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

Marco Passarella*

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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 readings to understanding the tendency of the capitalist economies to fall into recurring crises. The so-called ‘financial instability hypothesis’ of Minsky relies, however, on very 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, section 2 of the paper deals with the analytical structure of the financial instability theory, showing why this latter cannot be regarded as a general theory of the business cycle. Sections 3, 4 and 5 deal with 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 ‘Circuitist’ approach and the current Post Keynesian literature. In sections 6 and 7 we analyze the impact of both capital-asset inflation and consumer credit on the financial ‘soundness’ of the economy, within a simplified stock-flow consistent monetary circuit model. Some concluding remarks are provided in the last part of the paper (section 8).

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

JEL Classifications: B50, E12, E32, E44

Contents

| | |
|--|----|
| 1. Introduction | 2 |
| 2. Structure and limits of the ‘financial instability hypothesis’ | 2 |
| 3. A stock-flow consistent accounting framework | 5 |
| 4. The budget constraint of firms and the leverage ratio | 6 |
| 5. The monetary circuit in the ‘Money Manager Capitalism’ | 8 |
| 6. The effect of capital asset inflation on non-financial firms’ profits | 10 |
| 7. Financialization, prices and distribution of income | 12 |
| 8. Final remarks | 14 |
| References | 15 |
| Figures | 17 |
| Tables and key to symbols | 18 |

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This paper relies largely on an unpublished work with Riccardo Bellofiore, entitled ‘Minsky, the monetary circuit and the current crisis’, presented at the international conference *Can it happen again? Sustainable policies to mitigate and prevent financial crises* (University of Macerata, Italy, October 1-2 2010). I would like to thank Hervé Baron and Paul Hudson for suggestions and comments. Any errors that might still be present are mine.

1. Introduction

In the last few years, many financial analysts (see first and foremost Magnus 2007) and a number of heterodox (but even ‘dissenting’ orthodox) economists (see, for instance, Kregel 1997, 2008; Papadimitriou and Wray 2008; Tymoigne and Wray 2008; Vercelli 2009a,b; Wray 2008; see also Passarella 2010) have referred to the contributions of Hyman P. Minsky as fundamental to 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: from the growing financial fragility of the economic system as the result of a previous period of ‘tranquil growth’¹ to the risk of a credit crunch and a widespread debt deflation; from the gradual loosening of economic units’ safety-margins to the reduction in the time elapsing between one crisis and another; from the bankruptcy of big financial institutions to the forced policies of ‘Big Government’ and ‘Big Bank’ that have been implemented by governments and central banks in the hope of avoiding a 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 presents some serious internal logical problems, as many authors have convincingly argued (see, first and foremost, Lavoie 1986; Lavoie and Seccareccia 2001; Toporowski 2008; Bellofiore and Halevi 2009, 2010). The main trouble concerns Minsky’s belief that the leverage ratio (on the investment in fixed capital) 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) coming from the higher investment may offset the higher debt (in form of bank loans) of the non-financial firms. This counter-intuitive outcome is known in the Post-Keynesian literature as the ‘paradox of debt’ and can be regarded as the Kaleckian equivalent of the well-known Keynesian ‘paradox of thrift’. Furthermore, Minsky’s analysis of capitalism must be updated on the basis of the radical changes which have concerned 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 has allowed the industrial corporations to finance their investment in fixed capital by issuing equities. Paradoxically, this has effects that may be stabilizing 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 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 literature³. In order to do so, section 2 of the paper will introduce the reader to the mechanics of the financial instability theory, showing why this latter cannot be regarded as a general theory of the business cycle. Sections 3, 4 and 5 will deal with a simplified, 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).

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

¹ The definition is derived by 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 beg to refer to the Introduction to this Special Issue.

(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), and Minsky himself, have often used the investment ‘leverage ratio’ of the corporate sector to this purpose⁵. 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 it (*ex post*) arises from firms’ decisions on the whole. This trouble highlights a possible missing link between micro (or individual) and macro (or systemic) levels in Minsky’s theoretical model⁶.

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 a ‘pure credit’ closed economy of production where firms borrow in order to fund their investment plans:

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

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

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

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

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 fixed capital, 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 profits⁷, 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 banks⁸.

The 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 anything but their capital incomes (equal to the amount of firms’ profits distributed as dividends)⁹. The 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 profits and the amount of (new) equities issued by firms¹⁰. The equation (2.3) shows that the external funds (*viz.* bank loans) must allow firms to fund the purchase of capital goods which cannot be financed adequately from internal resources alone¹¹. Finally, the equation (2.4) shows that

⁴ The definition is drawn from Dos Santos 2005.

⁵ See, for example, Lavoie 1986-87. A more recent work using 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 indebtedness, 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 been 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). 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, which cannot 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 $L_f = \Delta L_f$, where L_f is the total debt of firms and ΔL_f is the current borrowing. Hence interests payable to banks reduce to: $i_L \Delta L_f$.

⁹ This restrictive simplifying hypothesis will be relaxed in the next sections.

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 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 absence of any delay, we get: $\Delta A_f = P_f$.

