Equity and debt in a financialised economy: the French case

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Abstract

While many studies have been devoted to capital accumulation and rate of profit, the article empirically characterises the financialization at the level of firms' liability, i.e. at the level of debt and equity. In particular, the determinants of non financial firms' indebtedness and equity issuing will be analysed econometrically. The theoretical framework is mainly Post-Keynesian, with the founding role played by Minsky (1986) and with Stock Flow Consistent models proposed by Lavoie and Godley (2001), Godley and Lavoie (2007), Taylor (2004) and Dos Santos and Zezza (2008)with their analysis of interactions between financial variables and investment. The article is based on the flow of funds accounts of INSEE which provide coherent data in flows and stocks over the period 1978-2007. Thanks to a precise account of financial assets and liabilities and capital gains, these data allow to implement a rigorous analysis of firms' financial behaviour at the macroeconomic level.

Key words: finance, investment, portfolio behaviour, growth regime.
JEL classification : G11, E12, E22, C32.

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1. Introduction

Since the 1980s non financial firms have been marked in France by significant structural changes. After a profitability crisis during the 1970s, the rate of profit has recovered in the second half of the 1980s and has returned to levels close to those which prevailed at the end of the 1960s. However this movement has not led to a lasting recovery of growth and capital accumulation. Beyond a temporary retreat, mass unemployment persisted. This configuration, characterized by a restored profitability of capital but with limited gains of productivity and a persistent unemployment, has been regarded as a new mode of extensive accumulation. Changes that occurred at the financing level constitute another outstanding feature of the period. Increases of real interest rates at the beginning of the 1980s, financial liberalization, development of direct finance, norm on equity return and boom of the stock market have deeply changed firms' financial structure and corporate governance. An abundant literature endeavoured to analyze the financialized accumulation regime of the 1990s (Aglietta and Rebérioux, 2004; Duménil and Levy, 2004; Boyer, 2000; Stockhammer, 2004; van Treeck, 2008). Since 2007 this financialized regime has entered in crisis.

While many studies have been devoted to capital accumulation and rate of profit, the article empirically characterises the financialization at the level of firms' liability, i.e. at the level of debt and equity. In particular, the determinants of non financial firms' indebtedness and equity issuing will be analysed econometrically. The theoretical framework is mainly Post-Keynesian, with the founding role played by Minsky (1986) with his analysis of interactions between financial variables and investment leading to periodic crises of over-accumulation and over-indebtedness. The article is based on the flow of funds accounts of INSEE which provide coherent data in flows and stocks over the period 1978-2007. Thanks to a precise account of financial assets and liabilities and capital gains, these data allow to implement a rigorous analysis of firms' financial behaviour at the macroeconomic level.

The paper is organized as follows. A second section summarizes the main tendencies of the last thirty years in France as regard firms' financial structure. Detailed attention is paid to indicators of financial profitability and indebtedness. A third section specifies the theoretical framework on debt and equity. A fourth section presents econometric estimates regarding firms' indebtedness and equity issuing. A final section concludes.

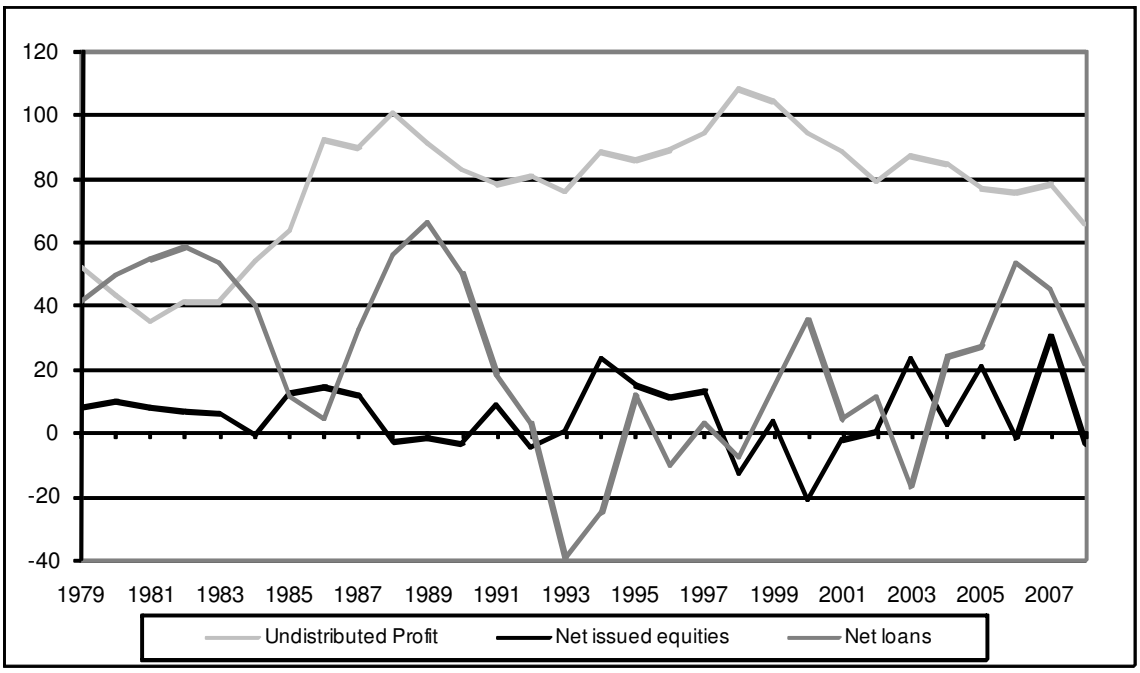
2. Debt and equity in the French financialised economy

