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Minsky, the monetary circuit and the current crisis: a SFC monetary accounting framework

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In the last few years many authors outside (but even inside) the mainstream have referred to the contributions of Hyman P. Minsky as fundamental to understand the current crisis. It is well known, however, that the traditional representation of Minsky's model has serious internal logical problems. As Lavoie and Seccareccia (2001) have convincingly argued, there is a macroeconomic missing link in Minsky' theory, so that leverage ratios may rise or decline during a phase of economic expansion. If leverage ratio is close to zero, also the argument (see Corbisiero 1998; Passarella 2010a) intended to strengthen Minsky – argument based on the consideration of the mis-matching ratio (viz. whenever the spread between long-term and short-term interest widens, firms tend to finance long-term assets by means of short-term liabilities) – loses its relevance. In this regard, notice that during the phase of the Great Moderation leverage ratios for the nonfinancial businesses were quite stable, or were increasing much less relative to the leverage ratios of the financial businesses or of households. We believe, however, that Minsky's vision can be rescued if 'capital assets' are not reduced to 'capital goods' (see Bellofiore 2009), and if his approach is 'augmented' with Kaleckian and 'circuitist' inputs. The counter-tendencies to an increase in leverage ratios for 'industrial' firms are shown to be stronger than the tendency to an increase. However, they are bound to collapse sooner or later, 'if anything goes wrong' (Minsky 1977), or as a consequence of the same factors contrasting the increase in the firm sector's leverage. The paper grounds this perspective through the construction of a stock-flow consistent accounting model which, on the one hand, is explicitly based on a 'circuitist' view of the economy and, on the other hand, integrates capital asset inflation into it. The new shape of the monetary circuit will be described, with the help of Graziani's insight (2004) and recent contributions by Mario Seccareccia (2010). Capital asset inflation (see Toporowski 2000, 2010) will be shown to be the main force explaining, first, the rise in consumption beyond the limits given by income (deterioration in the wage share), and later on the 'forced' indebtedness of firms (see Steindl 1982; Toporowski 2008).

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1. Introduction

It will be argued that instability is determined by mechanisms within the system, not outside it; our economy is not unstable because it is shocked by oil, wars or monetary surprises, but because of its nature.

Minsky 1986: 172

In the last few years, many financial analysts (see first and foremost Magnus 2007a,b,c,d) and a number of heterodox (but even orthodox) economists (see, for instance, Kregel 1997, 2008; Papadimitriou and Wray 2008; Passarella 2010a; Tymoigne and Wray 2008; Vercelli 2001, 2009a,b; Wray 2008), have referred to the contributions of Hyman P. Minsky as fundamental to understand the tendency of capitalistic 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 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’ implemented by governments and central banks in the hope to avoid a deep depression, namely, to prevent from ‘it’ happens again². It should be plain, however, that the traditional representation of Minsky’s implicit theoretical model has serious internal logical problems, as many authors have convincingly argued (see, first and foremost, Lavoie 1986; Lavoie and Seccareccia 2001; Toporowski 2008; see also Bellofiore and Halevi 2009, 2010a,b).

This paper aims to rescue Minsky’s vision by interbreeding and strengthening his model with both Kaleckian and ‘circuitist’ inputs. In order to do so, second section introduces the reader to the ‘mechanics’ of the financial instability theory, according to (a possible interpretation of) the traditional formulation. Third section shows the limits of Minsky’s ‘hypothesis’ insofar as it is interpreted as a general theory of business cycle. In fourth and five sections we use a stock-flow consistent monetary accounting framework (in the wake of Godley 1996, 1999; Godley and Lavoie 2007a,b; Lavoie and Godley 2001-02; Dos Santos 2005, 2006; Zezza 2010) in order to analyse the trend of the leverage ratio of business sector in the presence of both capital asset inflation and consumer credit. Section six shows how the tradition model of the monetary circuit (in the simplest version supplied by Graziani 2003) needs to be changed in the light of the central role taken by financial markets in Western economies since the end of the 1970s (see Seccareccia 2010). In section seven we show that capital asset inflation may have ‘stabilizing’, although temporary, effects on nonfinancial business sector. Some concluding remarks on the possibility to improve Minsky’s vision, by considering both the tendencies (to financial instability and crisis) and the countertendencies working in the ‘new’ capitalism’, are provided in the last section.

2. The ‘mechanics’ 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 economy as a whole) endogenously move

¹ The definition is derived by Joan Robinson (see Minsky 1986: 176, quoted in De Antoni 2009: 3, endnote 6).

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

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’³ (FML hereafter), and Minsky himself, have often used the *leverage ratio* for corporate sector to this purpose⁴. However, as we have anticipated, the trend of investment leverage ratio for firms as a whole cannot be *ex ante* determined, and this is the result of a macroeconomic missing link in Minsky’s theoretical framework⁵.

In order to shed light on this point, let us consider – as Minsky, following Kalecki (1971), does in his mature works – the macroeconomic equality between the sum of consumption and investment, on the one hand, and the domestic income, on the other hand. Notice that this equality is always *ex post*-validated (namely, it is an *identity*) in an economy with balanced government budget and balanced trade account. Then, by isolating total profit and assuming that wage-earners save anything but their capital incomes⁶, we obtain the well-known Kalecki’s macro-economic gross profit equation:

$$(2.1) \quad \begin{aligned} P_{Gt} &\equiv I_t + C_t - W_t \equiv I_t + [W_t + (1 - \theta_t)P_t - S_{ht}] - W_t \equiv I_t \equiv \\ &\equiv (1 + g_t)I_{t-1} \end{aligned}$$

where P_{Gt} is the total profit gross of bank interests, I_t is the total investment, C_t is the total consumption, W_t is the wage-bill, θ_t is the share of retained earnings, P_t is the total net profit, S_{ht} is the household saving and g_t is the rate of growth of investment. Notice that Minsky hypothesizes that the rate of growth of investment (namely, $g_t = (I_t - I_{t-1})/I_{t-1}$, that we will assume to be exogenous hereafter) is an increasing function of firms’ profit expectations and a decreasing function of their perceived risk on investment, that is, of the *borrower’s risk*.