¹¹ For most of the Post Keynesian authors bank debt is the residual term to close the gap between investment and equity finance *plus* retained earnings (see Lavoie and Godley 2001-02: 288; see also Dos Santos and Zezza 2008). We are going to come back to this point during the next sections.

total net profits gained by the corporate sector are the difference between total gross profits and total interests on bank loans. At this regard, we assume that bank loans are bargained at the beginning of the period and paid off at the end of the same period (including interests). 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 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 investment¹². This means that internal funds which are available at the beginning of a given period equal 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:

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

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

$$(2.5') \quad \lambda_f = 1 - \theta_f (1 - i_{L(-1)}\lambda_{f(-1)}) (1 + g)^{-1} \quad (\text{with: } 0 \leq \lambda_f \leq 1, \text{ for } g \geq 0)$$

where g stands for the rate of growth of the total investment in fixed capital¹³ and $\lambda_{f(-1)}$ is the past leverage ratio¹⁴.

The equation (2.5') shows that the leverage ratio for 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 ($\theta_f = 0$). On the contrary, given a non-negative rate of growth of investment, the leverage ratio achieves its minimum value (namely, $\lambda_f = 0$) when investment stays constant ($g = 0$) and profits are always entirely retained (whence $\theta_f = 1$ and $\lambda_{f(-1)} = 0$). In more intuitive terms, we can assert that marginal leverage ratio increases whenever debt-financed investment, pushed by profit expectations, grows at an *accelerating rate* (namely, whenever g grows)¹⁵, given both the rate of interest and the share of retained profits. It should be clear, then, that Minsky’s hypothesis of 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 investment – can be regarded as either a *consistent but not general* theory or a *general but not consistent* theory¹⁶.

¹² For the sake of simplicity, we assume also that households’ savings are held in the form of non-interest-bearing deposits.

¹³ Notice that Minsky hypothesizes that this rate (that 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.

¹⁴ Let us remember that we are assuming that firms borrow at the beginning of a certain period and get out of debt at the end of the same period.

¹⁵ Or, anyhow, when debt-financed investment grows more quickly than the accumulation of capital stock. This point, clearly highlighted by Corbisiero (1998: 53) and then re-invigorated by Passarella (2010: 79), had been previously (partially) acknowledged also by Lavoie when 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).

¹⁶ In formal terms, what we have labelled ‘the pure Minskian hypothesis’ 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 fixed capital grows at an accelerating rate ($g, dg/dt > 0$); (iii) the share of retained profits, θ_f , is quite stable (namely,

3. A stock-flow consistent accounting framework

In our opinion, Minsky was aware of the fact that his hypothesis of a growing aggregate leverage ratio (during the upswing) cannot be the *only* foundation of a general theory of the financial fragility and the crisis. However, on the one hand, he thought 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 markets¹⁷; on the other hand, the interconnection of firms' balance-sheets and cash-flows, as well as the practice of *stiffening* the temporal structure of liabilities during the ascending phase of the cycle, were considered to be 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)¹⁸. Notice also that, during the phases of high economic growth, fusion, mergers and takeovers, insofar as 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 that inflation in the money values of capital assets has allowed 'industrial' firms to finance their activity by issuing shares. Paradoxically, this has 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 price was increasing more and more has allowed U.S. households to support both the U.S. and the entire world economy by means of a constant flow of importation from Europe and Asia. The reason is that this inflation process has 'un-pegged' the dynamics of consumption from the dynamics of labour incomes. Consequently, the leverage ratio for the 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 will need to consider by respecting the condition of macroeconomic stock-flow consistency (SFC hereafter).

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)¹⁹. Hence, in the next two sections, the question of the financial soundness of a pure credit economy 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 (deposits and equities); (ii) 'non-financial' firms, which produce a single homogeneous output by means of labour and the same good used as input; (iii) a macro-sector including a central bank and commercial banks (which lend credit-money to both non-financial business sector and households) *plus* other non-bank

'ratchet effects' are nil or of a low order). An auxiliary hypothesis is that the effective interest rate on bank loans tends to increase during the upswing ($di_t / dt > 0$).

¹⁷ This could be one of the reasons why he considered the new shares as anything but 'one class of outside funds' (Minsky 1976: 107; quoted in Lavoie 1986-1987: 260).

¹⁸ 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 'hedge', but only that the aggregate leverage is not a good indicator of the financial 'unsoundness'. Indeed, individual financial fragility could, in any case, transmit from speculative units to hedge ones. On this point, see also Toporowski 2008: 735.

¹⁹ Although in principle it 'should be explicitly or implicitly valid for any consistent model, be it mainstream or heterodox' (Zezza 2010: 4), the label 'stock-flow consistent' usually refers to a specific set of Post-Keynesian models related to the 'New Cambridge' theories of the 1970s and then developed by Wynne Godley and other scholars of the *Levy Institute of Economics* (see, for instance, Godley and Cripps 1983; Godley 1996, 1999a,b; Lavoie and Godley 2001-02; Godley and Lavoie 2007a,b). These models are dynamic, consider the effects of financial stocks on both income-flows and financial flows, as well as explicitly represent the role of the banking system. More precisely, 'the SFC methodology consists of three "steps": (1) do the (SFC) accounting; (2) establish the relevant behavioral relationships; and (3) perform "comparative dynamics" exercises' (Dos Santos 2005: 713). These latter are usually carried out by means of a system of differential (or difference) equations and computer simulations. 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.

financial operators (which create ‘quasi-money’ or ‘derivatives’). Both the government and foreign sector are assumed away, because we are here considering an artificial pure credit closed economy of production.

