-financial firms are able to fund their desired real investment plans, they can assign a percentage of the retained earnings to both the equity market and the market of derivatives. In the former firms can repurchase a proportion of their own shares – either from other firms or from households and banks (arrows (4.b)-(4.c))[30]. In the latter banks and NBFI place derivatives (for instance, collateralized debt obligations or CDO) which are indirectly 'monetized' by non-financial firms' saving (arrows

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[28] For the moment, the question of the repayment of the interest (in monetary terms) on bank loans is left aside. Notice also that if households do not hoard deposits, then the sums paid by firms as dividends on shares flow back to the firm sector. For a complete analytical description of the monetary circuit, see Graziani 2003.

[29] Notice that bank loans which fund households' 'autonomous' consumption turn into an equivalent amount of bank deposits received by the non-financial firm sector. This amount of deposits (in excess of the funds needed to undertake the production and the investment) gives rise to a process of 'over-capitalization' and allows firms to invest in financial assets (see Toporowski 2008; Michell 2010).

[30] The reasons why the single firm would decide to buy back its shares are: (i) to sustain the price of equities; (ii) to maintain a given level of its own internal liquidity; (iii) to realize capital gains; (iv) to implement a 'distributional' mechanism.

(3)-(4.a))[31]. This happens because, in the presence of rising prices and returns in the financial markets, 'it may become profitable for overcapitalised firms to allocate excess capital to financial assets in preference to engaging in real investment' (Michell 2010: 20). The final outcome is that non-financial firms assume the role of net lender, whereas households become net borrowers.

6. The effect of 'capital-asset inflation' on non-financial firms' profits

The paradoxical form of the new monetary circuit, which is depicted in FIG. 2, can be analyzed in a SFC manner with the assistance of TABLE 1, 2 and 3[32]. In this regard, it is assumed that firms express two different kinds of demand for bank loans: (i) the *stricto sensu* 'initial finance' which business sector *as a whole* needs to fund current production, L_{fw}, and which covers the wage-bill (W, the cost of production); (ii) a further demand for credit, allowing *each single firm* to fund that part of investment which cannot be financed by internal resources, L_{fk}[33]. The amount of the initial loan demanded (and obtained) by firms is therefore:

(6.1) $L_f^i = L_{fw} + L_{fk} = W + \lambda p \Delta K$

where λ is the (residual) share of investment funded by loans – namely, the leverage ratio of the investment.

At the end of the process of production households can purchase consumer goods and/or save a share of their income, thereby increasing their stock of financial assets. If we assume that households can also borrow credit-money in order to fund their extra consumption (i.e. in order to achieve the 'desired' level of consumption), then their 'augmented' budget constraint is:

(6.2) $W + F_{fh} + F_b + i_{D(-1)} D_{h(-1)} + \Delta L_h - i_{L(-1)} L_{h(-1)} = C + \Delta V_h$

For the sake of simplicity, let us assume that: (i) bank loans to households can be expressed as a proportion, ρ, of the value of households' stocks of assets (including capital gains, see the seventh row of Table 3); (ii) the interest rate on bank deposits is negligible; (iii) banks and NBFI do not face any cost of production, and use entirely any level of their retained earnings to purchase equities issued by non-financial firms; (iv) banks and NBFI do not issue *new* shares; (v) households divide their savings between firms' equities and bank deposits only. Given these premises, we have:

(6.3) $\Delta L_h = \rho \left(V_{h(-1)} + \Delta p_{Ef} E_{fh(-1)} \right)$

(6.4) $\Delta V_h = \Delta D_h + p_{Ef} \Delta E_{fh}$

(6.5) $p_{Ef} \Delta E_{fb} = \theta_b \left(i_{L(-1)} L_{(-1)} + F_{fb} - i_{B(-1)} B_{(-1)} \right)$

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[31] For instance, with the intermediation of pension and investment funds. For the sake of simplicity, we will assume both in TAB. 1, 2, 3 and in the following equations that firms subscribe directly non-specific 'bank bonds'.

[32] Among the works suggesting an integration between SFC modeling and the theory of monetary circuit, see Godley 1999b, Godley and Lavoie 2007a, Lavoie 2004, Lavoie 2006, Zezza 2004, Keen 2009 and Pilkington 2009. For an opposite opinion that, on the whole, is critical of the monetary circuit approach (which is regarded as a mere 'pedagogical' instrument), see Cavalieri 2003.

[33] According to Graziani, firms 'need finance in order to set up and carry on any kind of production'. Hence, a bank loan 'must cover the cost of total production and is not confined to financing specifically the production of capital goods' (Graziani 2003: 69). However, Graziani himself admits that, insofar as we abandon the conception of the firm sector as one that is fully integrated and we consider a multiplicity of units, 'in order to buy finished [capital] goods, firms need finance as much they need finance for paying the wage bill in the labour market' (Graziani 2003: 99). Finally, notice that L_{fw} must be borrowed at the beginning of the period, whereas one should assume that L_{fk} is demanded when production has been completed. We will leave aside this distinction hereafter, and we will keep on assuming that the whole loan is borrowed at the beginning of the period.

$$(6.6) \quad \Delta E_{fN} = \Delta E_f \left(1 - \sigma\right) \qquad\qquad\qquad \left(\text{with: } \sigma \geq 0\right)$$

$$(6.7) \quad p_{Ef} \Delta E_{fN} = p_{Ef} \Delta E_{fh} + p_{Ef} \Delta E_{fb} = \left(\Delta V_h - \Delta D_h\right) + \theta_b \left(i_{L(-1)} \Delta L_{(-1)} + F_{fb} - i_{B(-1)} B_{(-1)}\right)$$

where θ_b is the percentage of banks' retained earnings, ΔE_{fN} is the quantity of new shares net of any stock buyback and σ is the firm-sector's ratio of stock buyback to current issues.