Internal funds which are available for corporate sector in order to finance investment are the sum of accumulated net profits and the amount of (new) equities issued by firms, that is:

$$(2.2) \quad \Delta A_t \equiv \theta_t P_{t-\omega} + p_{Et} \Delta E_t$$

where $\omega \geq 0$ is a parameter measuring the (possible) time-lag between profit and investment⁷, p_{Et} is the current unit price of shares and ΔE_t is the number of new shares issued by firms⁸.

For Minsky, external funds (essentially bank loans) allow firms to fund the purchase of capital goods (or assets) which cannot be financed by internal resources⁹. Hence, the amount of required external funds equals the difference

³ The definition is drawn from Dos Santos 2005.

⁴ See, for example, Lavoie 1986-87. A more recent work using the product of leverage ratio and mismatching ratio as a better indicator of the financial vulnerability is that of Passarella 2010a.

⁵ 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).

⁶ We will relax this restrictive hypothesis in the next sections.

⁷ As we will argue in the course of the paper, the very existence of this delay must be considered one of the most controversial hidden hypotheses sustaining Minsky’s theory. On this point, see Toporowski 2008: 735; and Passarella 2010a: 78.

⁸ For the moment, we leave aside the question of *where* the funds that are required to purchase these shares come from. Notice, however, that if we assume that wage-earners are the only purchasing sector and they do not hold either cash balances or other assets, then: $p_{Et}\Delta E_t = S_h = (1 - \theta_t)P_t$. Under this condition, we come back to the original Kalecki’s simplified hypothesis, namely, it is as if the whole investment is self-financed ($\Delta A_t = P_{t-\omega}$). This result needs a comment: although it is true that firms use stock market to recover the liquidity that wage-earners do not spend on the commodity market (Graziani 2003: 29, 70), we can also detect a causality that goes from distributed profits to wage-earners’ saving (as $p_{Et}\Delta E_t < S_h = (1 - \theta_t)P_t$, at least), and from this latter to the possibility of issuing shares (namely, the more dividends, the more firms’ equity-financing).

⁹ Actually, firms ‘need finance in order to set up and carry on any kind of production’. Hence, bank loans ‘must cover the cost of total production and is not confined to financing specifically the

between the monetary value of planned investment and the internal funds¹⁰, that is:

$$(2.3) \quad \Delta L_t = I_t - \Delta A_t$$

Obviously, at the end of the period t -th, firms will refund the principal of their bank debt increased by passive interests. These latter depend on both the amount of finance and the bargained overall interest rate, that is:

$$(2.4) \quad J_t \equiv i_t \Delta L_t$$

where i_t is the passive overall interest rate (including all bank burdens) due to banks. This latter is bargained at the beginning of the period. Notice that, for Minsky, this rate is an increasing function of the level of debt-financed investment, because of the *lender's risk* bearing on banks.

Finally, total net profit gained by corporate sector is the difference of total gross profit to total bank passive interests, that is:

$$(2.5) \quad P_t \equiv P_{Gt} - J_t$$

Let us note that equations (2.1), (2.2), (2.3), (2.4) and (2.5) form a system of five equations in five unknowns (P_{Gt} , ΔA_t , ΔL_t , J_t and P_t). Solving the system by the amount of external funds, ΔL_t , we get:

$$(2.6) \quad \Delta L_t = I_t - [\theta_t(I_{t-\omega} - i_{t-\omega}L_{t-\omega}) + p_{Et}\Delta E_t]$$

Then, substituting the (2.2) and the (2.6) into the equation of the *marginal leverage ratio* (calculate as debt-to-capital ratio), we obtain:

$$(2.7) \quad \lambda_t = \frac{\Delta L_t}{\Delta L_t + \Delta A_t} = \frac{\Delta L_t}{I_t} = 1 - \frac{\theta_t(I_{t-\omega} - i_{t-\omega}L_{t-\omega})}{I_{t-1}(1 + g_t)} - e_t \quad (e_t \equiv p_{Et}\Delta E_t / I_t)$$

where e_t is the share of equity-financed investment. We could consider the ‘pure hypothesis’ of Minsky as the case where the amount of equities is negligible ($e_t = 0$)¹¹ and there is a positive time-lag (for instance, one-period lag, $\omega = 1$) between profit and investment. This means that internal funds equal net profits which have been accumulated in the previous period. Given these assumptions, the equation (2.7) can be rewritten as:

$$(2.7') \quad \lambda_t = 1 - \frac{\theta_t}{1 + g_t} (1 - i_{t-1}\lambda_{t-1}) \quad (0 \leq \lambda_t \leq 1)$$

Hence, leverage ratio for corporate sector depends positively on the growth rate of investment, g_t , on the bank rate of interest (in force during the previous period), i_{t-1} , and on the past leverage ratio, λ_{t-1} ; whereas leverage depends negatively on the share of retained profits, θ_t . More precisely, leverage ratio achieves its maximum value (namely, $\lambda_t = 1$) when there are no retained profits ($\theta_t = 0$). On the contrary, leverage ratio achieves its non-negative minimum value (namely, $\lambda_t = 0$) when investment does not grow ($g_t = 0$) and profits are always

production of capital goods’ (Graziani 2003: 69). However, in order to make a comparison with the original Minskian formulation of the FIH, in this section we keep on assuming that firms need loan in order to fund ‘non-self-financed’ investment.

¹⁰ Bank debt is, therefore, the residual term to close the gap between investment and equity finance (plus retained earnings) (see Lavoie and Godley 2001-02: 288).

¹¹ In this case, for the sake of simplicity, we assume that households’ savings are held in the form of cash-balances.

entirely retained (so that $\theta_t = 1$ and $\lambda_{t-1} = 0$). In more intuitive terms, we can assert that leverage ratio increases whenever debt-financed investment, pushed by profit expectations, grows at an *accelerating rate* (namely, whenever g grows)¹², given both the rate of interest and the share of retained profits.

3. Limits of the FIH as a general theory of business cycle

If we assume, like the majority of Minsky's interpreters (and critics), both the absence of any time-lag between investment and (retained) profits and the possibility to finance a (constant) share of investment by issuing equities, then marginal leverage ratio for corporate sector becomes $\lambda_t = (1 - \theta_t - e_t)/(1 - \theta_t i_t)$ ¹³. Now, remembering that $P_{Gt} \equiv I_t$, equations (2.2), (2.3), (2.4) and (2.5) can be simultaneously represented in graphical terms by means of a four-axis diagram (see FIG. 1). On the 'economic' plan, we can detect a causality that goes from investment decisions to aggregate profit, from net profit to internal funds (on the basis of the share of retained profits), from internal funds to bank loan needs, and then from these latter to bank burdens (according to the level of the interest rate). It is easy to verify that, given the share of equity-financed investment, e_t , leverage ratio depends only on the relative trend of the share of retained earnings, θ_t , and the rate of interest, i_t .