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 for a given accounting period and are paid at the end of the same period. Furthermore, it is assumed that: (i) households held financial assets (bank deposits and equities), but do not purchase real assets (here ‘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 (both equities which are subscribed by households and ‘derivatives’ which are subscribed by firms) and hold a percentage of the non-financial business capital stock. Finally, following both Minsky (1986: 225) and Dos Santos (2006: 544), 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’)²⁰. 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. 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 means of the holding of shares, 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 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: 278)²¹. More precisely, TAB. 1 presents the nominal balance-sheet matrix of a pure credit economy and TAB. 2 is the corresponding transaction-flow matrix. For instance, row 2 in TAB. 1 shows that bank credit can be granted to both firms (which need it in order to finance investment in fixed capital, but also to pay a wage-bill to workers) and households (which use it in order to finance their extra-consumption); whereas row 4 in TAB. 2 shows the flow of ‘passive’ interests going from private sector to banking sector. Furthermore, TAB. 3 shows the uses and sources of funds – that is to say, shows the monetary budget constraint faced by each economic sector. More precisely, TAB. 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 temporary terms (namely, as the external resources that firms need to fund the non-self-financed investment in new capital goods), whereas bank lending to households is of different ‘nature’, since it entails an additional and (potentially) lasting indebtedness. 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 TAB. 2 and row 6 in TAB. 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 by the autonomous consumption of households and by inflation in the value of 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 second column of TAB. 2:

²⁰ However, we can keep on assuming that only banks are able to create credit-money, whereas the other financial units can just create ‘quasi-money’ (i.e. derivatives and other financial instruments).

²¹ 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 that ‘merely’ combines the factors of production.

$$(4.1) \quad P_f = C + p\Delta K - W - i_L L_f + i_D D_f + i_B B$$

where D_f is the amount of bank deposits held by non-financial firms, i_D is the rate of return on deposits, B is the amount of generic ‘bank bonds’ and i_B is their rate of return²².

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

$$(4.2) \quad C = W + (F_{fh} + F_b + i_D D_h - i_L L_h) + \Delta L_h - S_h$$

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 NBFIs, D_h is the amount of deposits held by households, L_h is the total debt (bank loans) of households, ΔL_h is the current borrowing of households²³, and S_h is their current savings.

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 get:

$$(4.1') \quad P_f = p\Delta K + \hat{C}_h - i_L L_f \quad \left(\text{with: } \hat{C}_h = C - W = F_{fh} + F_b - i_L L_h + \Delta L_h - S_h \right)$$

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 TAB. 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 use bank credit only in order to purchase capital goods (thereby implying that none of the firms’ wage-bills is financed by bank credit), then 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 non-financial business sector needs:

$$(4.5) \quad \Delta L_f = p\Delta K - \underbrace{\theta_f (p\Delta K + \hat{C}_h - i_L L_f)}_{[i]} - \underbrace{p_{Ef} \Delta E_f}_{[ii]} \quad \text{[iii]}$$

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: 283)²⁴. Thus, the marginal leverage ratio (calculated as marginal debt-to-investment ratio) of

²² 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 spending corresponds to the amount of bank deposits obtained by firms producing capital goods. Hence, with regards to the investment spending, the net cost of borrowing is equal to $L_f(i_L - i_D)$. This latter is ‘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).

²³ As has been anticipated, we can assume that bank loans to households are equal to a percentage of their net worth (viz. the current value of their stock of assets, including capital gains).

²⁴ See note 11.

the corporate sector is:

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

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, $q = (p_{E_f} / p)$ is the well-known Tobin ratio²⁵, and $e_f = (\Delta E_f / \Delta K)$ is the quantity of new shares per unit of real fixed investment²⁶. 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 (viz. the product $q e_f$), and on the percentage \hat{c}_h . This latter measures the excess of household consumption over wage-bill per unit of national income.

More in general, the 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 (namely, by issuing equities), the lower will be the investment leverage ratio. Furthermore, it is easy to verify that 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. All these latter, somehow or other, affect the soundness of non-financial business sector balance-sheets²⁷. 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 of external funds. Analogously, inflation in equity-prices allows firms to replace bank borrowing with 'cheaper' long-term capital, and hence to reduce the investment leverage ratio²⁸. 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 specific expansive monetary policy pursued by the central bank²⁹.

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

In a recent (unpublished) work, Mario Seccareccia has asserted that, whether a distinctive feature of a growth-oriented productive system – such as the one analyzed by Keynes and, in the wake of him, by Minsky (until the 1980s at least) – is the centrality of bank financing of production (and investment in capital goods), where security market plays a passive role in channelling household savings towards industrial firms, 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'

²⁵ 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 fixed capital (see Tobin 1971).