Equation (6.7) shows that the demand for firms' equities arises from households' saving (although in decreasing terms as the process of financialization takes off) and from banks' net receipts. Notice that if firms decide to use their retained earnings in order to repurchase part of their capital stock from households, then the current net change that is described by the left-hand term of (6.6) may become negative – this will be so if $\sigma \geq 1$. In this case, households and banks can *spend* the resulting additional flow of credit-money only for consumption. Consequently, even in the presence of share re-purchase, there is only one circumstance which can produce a net loss of liquidity for firms as a whole: the decision of the other sectors to save a percentage of their income in the form of cash balances (i.e. bank deposits, in this simplified model). Finally, if we divide (6.7) by ΔE_{fN} (and then substitute, using (6.6), for ΔE_{fN}), we obtain:

$$(6.7') \quad p_{Ef} = \frac{\left(\Delta V_h - \Delta D_h\right) + \theta_b \left(i_{L(-1)} L_{(-1)} + F_{fb} - i_{B(-1)} B_{(-1)}\right)}{\Delta E_f \left(1 - \sigma\right)}$$

which is a positive function both of the banks' retained earnings and the buy-back of firms' shares[34].

In order to analyze – still within a SFC basic model of monetary circuit – the effect of inflation in the prices of capital assets on the behaviour of the non-financial business sector, we have to come back to the macroeconomic equation of profits. From the second column of TABLE 2 we have:

$$(6.8) \quad P_f = p\Delta K + C - W - i_{L(-1)} L_{f(-1)} + i_{B(-1)} B_{(-1)}$$

which reproduces the identity $(4.1')$, where $(C - W) = \hat{C}_h$ and $i_B > 0$. Notice that the rate of return on bank bonds is directly linked to the rate of interest on households' debt. More precisely, banks and NBFIs issue bonds which are subscribed by firms which are looking for higher returns on their capital. This process allows banks and NBFIs to 'monetize' a percentage (call it α) of their credit with households without waiting until the maturity-date. However, in order to do so, banks and NBFIs have to pay interest on the issued bonds, whose rate of return must be higher than the rate on bank deposits and lower than (or equal to) the rate on bank loans to households ($i_D < i_B \leq i_L$).

Besides, from (6.2) and $(6.7')$ we obtain:

$$(6.9) \quad C = W + F_{fh} + F_b + \left(1 - i_L\right) \Delta L_h - \Delta V_h$$

$$(6.10) \quad p_{Ef} \Delta E_{fN} = \theta_b \left(i_{L(-1)} L_{(-1)} + F_{fb} - i_{B(-1)} B_{(-1)}\right) + \left(\Delta V_h - \Delta D_h\right)$$

Now, let us consider two different cases. *Case* 1. We assume initially that: (i) the investment in capital goods is entirely financed by the issuing of new equities (so that $p\Delta K = p_{Ef} \Delta E_{fN}$); (ii) both firms and banks do not distribute dividends (so that $F_{fh} = F_{fb} = F_b = 0$ and $\theta_f = \theta_b = 1$)[35]; (iii) the rate of return on bank bonds is negligible ($i_B = 0$). Using (6.9) and (6.10) into (6.8), we get:

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[34] See footnote 30.

[35] Notice that, in this case, the reason for purchasing equities is the wish to realize capital gains.

(6.11) $P_f = \Delta L_h - \Delta D_h$

and hence:

(6.12) $\Delta L_h > \Delta D_h \Rightarrow P_f > 0$

Receipts from sales (made by firms as a whole) are enough to pay back what the firms have borrowed (i.e. principal *plus* interest) and to provide a positive net money profit, if the amount of bank credit to households is larger than the amount of deposits that households (decide to) hold. The conclusion is that non-financial firms (considered as a wholly integrated sector) realize money profits if households are *net debtors* with the banking sector (and, hence, firms are *net creditors*).

   Case 2. Let us suppose that: (i) the investment in real assets (capital goods) could be debt-financed; (ii) the rate of return on bank bonds is positive, allowing firms to realize financial profits. If we keep on assuming that neither firms nor banks distribute dividends, then the amount of money profits of the firm sector as a whole becomes:

(6.13) $P_f = \left(\Delta L_h + L_{fk} + i_{B(-1)} B_{(-1)} \right) - \Delta D_h$

and, remembering (6.3), we obtain:

(6.13′) $P_f = \rho \left(1 + \alpha i_{L(-1)} \right) \left(V_{h(-1)} + \Delta p_{Ef} E_{fh(-1)} \right) + \lambda_f \, p \Delta K - \Delta D_h$

where α is the percentage of the loans made (by banks) to households which have been turned into bank bonds (or 'securitized')[36]. In this second case, we see that the higher the level of investment in capital goods and the higher will be the net money profit gained by the firm sector. Notice, however, that the profitability of the non-financial firm sector is now positively affected also by both the level of the receipts from the 'investment' in financial assets (i.e. bank bonds, in this simplified model) and the wealth of households, including capital gains realized on the equity market. More precisely, the inflation in the price of equities has two positive effects: first, it increases the amount of consumer credit and hence sustains firms' profits from sales; second, the interest accruing to the debt of households is a financial gain for the business sector. Notice also that, since inflation in the price of capital assets allows firms to replace their borrowings (from the banks) by the equity financing, the 'capital-asset inflation' could reduce the monetary cost of such financing. Nonetheless, if we admit that banks spend all of their receipts, then interest-payments on loans are never a 'real' cost for the firm sector, because they flow back to it in the form of higher consumption and/or higher equity-financing. This is the reason why interests accruing on bank loans to firms do not appear in the equation (6.13′) [37].