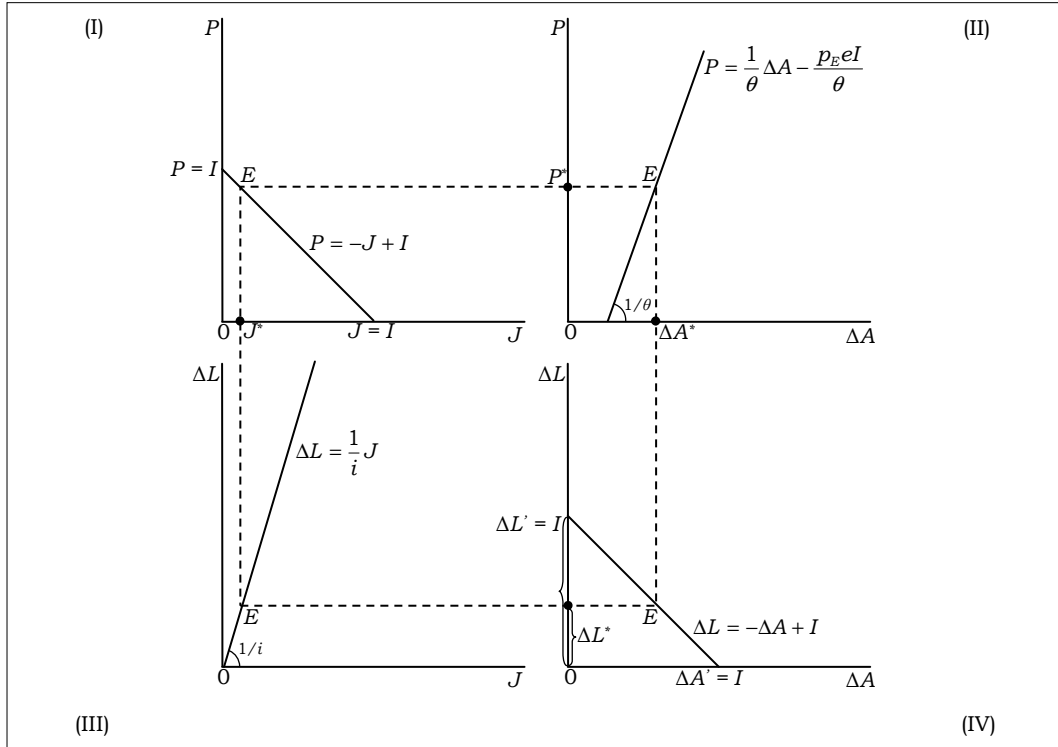


FIG. 1. The determination of internal funds and marginal debt for firms as a whole, given investment decisions (and e_t). The ratio of $0-\Delta L^*$ to $0-\Delta L'$ supplies the measure of marginal leverage ratio.

In FIG. 1 leverage is measured as the ratio of segment $0-\Delta L^*$ to segment $0-\Delta L'$ in quadrant IV, that depends on the slope of the profit-line in quadrant II and the interest-line in quadrant III. Hence, if we assume that both the interest rate and the share of retained earnings are quite stable, then firms' leverage ratio stays

¹² 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 recovered by Passarella (2010a: 79), had been previously acknowledged also by Lavoie that has 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).

¹³ Notice that we are implicitly assuming that $S_h > p_E \Delta E$ (see note 8).

constant as well (because of Kakecki's profit equation), whatever the level of investment.

It should be clear, then, that the hypothesis of growing leverage ratio cannot ground a general theory of business cycle, describing rather the particular case of a *debt-financed investment-led boom*. Broadly speaking, the FIH (interpreted as the idea that 'euphoric' profit expectations lead to growing leveraged investment plans) can be regarded as either a *consistent* theory or a *general* theory, but it cannot be considered both¹⁴. Minsky himself was probably aware of this aspect. However, on the one hand, he thought that financing investment by issuing new shares was, anyhow, a destabilizing factor, because of the extreme volatility in the quotations on equity markets¹⁵; on the other hand, the interconnection in 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)¹⁶. The only necessary condition for the tranquil growth to degenerate into an euphoric boom, and then in an open crisis, is the presence of financial imbalances between economic units and a (wide) positive spread of long-term compared to short-term interest rates¹⁷. Finally, notice that fusion, mergers and takeovers (that characterize phases of high economic growth), insofar as are financed by debt, determine an increase in the global leverage ratio (Passarella 2010a: 80). Indeed, aggregate investment and money profits remain unchanged, whereas total debt of corporate sector increases (as is also underlined by Lavoie 1986: 14).

Yet, as some authors have emphasized, during the 1990s – the years of the so called 'Great Moderation', based on the triad 'traumatised workers, bipolar savers and indebted consumers' (see Bellofiore and Halevi 2009, 2010a, 2010b; Bellofiore, Halevi and Passarella 2010) – not only total debt for the nonfinancial businesses has not increased, but capital asset inflation has allowed 'industrial' firms to finance their activity by issuing shares. Paradoxically, this has had stabilizing (and not destabilizing, as Minsky would have expected) effects on firms' balance-sheets (see Toporowski 2000, 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 (since this inflation process has un-pegged the dynamics of consumption from the dynamics of labour incomes). Consequently, the leverage ratio for the nonfinancial businesses could remain quite stable, just as the leverage ratios of households and financial businesses (namely, pension funds, insurance companies, hedge funds, private-equity funds and investment banks) was increasing more and more. Notice that these are all factors that we have to consider explicitly, whether we want to build both a consistent theory of business cycle and a general monetary analytical framework of the 'new' capitalism.

¹⁴ In formal terms, one could suppose that Minsky's theory is based on the following implicit restrictive assumptions: (i) investment is financed by loans and by retained earnings, but not by shares ($e = 0$); (ii) there is a positive time-lag ($\omega > 0$) between profit and investment, and this latter grows at an accelerating rate ($g, g'(t) > 0$); (iii) the share of accumulated profits, θ , is quite stable (namely, 'ratchet effects' are nil or of a low order); (iv) bank interest rate tends to increase during the upswing ($i'(t) > 0$).