²⁶ See also note 8.

²⁷ More precisely, besides firms' sale revenues (which are affected by \hat{c}_h), households directly affect the amount of new equities issued by non-financial business sector (ΔE_m), as well as the market value of stocks (p_{E_f}), and 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 NBFIs directly affect the overall rate of interest on loans (i_L), as well as ΔE_m and p_{E_f} , 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_{E_f} and ΔE_f), and so on.

²⁸ One could think that capital-asset inflation cannot produce *macroeconomic* changes, but only *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) banks loans are linked to the value of assets, allowing units to realize capital gains *immediately*.

²⁹ In the U.S. this has become a self-feeding process: the change in the banking model has concurred to produce the inflation of the capital assets which, in turn, has concurred to modify the banks' customer profile.

(Seccareccia 2010: 4) looking for higher financial returns on its internal funds. At the same time, households' savings has fallen vertically: since the 1990s, in many Anglo-Saxon countries household sector has increasingly become a net borrower, instead of a net lender (that is considered its '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 in the traditional 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 'traditional' monetary circuit is represented by the sequence (1)-(5). For the sake of simplicity, we assume that households use their (both labour and capital) incomes for buying commodities and/or securities issued by corporate sector, any increase in their holdings of bank deposits being excluded. In short, within a pure credit (closed) economy of production, the usual 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 they 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 (credit-money) that is spent on both the equity market and the commodity market comes back to the non-financial business sector; (5) insofar as it gets back its monetary advances, the business sector is able to repay (the 'principal' of) its bank debt³⁰.

As has been already mentioned, the process of financialization has involved a remarkable change in the logical 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' indebtedness, L_h , rather than by the demand for finance of the business sector (see arrow (1) in FIG. 2). On the other hand, households' indebtedness has fuelled the transactions on the financial markets (both on the equity market and on the market of 'bank bonds', within our simplified model) because of the demand arising from the growing 'savings' (money profits) of the non-financial corporate sector (see arrow (3) in FIG. 2)³¹. 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 (viz. the stock of financial assets hoarded by households) (1). Households spend both this credit-money and (a proportion of) their income in the commodity market (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 (4.b)-(4.c)³². In the latter banks and NBFIs place derivatives (for instance, collateralized debt obligations or CDO) which are indirectly 'monetized' by non-financial firms' savings (3)-(4.a)³³. 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 a net borrower.

³⁰ For the moment, the question of the repayment of the interests on bank loans (in monetary terms) 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 'traditional' monetary circuit, see Graziani 2003.

³¹ Notice that bank loans funding 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 raise to a process of 'over-capitalization' and allows firms to invest in financial assets (see Toporowski 2008; Michell 2010).

³² The reasons why the single firm would decide to buyback 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.

³³ For instance, with the intermediation of pension and investment funds. For the sake of simplicity, both in TAB. 1, 2, 3 and in the following formulas we will assume that firms subscribe directly unspecific 'bank bonds'.

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 way with the assistance of TAB. 1, 2 and 3³⁴. At this regard, it is assumed that firms express two different demands for bank loans: (i) the *stricto sensu* 'initial finance' which business sector *as a whole* needs to fund the current production, L_{fw} , and which covers both the wage-bill (W , the cost of production) and the interest payments to banks (the cost of credit-money)³⁵; (ii) a further demand for credit allowing *each single firm* to fund the part of investment which cannot be financed by internal resources, L_{fk} ³⁶. The amount of the initial loan demanded (and obtained) by firms is therefore³⁷:

$$(6.1) \quad \Delta L_f = L_{fw} + L_{fk} = (W + i_L L_f) + \rho \Delta K$$

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

$$(6.2) \quad W + F_{fh} + F_b + i_D D_h + \Delta L_h - i_L L_h = C + \Delta V_h$$

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' stock of assets (including capital gains, see the seventh row of TAB. 3); (ii) the interest rate on bank deposits is negligible; (iii) banks and NBFIs 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 NBFIs do not issue *new* shares and households divide their savings between firms' equities and bank deposits only. Given these premises, we get:

$$(6.3) \quad \Delta L_h = \rho (V_h + \Delta p_{Ef} E_{fh(-1)})$$

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

$$(6.5) \quad p_{Ef} \Delta E_{fb} = \theta_b (i_L L + F_{fb} - i_B B)$$

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

$$(6.7) \quad p_{Ef} \Delta E_{fN} = p_E \Delta E_{fh} + p_E \Delta E_{fb} = (\Delta V_h - \Delta D_h) + \theta_b (i_L L + F_{fb} - i_B B)$$

³⁴ Among the works suggesting an integration between the SFC Post Keynesian modelling and the theory of monetary circuit, see Godley 1999b, Lavoie 2004, Lavoie 2007, Zezza 2004, Keen 2009 and Pilkington 2009. For an opposite opinion, critical of the monetary circuit approach on the whole (which is regarded as a mere 'pedagogical' instrument), see Cavalieri 2003.