7. Financialization, prices and the distribution of income

As is well known, 'circuitist' authors reject the neoclassical theory (both the early 'marginalist' one and its subsequent improvements) of prices, distribution and employment. In its stead, they follow a formulation which is very close to the Post-Keynesian approach developed by Nicholas Kaldor, Joan Robinson and – although with some differences – by

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[36] So that we have: $i_B B = \alpha i_L \Delta L_h$.

[37] Herein lies another possible difference with respect to the traditional monetary circuit approach. For Graziani (2003) while interest paid on securities is never a real cost to firms (apart from a possible 'income effect'), interest paid on bank loans represents a real subtraction from firms' profits. However, the adoption of a SFC approach allows us to show that banks can successfully compete with households in the 'commodity' market ($X_w = (1 - k)X$, where k is the share of 'capital' goods and X_w is the output of 'consumer' goods), whereas firms as a whole can, theoretically, always realize their own investment plans, given the scale of intended production. However, for the sake of simplicity, we will keep on assuming in the rest of the paper that banks use the entirety of they retained earnings to purchase equities.

Michał Kalecki (see Graziani 2003). The first step is to determine the equilibrium price level which results from the equality between the aggregate demand and the aggregate supply. This latter is autonomously set in real terms by the non-financial firm sector's decisions about the level and the composition of the production[38]. In algebraic terms, the total monetary value of the aggregate supply is:

$$(7.1) \quad AS = p\pi N$$

where p is the (unknown) price of a unit of output, π is the average output per worker and N is the employment level.

From the first column of TABLE 2 we can derive the aggregate demand for consumption of households within our simplified 'pure credit' closed economy. Adding the demand for investment of non-financial firms, we get:

$$(7.2) \quad AD = C + I = \left(W + F_{fh} + F_b + i_{D(-1)}D_{h(-1)} - i_{L(-1)}L_{h(-1)} + \Delta L_h - S_h \right) + p\Delta K$$

Notice, however, that: (i) the monetary wage-bill is the product of the (average) wage paid to each worker, w, and the level of employment, N; (ii) both households' financial incomes and households' saving can be regarded as a percentage of the wage-bill; (iii) the investment in capital goods is anything but a percentage, k, of the produced output[39]. Hence, the equation (7.2) can be re-written as:

$$(7.2') \quad AD = wN\left(1 + f_h + l_h - s_h\right) + pk\pi N$$

where f_h is the percentage of net financial incomes and l_h is the percentage of bank loans granted to households, both percentages being related to the wage-bill. As usual, s_h is the (both average and marginal) propensity of households to save.

As we have mentioned before, the equilibrium price-level is determined by the equality between demand and supply, which gives us[40]:

$$(7.3) \quad p = \frac{w}{\pi} \cdot \frac{1 + f_h + l_h - s_h}{1 - k}$$

The price of output depends on the unit cost of labour (the left-hand ratio) and on the profit margin of the non-financial business sector (embedded in the right-hand ratio)[41]. This latter, in turn, depends on: the average propensity of non-financial firms to invest, k; on the average propensity of households to save, s_h; and, finally, on the value of f_h and l_h. Notice that if, by chance, the propensity to invest of firms equals the 'overall' propensity to save of households ($k = s_h - f_h - l_h$), then the equilibrium price equals the unit cost of production (which, of course, implies that profits are absent). Nonetheless, this is a very casual event: no endogenous economic device is able to assure a zero-level for firms' profits within a circuit model.

Gross profits in real terms are equal to money gross profits ($P_{Gf} = p\Delta K + C - W + i_{B(-1)}B_{(-1)}$) divided by the price level. If, for the sake of simplicity, we assume that interests on bank

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[38] Observe that if one considers n firms (or sectors) producing n different goods (with $n \geq 2$), then the hypothesis that the supply is *given* in real terms becomes inconsistent with the hypothesis of the tendential uniformity of the profit rates (see Lunghini and Bianchi 2004; see also Brancaccio 2008). However, the adoption of a totally aggregated model, that has a single homogeneous good, a single price and a single rate of profit, allows us to disregard this problem (to a first approximation, at least).

[39] In fact, 'firms offer for sale the whole of the finished product. At the same time they enter the market as buyers having decided to buy the fraction [k] of aggregate product' (Graziani 2003: 101).

[40] It is possible to demonstrate that this method leads to results which are equivalent to the usual *cost-plus pricing*. Notice also that, unlike Graziani, we prefer to assume that the level of employment is determined by the amount of initial finance bargained by non-financial firms and banks, given the (average) wage per worker that is negotiated by firms and workers ($N = L_{fw}/w$). Obviously, one can also assume that the amount of initial finance, in turn, is linked to the expected aggregate demand.