¹⁵ Perhaps this is one of the reasons why he considered new shares anything but 'one class of outside funds' (Minsky 1976: 107; also quoted in Lavoie 1986-1987: 260).

¹⁶ Notice that, insofar as one assumes this point of view, the criticism of 'fallacy of composition' directed to Minsky's theory can be avoided: the fact that aggregate leverage ratio does not grow does not automatically entail that the system as a whole is 'hedge', but only that aggregate leverage is not a good indicator. Indeed, individual financial fragility could anyhow transmit from speculative and Ponzi units to hedge ones. On this point, see also Toporowski 2008: 735.

¹⁷ As for the former condition, see Graziani 2003; as for the latter condition, see Passarella 2010a,b.

4. A SFC Minskian monetary accounting framework

As has been recently argued, models having reference to formal Minskian literature ‘can be phrased as special cases (or “closures”) of a particular stock-flow consistent accounting framework’ (Dos Santos 2005: 711)¹⁸. In the next two sections we are going to develop a stock-flow consistent (SFC hereafter) social framework where five 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 assets; (ii) nonfinancial firms, which produce a single homogeneous output by means of labour and the same good used as input; (iii) commercial and investment banks, which lend credit-money to both (nonfinancial) business sector and households, and other financial operators, which create ‘quasi-money’; (iv) central bank, which creates high-powered money and supplies advances to banking sector; (v) government sector (namely, Treasury), whose expenditure (aimed at purchasing consumer-goods and services) is covered by issuing one-period term treasury-bills. We simplify away foreign sector instead.

More precisely, we adopt a discrete time accounting where: (i) all interest and return rates (on bank loans, i ; on central bank advances, i_M ; on T-bills, i_B ; and on deposits, i_D) are set for a given accounting period; (ii) each rate of interest paid in period t is pre-determined in period $(t-1)$. Furthermore, we assume that: (i) households do not purchase ‘capital’ goods; (ii) nonfinancial firms issue equities, but hold neither treasury-bills nor high-powered money; (iii) government neither demand ‘capital’ goods nor holds equities or cash balances; (iv) banks and intermediaries do not invest in ‘capital’ goods, but issue equities (that are subscribed by households) and hold a share of the nonfinancial business capital stock. Finally, following Minsky (1986: 225) and Dos Santos (2006: 544), we refuse 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 we label ‘Banks and NBF’¹⁹. Notice that this allow us to consider the deep changes that have occurred (especially) in the US banking system during the last twenty years (as we will argue in section 6). However, unlike Dos Santos, we assume that households can get bank loans in order to finance consumption (even beyond the limit of their disposable income) and to purchase new assets. More specifically, we hypothesize that the amount of bank finance received by households is an increasing function of the inflation on the stock market (viz. $L_h = f(\Delta p_E)$, with $f' > 0$).

These assumptions are summarized in a consistent set of sectoral balance sheets where ‘every financial assets 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 stock of assets and liabilities’ (Godley and Lavoie 2001-02: 278)²⁰. More precisely, TAB. 1 presents the nominal balance sheet matrix of the economy and TAB. 2 can be considered the ‘flow-counterpart’ of TAB. 1. For instance, row 4 in TAB. 1 shows that bank credit can be granted to both firms (that need it in order to finance

¹⁸ 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 1993, 1996, 1999; Lavoie and Godley 2001-02; Godley and Lavoie 2007a,b). These models are dynamic, consider the effects of stock magnitudes on flow variables, and explicitly represent the role of the banking system (as underlined in Dos Santos 2006 and Zezza 2010).

¹⁹ Notice, however, that we keep on assuming that only banks are able to create (credit-)money, whereas the other financial units can create ‘quasi-money’ (including ‘derivatives’).

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, as opposed to the [traditional] notion of the firm as an entrepreneur making production decisions’ (Toporowski 2008: 730).

current production and investment) and households (that use it in order to finance consumption or to speculate on the stock market), whereas row 5 in TAB. 2 shows the flow of passive interests going from private sector to banking sector, and from this latter to central bank. Furthermore, TAB. 3 shows uses and sources of funds, that is, the monetary budget constraint faced by each economic sector. More precisely, it demonstrates ‘how the sectoral balance sheets are modified by current flows’ (Dos Santos 2005: 719). Finally, notice that the difference of row 9 in TAB. 2 to row 8 in TAB. 3 must be zero, since ‘every flow comes from somewhere and goes somewhere’ (Godley 1999: 394).

5. Asset inflation, autonomous consumption and leverage ratio

Let us examine how investment leverage ratio of nonfinancial business sector is affected by autonomous consumption of households and capital asset inflation, two of the main features of ‘Money Manager Capitalism’²¹. Total net profit for corporate sector, considered as a whole, can be derived from second column of TAB. 2:

$$(5.1) \quad P_{ft} \equiv C_t + G_t + I_t - W_t - i_{t-1}L_{ft-1} + i_{Dt-1}D_{ft-1} \quad (I_t \equiv p_t \Delta K_t)$$

where G_t is the government expenditure, L_{ft-1} is the amount of loans borrowed (in the previous period) by nonfinancial firms, and D_{ft} is the amount of deposits (held in the previous period).

Notice that aggregate consumption is anything but the difference between the sum of households’ total income (including financial gains, but net of bank burdens) and consumer credit, on one hand, and households’ savings, on the other hand, that is:

$$(5.2) \quad C_t \equiv W_t + (F_{fht} + F_{bt} + i_{Bt-1}B_{ht-1} + i_{Dt-1}D_{ht-1} - i_{t-1}L_{ht-1}) + L_{ht} - S_{ht}$$

where F_{fht} is the amount of dividends paid by nonfinancial firms to households, F_{bt} is the amount of dividends paid by banks and NBFI, B_{ht-1} is the amount of treasury-bills held by households in the previous period, D_{ht-1} is the amount of deposits held in the previous period, L_{ht-1} is the amount of bank loans borrowed by households, and S_{ht} is their current savings.