³⁵ As Zezza has convincingly argued, 'consistency implies that interest payments are made in advance', so that the initial loan required by firms in order to start the production has to fund 'both the wage bill *and* interest payments' (Zezza 2004: 5). Of course, if one wants that interests are paid on the full amount of the initial bank loan, then one has to set: $L_{fw} = W(1 - i_L)$. In any case, the point is that 'if we model a single monetary circuit, the rationale for getting interests on loans requires that interests can be used within the production period' (Zezza 2004: 13). On this disputed issue, see also Parguez 2003, Passarella 2008, and Bellofiore and Passarella 2009.

³⁶ According to Graziani, firms 'need finance in order to set up and carry on any kind of production'. Hence, 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).

³⁷ Notice that L_{fw} must be borrowed at the beginning of the period, whereas one should assume that L_{fk} is demanded at the end of the production. 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.

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

Equation (6.7) shows that the demand for firms' equities arises from households' savings (although in decreasing terms as the process of financialization takes off) and banks' net receipts, apart from the same firm sector. 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 variation that is described by the left-hand term of the (6.6) may become negative (for $\sigma \geq 1$). In this case, households can *spend* the resulting additional flow of credit-money only for consumption. Consequently, even in the presence of share repurchase there is only one circumstance which can produce a net loss of liquidity for firms as a whole: the decision of household sector to save a percentage of its income in the form of cash balances (bank deposits, in this simplified model). Finally, if we isolate the unit price of equities, we obtain:

$$(6.7') \quad p_{Ef} = \frac{(\Delta V_h - \Delta D_h) + \theta_b (i_L L + F_{fb} - i_B B)}{\Delta E_f (1 - \sigma)}$$

which is a positive function of the bank retained earnings and of the share buyback of firms³⁸.

In order to analyze the effect of capital asset inflation on the behaviour of the non-financial business sector, within a SFC basic model of monetary circuit, we have to come back to the macroeconomic equation of profits. From the second column of TAB. 2 one gets:

$$(6.8) \quad P_f = p\Delta K + C - W - i_L L_f + i_B B$$

which reproduces the identity (4.1') with $(C - W) = \hat{C}_h$ 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 capitals. This process allows banks and NBFIs to 'monetize' a percentage (α) of their credit with households without waiting for the maturity date. However, in order to do so, banks and NBFIs have to pay an 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:

$$(6.9) \quad C = W + F_{fb} + \Delta L_h (1 - i_L) - \Delta V_h$$

$$(6.10) \quad p_{Ef} \Delta E_{fN} = \theta_b (i_L L + F_{fb} - i_B B) + (\Delta V_h - \Delta D_h)$$

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 $p\Delta K = p_{Ef} \Delta E_{fN}$ and $\Delta L_f = L_{fw}$); (ii) neither firms nor banks distribute dividends (so that $F_{fb} = F_{fb} = 0$ and $\theta_f = \theta_b = 1$); (iii) the rate of return on bank bonds is negligible ($i_B = 0$). Using (6.9) and (6.10) into the (6.8), we get:

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

and hence:

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

Receipts from sales (for firms as a whole) are enough to pay back principal *plus* interests, and

³⁸ See note 32.

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 admit 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:

$$(6.13) \quad P_f = (\Delta L_h + L_{fk} + i_B B) - \Delta D_h$$

and, remembering the (6.3), we obtain:

$$(6.13') \quad P_f = (1 + \alpha i_L) \rho (V_h + \Delta p_{E_f} E_{fh(-1)}) + \lambda_f p \Delta K - \Delta D_h$$

where α is the percentage of households' bank loans which have been turned into bank bonds (or 'securitized')³⁹. In this second case, the investment leverage ratio and the debt of households being equal, the higher the amount of loans borrowed by firms, the higher the level of investment in fixed capital and the higher 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 (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 a double positive effect: on the one hand, it increases the amount of consumer credit and hence sustains firms' profits from sales; on the other hand, the interests accruing to the debt of households turn into financial gains for the business sector. Notice also that, since it allows firms to replace the bank borrowing with the equity financing, the capital asset inflation reduces the monetary cost of the financing. Nonetheless, if we admit that banks spend their whole receipts, then interests 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 (6.12')⁴⁰.

7. Financialization, prices and distribution of income

As is well known, 'circuistist' authors reject the neoclassical theory (both the '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 Michał Kalecki (see Graziani 2003). The first step is to determine the unit monetary value of output as 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 production⁴¹. In algebraic terms, the total monetary value of the aggregate supply is:

³⁹ So that we have: $i_B B = \alpha i_L \Delta L_h$

⁴⁰ Here comes another possible difference with respect to the traditional monetary circuit approach. For Graziani (2003) while interests paid on securities are never a real cost to firms (apart from a possible 'income effect'), interests paid on bank loans represent a real subtraction from firms' profits. However, the adoption of a SFC approach allow us to show that banks can successfully compete with households in the 'commodity' market ($X_C = (1 - k)X$, where k is the share of 'capital' goods), whereas firms as a whole can theoretically always realise their own investment plans, given the scale of the production. However, for the sake of simplicity, in the rest of the paper we will keep on assuming that banks use entirely they retained earning to purchase equities.