[41] Notice that the rate of profit (gross of interests) is: $r = (1 + f_h + l_h - s_h)/(1 - k) - 1 = (f_h + l_h - s_h + k)/(1 - k)$.

bonds are negligible, then we obtain:

$$(7.4) \quad \frac{P_{Gf}}{p} = \frac{k + f_h + l_h - s_h}{1 + f_h + l_h - s_h} \pi N$$

As we would expect – on the basis of the well-known Kaleckian macroeconomic accountings – if consumption equals the wage-bill ($C = W \Rightarrow f_h + l_h - s_h = 0$), then real profit before the deduction of bank interest is equal to real investment ($P_{Gf}/p = k\pi N = \Delta K$), and so non-financial firms earn exactly what they have spent on investment in capital goods ($P_{Gf} = pk\pi N = p\Delta K$).

From the (6.13′) we can derive also net profits in real terms, which amount to:

$$(7.5) \quad \frac{P_f}{p} = \left[\frac{\rho\left(1 + \alpha i_{L(-1)}\right)\left(V_{h(-1)} + \Delta p_{Ef} E_{fh(-1)}\right) - \Delta D_h}{w\left(1 + f_h + l_h - s_h\right)} + \lambda_f k\pi N \right](1-k)\pi$$

Net profits of the non-financial firm sector depend on several factors, among which are the net worth of households (including capital gains on firms' shares) and the percentage of securitization. Notice, however, that the same possibility of realizing financial profits through the purchase of speculative assets (bank bonds, in this simplified model) could affect negatively the propensity of firms (as a whole) to invest in capital goods. More precisely, we can suppose that the greater the possibility of realizing interest on bank bonds, the lower is the benefit coming from the purchase (and hence the production) of capital goods. To the extent that this happens, the final effect on the total net money profit of the business sector is ambiguous, since the percentage α (which is a proxy of the degree of financialization) increases, but the scale of production (N, in this simplified model) could decrease, because of the smaller amount of investment.

As for the distribution of output between firms and households, it is set autonomously by the decisions of firms as a whole with regard to the level of production (N) and the composition (k) of output (given the labour productivity, π). This means that the purchasing power of households can be regarded as the residual term (or the *dependent variable*) to close the gap between the total output and the real profit realized by the firm sector. Finally, notice that, once the process of inflation in the prices of capital-assets has been started, this could come to cause a change in the profile of customers of banks and, hence, a quickening in the change of the banking system itself. Indeed, banks are driven to shift towards credit consumer and/or other financial activities, insofar as the non-financial business sector is able to borrow funds and/or realize profits in the financial markets. The same increase in the autonomous consumption of households is another factor which allows firms to increase their internal funds (in the form of retained profits) and to reduce their *non-speculative* demand for bank loans. The result is that banks as a whole face a trade-off: they can expand their business towards households and financial sectors only if they accept the risk of reducing their role in the financing of 'productive' investment plans of the production sector[42].

8. Final remarks

In this paper, we have tried to provide a simplified, but stock-flow consistent, re-interpretation of some of the most disputed aspects of Minsky's thought by cross-breeding his 'financial instability hypothesis' with inputs from the Theory of the Monetary Circuit and the current Post-Keynesian literature. The result is a new, although paradoxical, monetary-financial circuit model in which the creation of credit-money is sustained by households' debt, rather than by the demand by firms for finance (for both production and investment), and in which the same debt of households fuels the expansion of the financial market, by virtue of firms' growing saving (invested in financial assets). In short, the sequence which leads to financial fragility and to a crisis, within this simplified circuit model, can be split into two different

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[42] Notice that, if this is true, then an expansive monetary policy pursued by the central bank may have a 'crowding out'-effect on the banking activity.

phases. Initially, consumer credit and the (resulting) 'capital-asset inflation' have a positive effect on the financial structure of the business sector. We can assume that both factors are the result of households' attempt to keep a given 'desired' level of consumption – for instance, in spite of the (long-run) decrease in the wage-receipts[43]. Households can resort to bank loans on the basis of their stock of assets, and this requires the central bank to pursue an 'easy' monetary policy (initially, at least). In the course of this phase, firms are driven to use their (extra) profits in order to purchase financial assets. This very inflow of new funds stimulates the activity in the asset markets. In fact, this is what happened in the US during the 1990s and – although with some differences – during the up-swing of 2003-2007.

During the second phase of 'financialization', this latter shows its negative face. First, insofar as it becomes profitable for over-capitalized firms to allocate excess capital to financial assets in preference to engaging in 'productive' investment, this component of the demand decreases. Second, financialization can lead to a 'over-indebtness' of firms, because of the very firms' attempt to increase the rate of return on their own funds. Third, firms' buyback of shares comes to reduce the resilience of the business sector, because it increases the leverage ratio on investment[44]. At the same time, both the increase in the price of assets and the growing financial fragility of firms and households can lead to an increase in the *effective* rate of interest[45]. Eventually, all these factors can affect consumption and investment, therefore giving rise to the crisis. Finally, notice that the overall viability of the whole economic system depends on the possibility of the *private* sector (including both households and firms) maintaining an equilibrium in the ratio of the cash-outflows involved in bank debt to the cash-inflows derived from assets over time. A 'Minskian' condition that is intrinsically uneasy, because it is historically linked to the prevailing 'conventions' in the financial (and credit) markets.

References

Bellofiore R. and Halevi J. (2009) "A Minsky moment? The subprime crisis and the new capitalism", in C. Gnos and L.P. Rochon (eds.), *Credit, Money and Macroeconomic Policy. A Post-Keynesian Approach*, Cheltenham: Edward Elgar.