For the sake of simplicity, we assume that the rate of interest on deposits is negligible ($i_{Dt-1} = 0$) and we leave aside the government sector (so that $G_t = 0$ and $i_{Bt-1} = 0$). Then, substituting (5.2) into (5.1), we get:

$$(5.1') \quad P_{ft} \equiv I_t + X_{ht} - i_{t-1}L_{ft-1} \quad (X_{ht} \equiv C_t - W_t \equiv F_{fht} + F_{bt} - i_{t-1}L_{ht-1} + L_{ht} - S_{ht})$$

where X_{ht} is the (positive or negative) gap between households’ consumption and their wage-bill.

On the other hand, additional internal funds that are available to finance firms’ investment related to t -th period can still be calculated as the sum of retained profits (F_{uft}) and the value of new shares (see TAB. 3, second column, row 6 and 7), that is:

²¹ Before we proceed, note that ‘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. However, in this article we will limit ourselves to develop steps 1 and 2, so the accounting framework that we are proposing cannot be considered ‘dynamic’ in strictly mathematical terms, although it is already dynamic in ‘economic’ terms.

$$(5.3) \quad \begin{aligned} \Delta A_{ft} &\equiv F_{uft} + p_{Eft} \Delta E_{ft} \\ &\equiv \theta_{ft} P_{ft} + p_{Eft} \Delta E_{ft} \end{aligned}$$

If, in the wake of Minsky, we assume that firms use bank credit (only) in order to purchase capital goods, then marginal external funds that corporate sector as a whole needs to realize planned investment are:

$$(5.4) \quad \Delta L_{ft} = I_t - \Delta A_{ft}$$

Substituting identity equation (5.1') into (5.3), and then this latter into (5.4), we obtain the amount of marginal external funds (namely, new bank loans) that nonfinancial business sector needs:

$$(5.5) \quad \underbrace{\Delta L_{ft}}_{[3]} = I_t - \underbrace{\theta_{ft}(I_t + X_{ht} - i_{t-1}L_{ft-1})}_{[1]} - \underbrace{p_{Eft}\Delta E_{ft}}_{[2]}$$

This latter is anything but the Kaldorian budget constraint of firms (see Kaldor 1966), that shows that investment 'must be financed by some combination of retaining earnings [1], sale of new equities [2], and additional borrowing from banks [3]' (Godley and Lavoie 2001-02: 283). Thus, marginal leverage ratio (calculated as debt-to-capital ratio) of corporate sector is:

$$(5.6) \quad \lambda_{ft} = \frac{\Delta L_t}{\Delta L_t + \Delta A_t} = 1 - \theta_{ft} \left(1 + x_{ht} - \frac{i_{t-1}\lambda_{ft-1}}{1 + g_t} \right) - e_t \quad (x_{ht} \equiv X_{ht} / I_t)$$

Leverage ratio depends positively on both the previous interest rate on bank loans, i_{t-1} , and the previous leverage ratio, λ_{ft-1} , whereas it depends negatively on the share of retained profits, θ_{ft} , but also on the share of equity-financed investment, e_t , and on the variable x_{ht} . This latter (if positive) measures the excess of household consumption over wage-bill (per unit of investment). Hence, x_{ht} can be considered a proxy of the so called consumer credit made possible by the access to bank credit. This means that, *ceteris paribus*, the higher the autonomous consumption and the higher the possibility to cover the purchase of capital assets by resorting to the financial market (namely, by issuing equities), the lower the investment leverage ratio. Notice that, given the ratio $\Delta E_{ft}/I_t$, the percentage e_t measures the inflation on the capital asset market. Notice also that the leverage ratio depends negatively on the rate of growth of investment, g_t . This happens because, in absence of a temporal delay between profit and investment, the more g_t , the lower the incidence of passive interests over firms' balance sheets.

Now, it is easy to verify that nonfinancial 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 sectors. More precisely, besides firms' sale revenues (here measured by x_{ht}), households directly affect the amount of new equities issued by nonfinancial business sector (ΔE_{ft}), as well as the market value of stocks (p_{Eft} , and hence e_t), and indirectly affect the share of retained earnings (θ_{ft}) (for instance, insofar as managers are driven to maximize the shareholder value); banks and NBFI directly affect the overall rate of interest on loans (i_{t-1}), as well as ΔE_{ft} and p_{Eft} (and hence e_t), and indirectly affect θ_{ft} ; central bank, in turn, indirectly affects the effective rate of interest paid on bank loans, i_{t-1} , and then firms' dividend policy (θ_{ft}), as well as the quotations on the stock market (p_{Eft} and ΔE_{ft}); and so on. Thus, all these actors affect the solidity of nonfinancial business sector balance-sheets. For instance, an increase in the autonomous consumption of households, insofar as increases net profit of nonfinancial firms, allows these latter to reduce their need of external funds.

Analogously, inflation on equity market allows firms to replace bank borrowing with ‘cheaper’ long-term capitals, and hence reduces investment leverage ratio. Finally, notice that, in the presence of capital asset inflation, banks are forced to shift towards consumer-credit and change their nature into fee-related business, insofar as they lost nonfinancial business sector as main costumer. This process could be the result of spontaneous euphoria, but also the outcome of a specific expansive monetary policy pursued by central bank²². We will come back to this point during next sections.

6. The monetary circuit in the ‘Money Manager Capitalism’

In a recent (unpublished) work, Mario Seccareccia has underlined 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 saving 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 nonfinancial business sector itself into a net lender’ (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 complete reversal of the traditional monetary circuit, where banking system is assumed to finance business sector activity (current production and, at a lower level of abstraction, investment plans). In the money manager capitalism, ‘the traditional link between 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. 2 (at the end of the paper) the simplest version of the ‘traditional’ monetary circuit is represented by the sequence (1)-(7). In short: (1) banks grant credit to industrial 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 this initial finance to pay a wage-bill to households, in order to purchase the labour-power that they need; (3a) households devote a share of their savings in form of bank deposits; (3b) the remaining share of savings flows into the financial market on the purchase of securities (we simplify away cash balances); (4) this kind of expenditure comes back to the non-financial firms’ sector as a whole; (5) firms pay interests (or dividends) on the amount of securities held by households; (6) these latter, in turn, spend their non-saving income in the commodity market; (7) insofar as firms get back their monetary advances, firms are able to repay the principal of their bank debt²³.