⁴¹ 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, with 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).

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

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

From the first column of TAB. 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:

$$(7.2) \quad AD = C + I = (W + F_m + F_b + i_D D_h - i_L L_h + \Delta L_h - S_h) + p\Delta K$$

Notice, however, that: (i) the monetary wage-bill is the product of the unit wage, w , and the level of employment, N ; (ii) households' financial incomes and savings can be regarded as a percentage of the wage-bill; (iii) the investment in fixed capital is anything but a percentage, k , of the produced output⁴². Hence, the equation (7.2) can be re-written as:

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

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

As we have mentioned, the equilibrium price level is determined by the equality between demand and supply, which gives for⁴³:

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

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 (the right-hand ratio)⁴⁴. This latter, in turn, depends on the average propensity to invest of non-financial firms, k , on the average propensity to save of households, 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 (namely, profits are absent). Nonetheless, this is a very casual event: no endogenous economic device is able to assure the zeroing of firms' profits within a circuit model.

Gross profits in real terms are equal to money gross profits ($P_{Gf} = p\Delta K + C - W + i_b B$) divided by the price level. If, for the sake of simplicity, we assume that interests on bank 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 profits before bank interests equal real investments ($P_{Gf}/p = k\pi N$) and non-financial firms earn exactly what they have spent on investment in fixed capital ($P_{Gf} = pk\pi N = I$).

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

⁴² 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).

⁴³ 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 unit wage bargained by firms and workers ($N = L_h/w$). Obviously, one can also assume that the amount of initial finance, in turn, is linked to the expected aggregate demand.

⁴⁴ Notice that the rate of profit (gross of interests) is: $r = (1 + f_h + l_h - s_h)/(1 - k) - 1 = (f_h + l_h - s_h + k)/(1 - k)$.

$$(7.5) \quad \frac{P_f}{p} = \left[\frac{(1 + \alpha i_L) \rho (V_h + \Delta p_{E_f} E_{fn(-1)}) - \Delta D_h}{w(1 + f_h + l_h - s_h)} + \lambda_f k \pi N \right] (1 - k) \pi$$

Net profits of non-financial firm sector depend on several factors, among which the net worth of households (including capital gains on their own shares) and the return on bank bonds. Notice, however, that the same possibility to realize financial profits by purchasing speculative assets (bank bonds, in this simplified model) could affect negatively the propensity of firms (as a whole) to invest in fixed capital. More precisely, we can suppose that the more the possibility to realize interests on bank bonds, the less the convenience to purchase (and hence to produce) capital goods. Insofar as this happens, the final effect on the total net money profit of 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 lower 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 (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’, in Sraffa’s words) to close the gap between the total output and the real profit realized by the firm sector. Finally, notice that, once the process of capital asset inflation has been started, this could come to cause a change in the profile of costumers of banks and, hence, a quickening in the change of the banking system itself. Indeed, this latter is led to shift towards credit consumer or other financial assets, insofar as non-financial business sector is able to borrow funds and/or realize profits on the financial markets. The same increase in the autonomous consumption of households is another factor which allows firms to increase their internal funds (in form of retained profits) and reduce their demand for bank loans. The result is that banks as a whole face a trade-off: they can expand their business towards households only if they accept the risk of reducing their role in the financing of investment plans of business sector⁴⁵.

8. Final remarks

In this paper, we have tried to supply a simplified, but stock-flow consistent, re-interpretation of some of the more 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 where the creation of credit-money is sustained by households’ debt, rather than by the demand for finance of firms, and where the same households’ debt fuels the expansion of the financial market, because of firms’ growing savings (invested in financial assets). In short, the sequence which leads to the financial fragility and the crisis, within this simplified circuit model, can be resumed in five steps: (1) households try to keep a given ‘desired’ level of consumption, in spite of the tendential decrease in the wage-bill, and resort to bank loans (on the basis of their stock of assets); (2) non-financial firms use their extra-profits (arising from the decrease in the wage level, in spite of a quite constant flow of consumption) in order to purchase financial assets (either equities or bank bonds, in our simplified model)⁴⁶; (3) the inflow of new capitals makes financial markets grow, but, at the macroeconomic level, firms’ share buyback reduces the ‘soundness’ of the business sector, because it increases the leverage ratio on investments⁴⁷; (4) at the same time, the increase in the price of (financial) assets can

⁴⁵ Notice that, if this is true, then an expansive monetary policy put by the central bank may have a ‘crowding out’ effect on the banking activity.

⁴⁶ As for dividends distributed to households, notice that: (i) if households do not hoard deposits then they cannot but flow back to the firm sector; (ii) dividends do not represent a real additional purchasing power for households *as a whole*, since the composition of output is ‘given’.