Bellofiore R. and Halevi J. (2010) "Magdoff-Sweezy and Minsky on the Real Subsumption of Labour to Finance", in D. Tavasci and J. Toporowski (eds.), *Minsky, Crisis and Development*, Basingstoke and New York: Palgrave Macmillan, pp. 77-89.

Bellofiore R., Halevi J. and Passarella M. (2010) "Minsky in the 'new' capitalism. The new clothes of the Financial Instability Hypothesis", in D. Papadimitriou and L.R. Wray (eds.), *The Elgar Companion to Hyman Minsky*, Northampton: Edward Elgar, pp. 84-99.

Bellofiore R. and Passarella M. (2009) "Finance and the realization problem in Rosa Luxemburg: a 'circuitist' reappraisal", in J.F. Ponsot and S. Rossi (eds.), *The Political Economy of Monetary Circuits: Tradition and Change in Post-Keynesian Economics*, Basingstoke & New York: Palgrave Macmillan, pp. 98-115.

Brancaccio E. (2008) "Solvency and labour effort in a monetary theory of production", *European Journal of Economic and Social Systems*, 21(2): 195-211.

Cavalieri D. (2003) "On the closure of the monetary circuit", working paper presented at the conference on *The Monetary Theory of Production* (in Honour of Augusto Graziani), Benevento, Italy, December 5-6 2003.

Corbisiero G. (1998) "La problematica della crescente fragilità nella 'ipotesi di instabilità finanziaria' da una

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[43] As for dividends distributed to households, notice that: (i) if households do not hoard deposits, then they can only flow back to the firm sector; (ii) dividends do not represent real additional purchasing power for households *as a whole*, since the composition of output is 'given'.

[44] A look at the Fig. 2 shows that, if the stock buyback is 'internal' to the non-financial firm sector, then households (as a whole) cannot draw from the financial markets the liquidity that they need to pay off their bank debt. However, they can easily keep on renewing their bank debt, as the price of their own financial assets keeps on increasing, because of the inflow of non-financial firms' saving (i.e. retained profits). The same goes for the firms' purchasing of financial assets (bank bonds) from banks and NBFI. By contrast, insofar as non-financial firms re-purchase their shares from households, these latter can pay off (part of) their bank debt, but at the price of 'de-accumulating' their stock of assets. Data seem to indicate that the two cases describe two different (subsequent) phases of the business cycle as well as describe the process of 'financialization' on the whole. In fact, on the one hand, the process of financialization of western economies (which started at the end of the 1970s and continued to take place during the 1980s) has been associated with a tendential fall in the proportion of (fixed) investment which is financed by new issues. On the other hand, the equities-to-investment ratio decreased during the upswings (mainly because of the stock-repurchase of the non-financial business sector) and increased after the crises, such as in the Wall Street crashes of 1987, 2000 and 2007 (see Ryoo 2010; see also Passarella 2011).

[45] As either the endogenous outcome of the pressure of demand for credit on a non-infinitely elastic supply (as claimed by Minsky) or the result of an autonomous decision – concerning the *target* rate of interest – taken by the central bank in order to hold inflation down (as claimed by 'horizontalist' authors).

prospettiva kaleckiana", in *Banca d'Italia*, Temi di discussione, Servizio Studi, No. 330.

Davidson P. (2008) "Is the current financial distress caused by the subprime mortgage crisis a Minsky moment? or is it the result of attempting to securitize illiquid non commercial loans?", *Journal of Post Keynesian Economics*, 30(4): 669-76.

De Antoni E. (2009) "Minsky, Keynes and financial instability: the recent subprime crisis", working paper presented at the *13th Conference of the Research Network Macroeconomics and Macroeconomic Policies*, Berlin, Germany, 30-31 October 2009 [then published on *International Journal of Political Economy*, 2010, 39(2): 10-25].

Dos Santos C. (2005) "A stock-flow general consistent framework for formal Minskian analyses of closed economies", *Journal of Post Keynesian Economics*, 27(4): 711-35.

Dos Santos C. (2006) "Keynesian theorizing during hard times: stock-flow consistent models as an unexplored 'frontier' of Keynesian Macroeconomics", *Cambridge Journal of Economics*, 30(4): 541-65.

Dos Santos C. and Zezza G. (2008) "A simplified, 'benchmark', stock-flow consistent Post-Keynesian growth model", *Metroeconomica*, 59(3): 441-478.

Ferri P. and Minsky H.P. (1992) "Market processes and thwarting systems", *Structural Change and Economic Dynamics*, 3(1): 79-91.

Godley W. (1996) "Money, finance, and national income determination: an integrated approach", *The Levy Economics Institute*, Working Paper No. 167.

Godley W. (1999a) "Seven Unsustainable Processes: Medium-Term Prospects and Policies for the United States and the World", *The Levy Economics Institute*, Strategic Analysis, January 1999 (revised October 2000).

Godley W. (1999b) "Money and credit in a Keynesian model of income determination", *Cambridge Journal of Economics*, 23(4): 393-411.

Godley W. and Lavoie M. (2007a) *Monetary economics: an integrated approach to credit, money, income production and wealth*, Basingstoke: Palgrave Macmillan.

Godley W. and Lavoie M. (2007b) "Fiscal Policy in a Stock-Flow Consistent (SFC) Model", *The Levy Economics Institute*, Working Paper No. 494.

Graziani A. (2003) *The Monetary Theory of Production*, Cambridge: Cambridge University Press.

Kaldor N. (1966) "Marginal productivity and the macro-economic theories of growth and distribution", *Review of Economic Studies*, 33(96): 309-319.