As we have already mentioned, the process of financialization has involved a deep change in the logical structure of the monetary circuit. The strategic position of banking system and financial markets in the new capitalism is depicted in FIG. 3 (at the end of the paper). On the one hand, the creation of credit-money has been increasingly sustained by households’ indebtedness, L_{ht} , rather than by the demand for finance of the business sector – see arrow (6) and

²² In a sense, capital asset inflation can be considered, at the same time, cause and consequence of the change regarding US banking sector.

²³ We leave aside the question of the repayment of bank interests in monetary terms. For a complete analytical description of the ‘traditional’ monetary circuit, see Graziani 2003.

in FIG. 3. On the other hand, household indebtedness ‘has fuelled the expansion of speculative derivatives because of the demand arising from the growing savings of the nonfinancial corporate sector’ (Seccareccia 2010: 6) – see arrows (7) and (10) in FIG. 3. This new form of the monetary circuit can be analyzed in a SFC way with the assistance of TAB. 1, 2 and 3²⁴. At this regard, we assume that (initially at least) firms express two different demands for bank loans: (i) the *stricto sensu* ‘initial finance’ that business sector as a whole needs to cover the cost of current production (L_{fwt} , equal to the wage-bill, W_t); and (ii) a further demand for credit allowing each single firm to cover the share of investment that cannot be financed by internal resources (L_{fkt} on the whole, where $L_{fkt} + L_{fwt} = L_{ft}$). Following Graziani (2003: 100-105), we determine first the level of the money price of output. The monetary value of aggregate supply is:

$$(6.1) \quad AS_t \equiv p_t \pi_t N_t$$

where p_t is the (unknown) money price of output, π_t is the average output per worker, and N_t is the employment²⁵. On the other hand, if we simplify away government expenditures, foreign sector and taxes, then aggregate demand for consumption and investment is:

$$(6.2) \quad AD_t \equiv C_t + I_t \equiv (W_t + X_{ht}) + p_t \Delta K_t$$

Now notice that: (i) the money wage-bill is the product of the unit wage and the level of employment, $W_t \equiv w_t N_t$; (ii) the (positive or negative) excess of households’ consumption over the wage-bill can be expressed as a percentage of money wages, $X_{ht} \equiv \alpha_t W_t$; (iii) real investment is anything but a share of output, $\Delta K_t \equiv k_t \pi_t N_t$ ²⁶. Hence, (6.2) can be re-written as:

$$(6.2') \quad AD_t \equiv w_t N_t (1 + \alpha_t) + k_t p_t \pi_t N_t$$

As usual in the ‘circuit’ literature, the equilibrium price level is determined by the equality between demand and supply, $AD_t = AS_t$, which gives for:

$$(6.3) \quad p_t = \frac{w_t}{\pi_t} \frac{1 + \alpha_t}{1 - k_t}$$

that depends on the unit cost of labour (the left-hand ratio) and on the profit margin of nonfinancial business sector (the right-hand ratio)²⁷. This latter, in turn, depends on the average propensity to invest of nonfinancial firms, k_t , and on the value of α_t (viz. the opposite of the overall average propensity to save of households, that is an increasing function of consumer credit). Notice that if the propensity to invest of firms equals the overall (or ‘augmented’) propensity to save of households, then $k_t = -\alpha_t$ and hence the equilibrium price equals the monetary 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. Finally, notice that $\alpha_t > 0$ entails that households (as a

²⁴ Among works suggesting an integration of SFC Post-Keynesian modelling to the theory of monetary circuit, see Godley 1999, Zezza 2004 and Pilkington 2009.

²⁵ Let us observe that if we consider n firms (or sectors) producing n different goods (with $n \geq 2$), then the hypothesis that supply is *given* in real terms becomes inconsistent with the hypothesis of tendential uniformity of 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, allow us to overcome this problem (to a first approximation, at least).

²⁶ In fact, one can assume that ‘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 $[k_t]$ of aggregate product’ (Graziani 2003: 101).

²⁷ Notice that the rate of profit (gross of interests) is: $r_t = (1 + \alpha_t) / (1 - k_t) - 1 = (\alpha_t + k_t) / (1 - k_t)$.

whole) spend more than their labour-incomes. However, this does not necessarily mean that households get into debt, unless their net financial incomes are zero or negative.

7. The ‘stabilizing’ effect of capital asset inflation on business sector

In order to test the effect of capital asset inflation on the behaviour of nonfinancial business sector, within a SFC basic model of monetary circuit, we have to come back to the macroeconomic equation of profit. Before we proceed, notice, however, that the term ‘capital asset’ (perhaps one of the most controversial Minskian recurring expression) is considered in a wide sense (when it is not differently indicated). It means not only ‘physical capital goods’, but also ‘equities’ (or even bonds, derivatives and any asset – including houses – used to make money) representing capital goods on the financial market. Then, from the identity (5.1'), we get:

$$(7.1) \quad \begin{aligned} P_{Gft} &\equiv P_{ft} + i_{t-1}L_{ft-1} \equiv I_t + X_{ht} \equiv \\ &\equiv k_t p_t \pi_t N_t + \alpha_t w_t N_t \end{aligned}$$

that supplies the equation of total gross money profit for nonfinancial firms considered as a whole. Obviously, total gross profit in real terms is equal to money profit divided by the price level, that is:

$$(7.2) \quad RP_{Gft} \equiv \frac{P_{Gft}}{p_t} \equiv \pi_t N_t \frac{k_t + \alpha_t}{1 + \alpha_t}$$

As we would expect on the basis of the well-known Kaleckian macro-accounting framework, if consumption equals the money wage-bill ($C_t = W_t \Rightarrow \alpha_t = 0$), then real profits before bank interests equal real investment ($RP_{Gft} \equiv k_t \pi_t N_t \equiv \Delta K_t$) and firms earn exactly what they have spent on investment ($P_{Gft} \equiv I_t$).

Finally, total money profit net of interests paid on bank loans is:

$$(7.3) \quad P_{ft} \equiv k_t p_t \pi_t N_t + \alpha_t w_t N_t - i_{t-1}L_{fwt-1}(1 + \beta_{t-1}) \quad (\beta_{t-1} \equiv L_{fkt-1} / L_{fwt-1})$$

where β_{t-1} is the ratio of loans funding investment spending to loans covering wage-bill spending.