⁴⁷ 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’ savings (retained profits). The same goes for the firms’

lead the central bank to increase the target rate of interest (in order to ‘cool’ the asset price level); (5) finally, in the medium-run, the reduction in the households’ stock of assets and the increase in the bank interest rate affects consumption and investment, giving rise to the crisis. Obviously, the overall viability of the whole economic system depends on the possibility of household sector to maintain an equilibrium in the ratio of the cash outflows involved in bank debt to the cash inflows derived from capital assets (in addition to labour incomes) over time. A ‘Minskian’ condition that is intrinsically uneasy, because is historically linked to the prevailing ‘conventions’ in the financial (and credit) markets.

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purchasing of financial assets (bank bonds) from banks and NBFIs. On the contrary, insofar as non-financial firms repurchase their shares from households, these latter can pay off (part of) their bank debt, but at the price of ‘decumulating’ their stock of assets. Data seem to indicate that the two cases describe two different (subsequent) phases of the business cycle as well as of 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 the Wall Street crashes of 1987, 2000 and 2007 (see Ryoo 2010; see also Passarella 2011).

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Figures

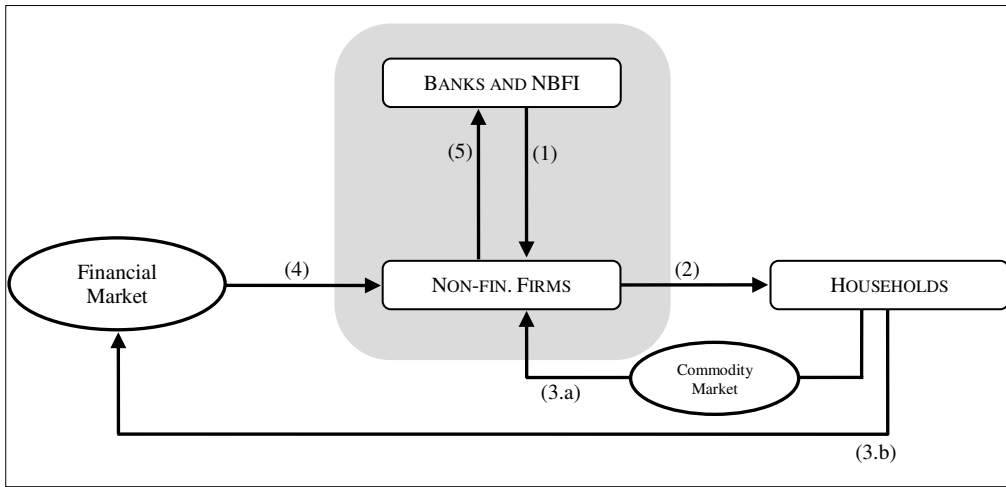


FIG. 1. The traditional monetary circuit. Government sector, foreign sector and central bank are simplified away. It is also assumed that households do not want to hoard bank deposits.

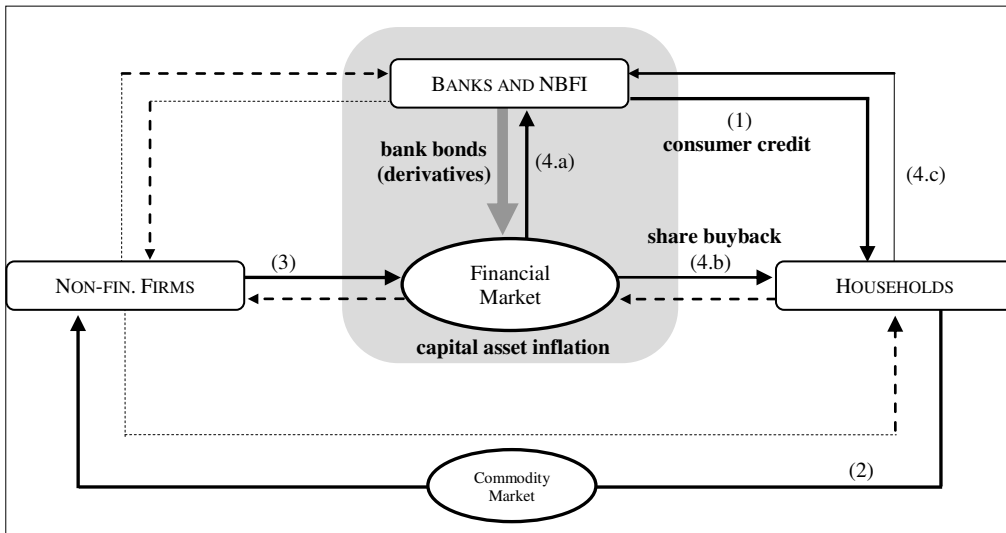


FIG. 2. The paradoxical form of the monetary circuit in the 'Money Manager Capitalism'. Broken arrows show the weakening of the traditional monetary link between firms, banks and households.