Kalecki M. (1971) *Selected Essays on the Dynamics of the Capitalist Economy, 1933-1970*, Cambridge: Cambridge University Press.

Keen S. (2009) "The dynamics of the monetary circuit", in J.F. Ponsot and S. Rossi (eds.), *The Political Economy of Monetary Circuits: Tradition and Change in Post-Keynesian Economics*, Basingstoke & New York: Palgrave Macmillan, pp. 161-187.

Kregel J.A. (1997) "Margins of safety and weight of the argument in generating financial fragility", *Journal of Economic Issues*, 31(2): 543-548.

Kregel J.A. (2008) "Minsky's cushion of safety. Systemic risk and the crisis in the U.S. subprime mortage market", *The Levy Economics Institute*, Public Policy Brief, 93a.

Lavoie M. (1986) "Minsky's law or the theorem of systemic financial fragility", *Studi Economici*, 29(2): 3-28.

Lavoie M. (1986-87) "Systemic financial fragility: a simplied view", *Journal of Post Keynesian Economics*, 9(2): 258-66.

Lavoie M. (2004) "Circuit and Coherent Stock-Flow Accounting", in R. Arena and N. Salvadori (eds.), *Money, Credit and the Role of the State. Essays in Honour of Augusto Graziani*, Aldershot: Ashgate, pp. 136-151.

Lavoie M. (2006) *Introduction to Post-Keynesian Economics*, Basingstoke: Palgrave Macmillan.

Lavoie M. and Godley W. (2001-02) "Kaleckian models of growth in a coherent stock-flow monetary framework: a Kaldorian view", *Journal of Post Keynesian Economics*, 24(2): 277-311.

Lavoie M. and Seccareccia M. (2001) "Minsky's financial fragility hypothesis: a missing macroeconomic link?", in R. Bellofiore and P. Ferri (eds.), *Financial Fragility and Investment in the Capitalist Economy: the Economic Legacy of Hyman Minsky*, Vol. II, Cheltenham: Edward Elgar, pp. 76-96.

Lunghini G. and Bianchi C. (2004) "The monetary circuit and income distribution: bankers as landlords?", in R. Arena and N. Salvadori (eds.), *Money, Credit and the Role of the State. Essays in Honour of Augusto Graziani*, Aldershot: Ashgate, pp. 152-174.

Magnus G. (2007) "The credit cycle and liquidity: have we arrived at a Minsky moment?", *Economic Insights – By George*, March, UBS Investment Research.

Michell J. (2010) "Financial Developments and Stock-flow Consistency: the Limits to Formal Modelling", working paper presented at the international conference *Beyond the Crisis*, Rethymno, Creta, Greece, 10-12 September 2010.

Minsky H.P. (1959) "Monetary systems and accelerator models", *American Economic Review*, 47(6): 859-83.

Minsky H.P. (1975) *John Maynard Keynes*, London: Macmillan.

Minsky H.P. (1986) *Stabilizing an Unstable Economy*, New Haven (CT): Yale University Press.

Palley T. (1994) "Debt, aggregate demand, and the business cycle: an analysis in the spirit of Kaldor and Minsky", *Journal of Post Keynesian Economics*, 16(3): 371-90.

Palley T. (2009) "A theory of Minsky super-cycles and financial crisis", IMK Working Paper No. 2009/5.

Papadimitriou B. and Wray L.R. (2008) "Minsky's stabilizing an unstable economy: two decades later", in H.P. Minsky, *Stabilizing an Unstable Economy*, McGraw-Hill.

Parguez A. (2004) "The solution of the paradox of profits", in R. Arena and N. Salvadori (eds.), *Money, Credit and the Role of the State. Essays in Honour of Augusto Graziani*, Aldershot: Ashgate, pp. 257-270.

Passarella M. (2010) "The paradox of tranquility revisited. A Lotka-Volterra model of the financial instability", *Rivista Italiana degli Economisti*, 15(1): 69-104.

Passarella M. (2012) "A simplified stock-flow consistent dynamic model of the systemic financial fragility in the 'New Capitalism'", *Journal of Economic Behavior & Organization* (forthcoming).

Pilkington M. (2009) "The financialization of modern economies in monetary circuit theory", in J.F. Ponsot and S. Rossi (eds.), *The political economy of monetary circuits. Tradition and change in Post-Keynesian economics*, Basingstoke: Palgrave Macmillan, pp.188-216.

Ryoo S. (2010) "Long waves and short cycles in a model of endogenous financial fragility", *Journal of Economic Behavior and Organization*, 74(3): 163-186.

Seccareccia M. (2010) "Financialization and the transformation of commercial banking: understanding the recent Canadian experience before and during the international financial crisis", mimeo.

Sordi S. (1986) "Some notes on the second version of Kalecki's business cycle theory", *Quaderni dell'Istituto di Economia*, Siena: University of Siena.

Tobin J. (1971) *Essay in Economics. Volume 1: Macroeconomics*, Chicago: Markham Publishing Company.

Toporowski J. (2000) *The End of Finance. Capital Market Inflation, Financial Derivatives and Pension Fund Capitalism*, London: Routledge.

Toporowski J. (2008) "Minsky's 'induced investment and business cycles'", *Cambridge Journal of Economics*, 32(5): 725-737.

Toporowski J. (2010) "Excess debt and asset deflation", in Kates S. (ed.), *Macroeconomic Theory and Its Failings. Alternative Perspectives on the World Financial Crisis*, Cheltenham: Edward Elgar, chapter 13.