Hence, *ceteris paribus*²⁸, an increase in the value of α_t , and a reduction in the ratio β_{t-1} produce an increase in net monetary profits gained by nonfinancial business sector. This is exactly what happens when nonfinancial firms decide to reduce their investment plans, in presence of growing consumption. Insofar as the positive effect involved with the change in α_t , and β_{t-1} is greater than the negative effect involved with the reduction in k_t , nonfinancial firms take advantage of a disinvestment. So a question emerges: what do these variables depend on? As we are going to argue, both these variables are affected (directly or indirectly) by the trend of capital asset markets. More precisely, the higher the capital asset inflation, the higher the total net money profit of nonfinancial business sector. This happens because: first, the higher the capital asset inflation, the larger the consumer credit (L_{ht}) granted by banks to household sector and, consequently, the larger the percentage α_t ; second, the higher the capital asset inflation, the higher the possibility that the planned investment is internally financed with cheaper and long-term capitals (namely, the lower β_{t-1})²⁹.

If this is true, then capital asset inflation could have a stabilizing (and not

²⁸ Namely, given the scale of production (π_t, N_t), the unit cost of the labour-power (w_t), the cost of the bank loans (i_{t-1}) and hence the amount of initial finance (L_{fwt-1}).

²⁹ This point has been clearly underlined by Toporowski 2000, 2010.

destabilizing, as Minsky would have expected) effect on the balance-sheet of business sector, since it reduces both the leverage ratio and the so called ‘mismatching ratio’ (namely, the average frequency that units of each economic sector have to resort to the refinancing of debt, per unit of time)³⁰. Notice that the same process of capital asset inflation affects negatively the propensity to invest (in capital goods), k_t . In fact, the more the possibility to realize financial (capital) gains, the less the convenience to purchase capital goods. Whenever this happens, the final effect on total net money profit of business sector is ambiguous.

Finally, notice that an expansive monetary policy may have a ‘crowding out’ effect on the banking activity. Indeed, the resulting increase in the capital asset market value could cause a change in the profile of customers of banks. These latter could be led to shift towards credit consumer or even other financial activities, since nonfinancial business sector can easily borrow funds on financial markets. The same increase in consumer credit is another factor allowing firms to increase their internal funds (in form of retained profits), so reducing their demand for bank loans (L_{fkt} and hence β_{t-1}). 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 sector. Obviously, the overall viability of this system depends on the possibility for 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, and that is historically linked to the prevailing conventions in the financial and credit markets, rather than to specific algebraic formulations.

8. Final remarks

In previous sections we have developed a SFC basic model of monetary circuit in order to analyze the effects produced on balance-sheet of business sector by the deep changes occurred in the economic and financial structure of western capitalist economies. Now, we are able to explain why, although Minsky’s financial instability hypothesis has seemed to eventually come true at the beginning of the summer 2007, it has occurred with a different set of modalities and through a different concatenation of factors compared to the original Minskian formulation. The point is that in the post 2003 upswing, as well as during the boom of the 1990s, the countertendencies to an increase in the leverage ratio for nonfinancial business sector have been stronger than the tendency to an increase (tendency that Minsky considered the main factor of financial fragility).

Among these countertendencies, we have stressed the role played by consumer credit in sustaining firms’ gross profit, the function held by capital assets inflation as stabilizing factor for the business sector balance-sheets, and finally the increasing sway of banks and other NBFIs over savers. All these factors have generated a ‘new’ capitalism where the wage deflation has cohabited with the increase in the market value of financial assets, and where flat private investments in fixed capital and declining government social expenditures have cohabited with a huge increase in the indebtedness of household sector (in Anglo-Saxon countries, at least). As recent events have shown, this was an explosive mix which was doomed, since the beginning, to flow into a ‘Minsky meltdown’ and then into a global crisis.

³⁰ This has a double positive effect on the profit: on the one hand, it increases sale revenues; on the other hand, it reduces the necessity to borrow bank credit, therefore reducing passive interests.

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Tables and figures

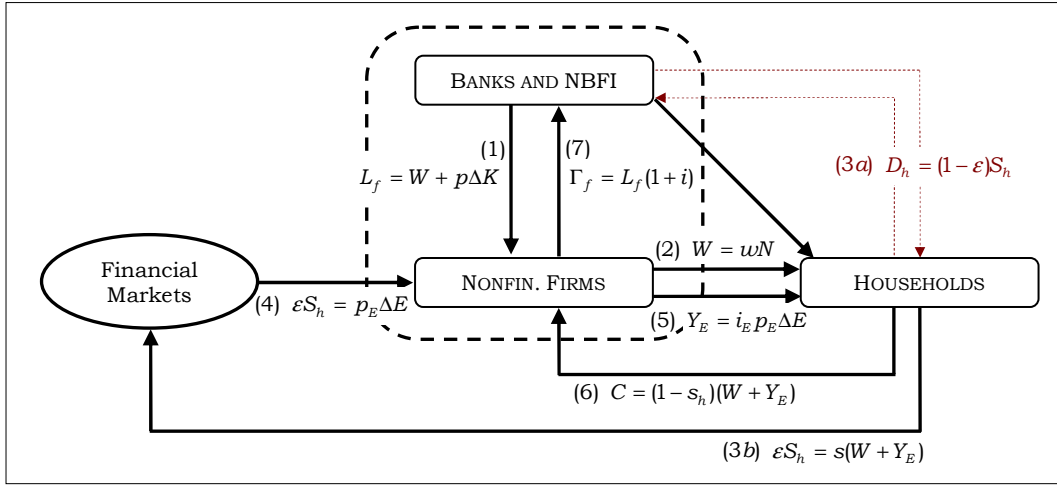


FIG. 2. The traditional monetary circuit. We simplify away government sector and central bank. Notice that ΔE is the quantity of generic securities (bond or equities, whose yield is $Y_E = i_E p_E \Delta E$, where i_E is the return rate on securities and p_E is their price) purchased by households, Γ_f is the firms' debt and ε is the share of savings held in form of securities. We also assume that the rate of return on deposits is negligible.