Tables and key to symbols

TAB. 1. Nominal balance-sheets of each economic sector in a pure credit economy

| | 1. Households | 2. Non-financial Firms | 3. Banks and NBF1 | Totals (column) |
|-----------------------|--------------------------------|------------------------|--------------------------------|--------------------|
| 1. Bank deposits | $+D_h$ | $+D_f$ | $-D$ | 0 |
| 2. Bank loans | $-L_h$ | $-L_f$ | $+L$ | 0 |
| 3. Capital goods | | $+pK$ | | $+pK$ |
| 4. Bank bonds | | $+B$ | $-B$ | 0 |
| 5. Equities | $+p_{E_f}E_{f_h} + p_{E_b}E_b$ | $-p_{E_f}E_{f_N}$ | $+p_{E_f}E_{f_b} - p_{E_b}E_b$ | 0 |
| 6. Net worth (Totals) | V_h | V_f | V_b | pK |

Notes: A '+' before a magnitude denotes an asset, whereas '-' denotes a liability; the set of 'Banks and NBF1' includes financial firms; L_h is the total amount of bank loans borrowed by households in order to fund their 'autonomous' consumption.

TAB. 2. Nominal transactions among economic sectors

| | 1. Households | | 2. Non-financial Firms | | 3. Banks and NBF1 | | Totals (row) |
|-------------------------------|------------------|-----------------|------------------------|----------------|-------------------|---------|-----------------|
| | Current | Capital | Current | Capital | Current | Capital | |
| 1. Consumption | $-C$ | | $+C$ | | | | 0 |
| 2. Investment (capital goods) | | | $+p\Delta K$ | $[-p\Delta K]$ | | | 0 |
| 3. Wages | $+W$ | | $-W$ | | | | 0 |
| 4. Consumer credit | $+\Delta L_h$ | $[-\Delta L_h]$ | | | | | 0 |
| 5. Interest on loans | $-i_L L_h$ | | $-i_L L_f$ | | $+i_L L$ | | 0 |
| 6. Interest on deposits | $+i_D D_h$ | | $+i_D D_f$ | | $-i_D D$ | | 0 |
| 7. Return on bank bonds | | | $+i_B B$ | | $-i_B B$ | | 0 |
| 8. Dividends (net profits) | $+F_{f_h} + F_b$ | | $-F_f$ | | $+F_{f_b} - F_b$ | | 0 |
| 9. Current savings (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.

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

| Changes in: | 1. Households | | 2. Non-financial Firms | | 3. Banks and NBF1 | | 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 | | | $[-p\Delta K]$ | $+p\Delta K$ | | | 0 |
| 5. Equities | | $+p_{E_f}\Delta E_{f_h} + p_{E_b}\Delta E_b$ | | $-p_{E_f}\Delta E_{f_N}$ | | $+p_{E_f}\Delta E_{f_b} - p_{E_b}\Delta E_b$ | 0 |
| 6. Net capital trans. (Totals) | 0 | S_h | 0 | F_{uf} | 0 | F_{ub} | S_{tot} |
| 7. Net worth (acc. memo) | $S_h + \Delta p_{E_f}E_{f_h(-1)} + \Delta p_{E_b}E_{b(-1)}$ | | $F_{uf} - \Delta p_{E_f}E_{f(-1)} + \Delta p_{K(-1)}$ | | $F_{ub} - \Delta p_{E_b}E_{b(-1)} + \Delta p_{E_f}E_{f_b(-1)}$ | | $S_{tot} + \Delta p_{K_{t-1}}$ |

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: $\Delta D = \Delta L$; 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 TAB. 3) and the same goes for consumer credit; the difference between current savings (row 9 in TAB. 2) and net capital transactions (row 6 in TAB. 3) is always zero.

Glossary of symbols in Tables 1, 2 and 3

| | |
|------------|--|
| B | Bonds issued by banks and NBF1 and subscribed by firms |
| C | Total consumption of households (monetary value of 'consumer' goods) |
| D | Total amount of bank deposits |
| D_f | Deposits held by non-financial firms |
| D_h | Deposits held by households |
| E_b | Equities issued by banks and NBF1 (and purchased by households) |
| $E_{f[N]}$ | Equities issued by non-financial firms (total [net of share repurchase]) |
| E_{f_b} | Equities issued by firms and purchased by banks and NBF1 |
| E_{f_h} | Equities issued by firms and purchased by households |
| F_b | Banks and NBF1's dividends (distributed to households) |
| F_f | Non-financial firms' dividends (total) |
| F_{f_b} | Non-financial firms' dividends distributed to banks and NBF1 |
| F_{f_h} | Non-financial firms' dividends distributed to households |
| F_{ub} | Retained earnings of banks and NBF1 ($\equiv \theta_b i_L L$) |
| F_{uf} | Retained earnings of non-financial firms ($\equiv \theta_f P_f$) |

| | |
|-----------|---|
| i_B | Rate of return on 'bank bonds' |
| i_D | Rate of return on bank deposits |
| i_L | Rate of interest on bank loans |
| K | Quantity of capital goods (fixed capital) |
| L | Total amount of bank loans |
| L_f | Loans to non-financial firms |
| L_h | Loans to households (consumer credit) |
| p | Price of output (both consumer and capital goods) |
| p_{E_b} | Price of equities issued by banks and other NBF1 |
| p_{E_f} | Price of equities issued by non-financial firms |
| V_b | Net worth of banks and NBF1 |
| V_f | Net worth of non-financial firms |
| V_h | Net worth of households |
| W | Total monetary wage-bill |