Tymoigne E. and Wray L.R. (2008) "Macroeconomics meets Hyman P. Minsky: the financial theory of investment", *The Levy Economics Institute and University of Missouri–Kansas City*, Working Paper No. 543.

Vercelli A. (2009a) "A perspective on Minsky moments. The core of the financial instability hypothesis in the light of the subprime crisis", *The Levy Economics Institute*, Working Paper No. 579.

Vercelli A. (2009b) "Minsky moments, Russell chickens, and gray swans. The methodological puzzles of the financial instability analysis", *The Levy Economics Institute*, Working Paper No. 582.

Wray L.R. (2008) "Financial Markets Meltdown: What Can We Learn from Minsky?", *The Levy Economics Institute*, Public Policy Brief No. 94 (April).

Zezza G. (2004) "Some simple, consistent models of the monetary circuit", *The Levy Economics Institute*, Working Paper No. 405.

Figures

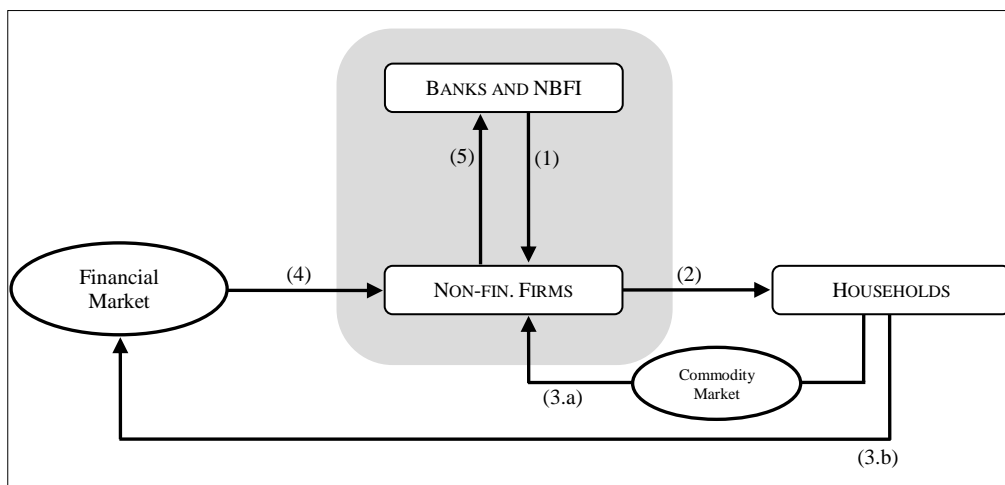FIG. 1. The *logical* structure of the monetary circuit. The government sector, foreign sector and central bank are assumed away. It is also assumed that households do not want to hoard bank deposits.
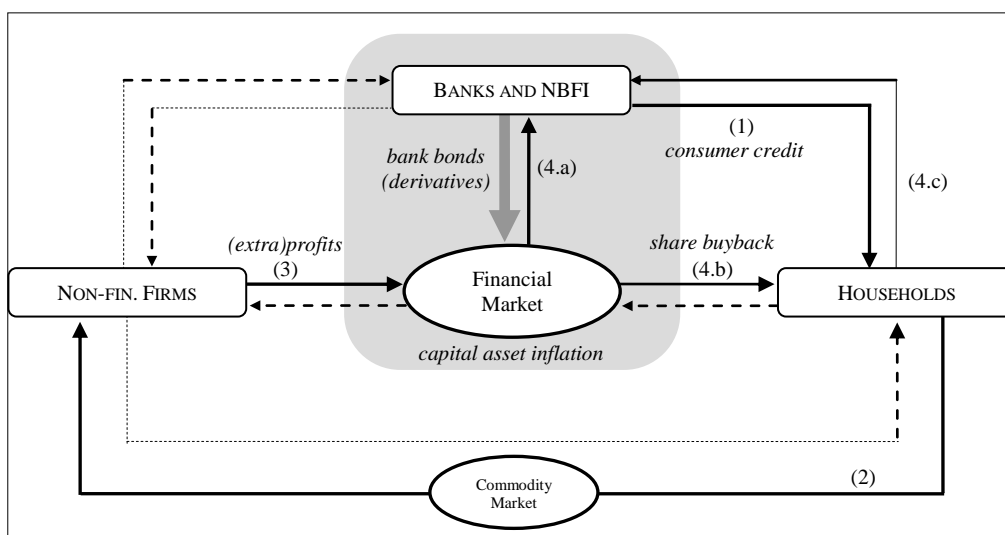

FIG. 2. The paradoxical form of the monetary circuit in 'Money-Manager Capitalism'. The broken arrow-lines show the weakening of the traditional monetary link between firms, banks and households.

Tables and key to symbols

TABLE 1. Nominal balance-sheets of each economic sector in a 'pure credit' capitalist economy

	1. Households	2. Non-financial Firms	3. Banks and NBFI	Totals (*column*)
1. Bank deposits	$+D_h$	$[-D_f]$	$-D$	0
2. Bank loans	$-L_h$	$-L_f$	$+L$	0
3. Capital goods		$+p \cdot K$		$+p \cdot K$
4. Bank bonds		$+B$	$-B$	0
5. Equities	$+p_{Ef} \cdot E_{fh} + p_{Eb} \cdot E_b$	$- p_{Ef} \cdot E_{fN}$	$+p_{Ef} \cdot E_{fb} - p_{Eb} \cdot E_b$	0
6. Net worth (Totals)	V_h	V_f	V_b	$p \cdot K$

Notes: A '+' before a magnitude denotes an asset, whereas '−' denotes a liability; the set of 'Banks and NBFI' includes financial firms; L_h is the total amount of bank loans borrowed by households in order to fund their 'autonomous' consumption.