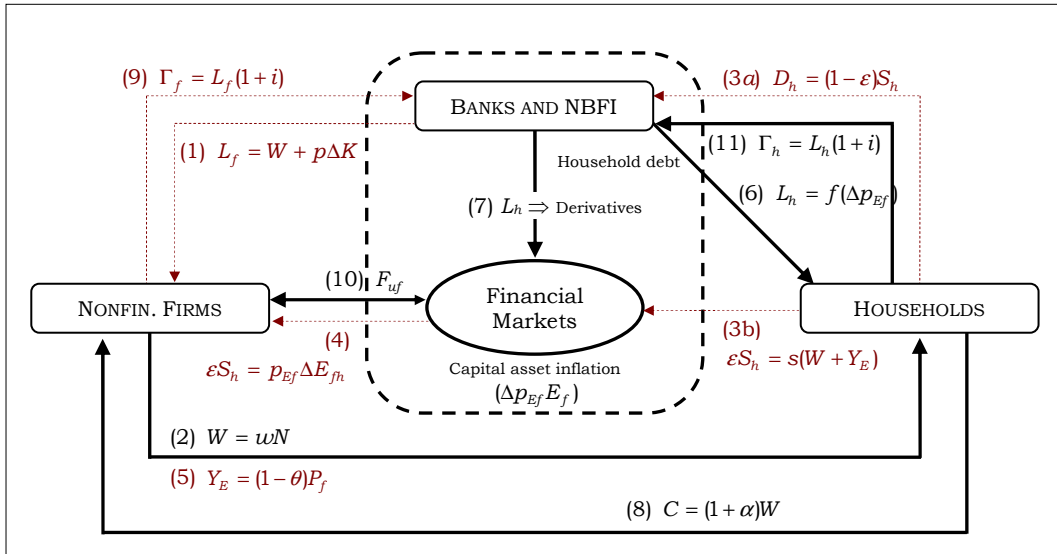


FIG. 3. The paradoxical form of the monetary circuit in the 'new' capitalism (see Seccareccia 2010). Broken arrows show the weakening of the traditional monetary link between firms, banks and households. Notice that α is the excess of households' consumption over wage-bill (as a percentage of the wage-bill) and Γ_h is households' indebtedness.

TAB. 1. Nominal balance sheets of each economic sector

	Households	Nonfinancial Firms	Banks and NBFI	Central Bank	Government	Totals
1. High-powered money	$+H_h$		$+H_b$	$-H$		0
2. Central bank advances			$-M$	$+M$		0
3. Bank deposits	$+D_h$	$+D_f$	$-D$			0
4. Bank loans	$-L_h$	$-L_f$	$+L$			0
5. Treasury bills	$+B_h$		$+B_b$	$+B_c$	$-B$	0
6. Capital goods		$+pK$				$+pK$
7. Equities	$+p_E E_f + p_{Eb} E_b$	$-p_E E_f$	$+p_E E_{fb} - p_{Eb} E_b$			0
8. Net worth (Totals)	$+V_h$	$+V_f$	$+V_b$	0	$-B$	$+pK$

Notes: A '+' before a magnitude denotes an asset, whereas '-' denotes a liability; p_E is the unit price of equities and E is the number of equities issued; p stands for the unit price of output and K is the number of 'capital' goods; set of 'Banks and NBFI' includes financial firms.

TAB. 2. Nominal transactions among economic sectors

	Households	Nonfinancial Firms		Banks and NBFI	Central Bank	Government	Totals
		Current	Capital				
1. Consumption	$-C$	$+C$					0
2. Government expenditures		$+G$				$-G$	0
3. Investment (capital goods)		$+p\Delta K$	$-p\Delta K$				0
4. Wages	$[+\Delta L_h] + W$	$-W$					0
5. Interest on loans	$-i_{t-1}L_{ht-1}$	$-i_{t-1}L_{ft-1}$		$+i_{t-1}L_{t-1} - i_{Mt-1}M_{t-1}$	$+i_{Mt-1}M_{t-1}$		0
6. Interest on Treasury bills	$+i_{Bt-1}B_{ht-1}$			$+i_{Bt-1}B_{bt-1}$	$+i_{Bt-1}B_{ct-1}$	$-i_{Bt-1}B_{t-1}$	0
7. Interest on deposits	$+i_{Dt-1}D_{ht-1}$	$+i_{Dt-1}D_{ft-1}$		$-i_{Dt-1}D_{t-1}$			0
8. Dividends	$+F_{ft} + F_b$	$-F_f$		$+F_{fb} - F_b$	$-F_c$	$+F_c$	0
9. Totals (current saving)	S_h	F_{uf}	-	F_{ub}	0	S_g	S_{tot}

Notes: A '+' before a magnitude denotes a receipt, whereas '-' denotes a payment; there are neither taxes nor a foreign sector; we simplify away both investment in inventories and capital depreciation; ΔL_h is counted in the (first) column total, but not in the (fourth) row total.

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

Changes in:	Households	Nonfinancial Firms	Banks and NBFI	Central Bank	Government	Totals
1. Cash	$+\Delta H_h$		$+\Delta H_b$	$-\Delta H$		0
2. Central bank advances			$+\Delta M$	$-\Delta M$		0
3. Bank deposits	$+\Delta D_h$	$+\Delta D_f$	$-\Delta D$			0
4. Bank loans	$[-\Delta L_h]$	$-\Delta L_f$	$+\Delta L$			0
5. Treasury bills	$+\Delta B_h$		$+\Delta B_b$	$+\Delta B_c$	$-\Delta B$	0
6. Capital		$+p\Delta K$				0
7. Equities	$+p_{Ej}\Delta E_{jht}+p_{Eb}\Delta E_b$	$-p_{Ej}\Delta E_f$	$-p_{Eb}\Delta E_b+p_{Ej}\Delta E_{jb}$			0
8. Totals (current saving)	S_h	F_{uf}	F_{ub}	0	S_g	S_{tot}
9. Net worth (acc. memo)	$S_h+\Delta p_{Ej}E_{jht-1}+\Delta p_{Eb}E_{bt-1}$	$F_{uf}-\Delta p_{Ej}E_{jft-1}+\Delta pK_{t-1}$	$F_{ub}-\Delta p_{Eb}E_{bt-1}+\Delta p_{Ej}E_{jbt-1}$	0	S_g	$S_{tot}+\Delta pK_{t-1}$

Notes: A '+' before a magnitude denotes a *use* of funds, whereas '-' denotes a *source* of funds; notice that the difference of row 9 in TAB. 2 to row 7 in TAB. 3 is always zero; ΔL_h is counted in the (fourth) row total, but not in the (first) column total.