TABLE 2. Nominal transactions among economic sectors

	1. Households		2. Non-financial Firms		3. Banks and NBFI		Totals (*row*)
	Current	Capital	Current	Capital	Current	Capital	
1. Consumption	$-C$		$+C$				0
2. Investment (capital goods)			$+p \cdot \Delta K$	$[- p \cdot \Delta K]$			0
3. Wages	$+W$		$-W$				0
4. Consumer credit	$+\Delta L_h$	$[-\Delta L_h]$					0
5. Interest on loans	$-i_{L(-1)} \cdot L_{h(-1)}$		$-i_{L(-1)} \cdot L_{f(-1)}$		$+i_{L(-1)} \cdot L_{(-1)}$		0
6. Interest on deposits	$+i_{D(-1)} \cdot D_{h(-1)}$		$[+i_{D(-1)} \cdot D_{f(-1)}]$		$-i_{D(-1)} \cdot D_{(-1)}$		0
7. Return on bank bonds			$+i_{B(-1)} \cdot B_{(-1)}$		$-i_{B(-1)} \cdot B_{(-1)}$		0
8. Dividends (distrib. profits)	$+F_{fh} + F_b$		$-F_f$		$+F_{fb} - F_b$		0
9. Current saving (Totals)	S_h	0	F_{uf}	0	F_{ub}	0	S_{tot}

Notes: A '+' before a magnitude denotes a receipt, whereas '−' denotes a payment; it is assumed that there is neither a government sector nor a foreign sector; both inventory stocks and capital depreciation are assumed to be negligible.

TABLE 3. Flow of funds at current prices: uses and sources

Changes in:	1. Households		2. Non-financial Firms		3. Banks and NBFI		Totals (*row*)
	Current	Capital	Current	Capital	Current	Capital	
1. Bank deposits		$+\Delta D_h$		$[-\Delta D_f]$		$-\Delta D$	0
2. Bank loans		$-\Delta L_h$		$-\Delta L_f$		$+\Delta L$	0
3. Bank bonds				$+\Delta B$		$-\Delta B$	0
4. Capital goods			$[-p \cdot \Delta K]$	$+p \cdot \Delta K$			0
5. Equities		$+p_{Ef} \cdot \Delta E_{fh} + p_{Eb} \cdot \Delta E_b$		$-p_{Ef} \cdot \Delta E_{fN}$		$+p_{Ef} \cdot \Delta E_{fb} - p_{Eb} \cdot \Delta E_b$	0
6. Net capital trans. (Totals)	0	S_h	0	F_{uf}	0	F_{ub}	S_{tot}
7. Net worth (acc. memo)	$S_h + \Delta p_{Ef} \cdot E_{fh(-1)} + \Delta p_{Eb} \cdot E_{b(-1)}$		$F_{uf} - \Delta p_{Ef} \cdot E_{fN(-1)} + \Delta p \cdot K_{(-1)}$		$F_{ub} - \Delta p_{Eb} \cdot E_{b(-1)} + \Delta p_{Ef} \cdot E_{fb(-1)}$		$S_{tot} + \Delta p \cdot K_{t-1}$

Notes: A '+' before a magnitude denotes a *use* of funds, whereas '−' denotes a *source* of funds; the total amount of bank deposits must be equal to total amount of bank loans; the economy's *ex post* total savings equals total investment; changes in capital goods do not enter in the column totals (because they are considered in TABLE 3) and the same goes for consumer credit; the difference between current savings (row 9 in TABLE 2) and net capital transactions (row 6 in TABLE 3) is always zero.

Glossary of symbols in Tables 1, 2 and 3

B	Bonds issued by banks and NBFI and subscribed by firms		F_{uf}	Retained earnings of non-financial firms ($\equiv \theta_f P_f$)
C	Total consumption of households (monetary value of 'consumer' goods)		i_B	Rate of return on 'bank bonds'
D	Bank deposits (total)		i_D	Rate of return on bank deposits
D_h	Bank deposits held by households		i_L	Rate of interest on bank loans
D_f	Bank deposits held by firms		K	Quantity of capital goods
E_b	Equities issued by banks and NBFI (and purchased by households)		L	Total amount of bank loans
E_f	Equities issued by non-financial firms (total)		L_f	Loans to non-financial firms
E_{fN}	Equities issued by non-financial firms net of share repurchase		L_h	Loans to households (consumer credit)
E_{fb}	Equities issued by firms and purchased by banks and NBFI		p	Price of output (both consumer and capital goods)
E_{fh}	Equities issued by firms and purchased by households		p_{Eb}	Price of equities issued by banks and other NBFI
F_b	Banks and NBFI's dividends (distributed to households)		p_{Ef}	Price of equities issued by non-financial firms
F_f	Non-financial firms' dividends (total)		V_b	Net worth of banks and NBFI
F_{fb}	Non-financial firms' dividends distributed to banks and NBFI		V_f	Net worth of non-financial firms
F_{fh}	Non-financial firms' dividends distributed to households		V_h	Net worth of households
F_{ub}	Retained earnings of banks and NFBI ($\equiv \theta_b i_L L$)		W	Total monetary wage-bill