At the level of non financial companies, evolutions of the accumulation rate and economic rate of profit are well documented (Stockhammer, 2004; von Treeck, 2008; Clévenot et al., 2009). Less attention is paid to debt and equities and change in firms' financial structure, although it is one of the main characteristics of the financialized mode of accumulation which has settled since the 1990s in France. The main stylised facts will be described over the last three decades, regarding, first, firms' financial structure, second, the associated rates of return. This will give some support to the following econometric works.

2.1 Financial liberalisation and firms' financial structure

The conjunction of a restored rate of profit and a limited resumption of investment led to high rates of self-financing since the end of the 1980s that only the erosion of retained earnings at the beginning of the 2000s has, partly, called into question. Firms' financing structure can be first summarised in a very simplified way using three kinds of aggregates, the undistributed profit, the flow of net issued equities and the flow of net credit (each of them in percentage of total investment, including housing). It shows the prominent role plaid by retained earnings, the declining share of net credit, especially during the beginning of the 1980s and of the 1990s, and the limited contribution of net issued equities. This statement, although often made, must be interpreted cautiously as, apart from retained earnings, the two other sources of financing are consolidated and too aggregated (figure 1). This can lead to underestimate the role played by loans and equities in financing capital accumulation.

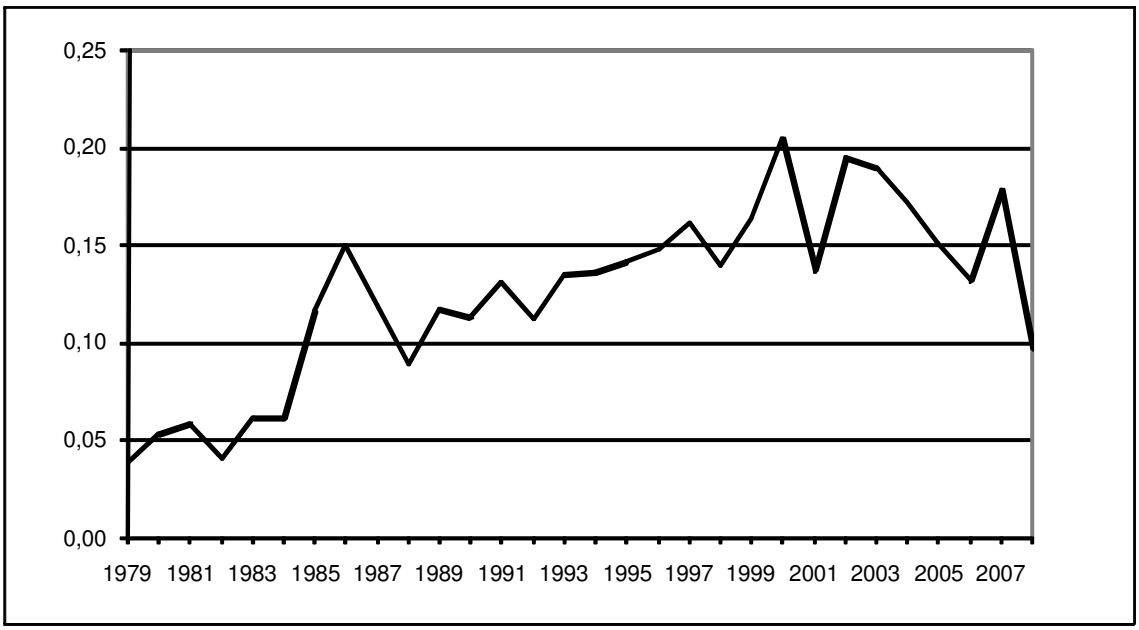
Figure 1: Financing structure of total investment, including housing, in %
(non financial companies)



This can be illustrated in another way by a ratio relating new issued equities to the total flow of investment, both fixed and financial. This ratio has increased at the beginning of the 1980s with the rising interest rates. Since the middle of the 1980s this ratio has fluctuated around 15%, increasing during equity prices booms and period of higher profitability, but decreasing with equities price downturns and decline of interest rates since the 1990s. The boom of the share of new issued equities during the 1990s has been partly offset during the 2000s (figure 2).

Figure 2: New issued equities (in % of total fixed and financial investment)

$p_e\Delta E / (p_k I + \Delta FA)$



Beyond these simple data in flows, main transformations induced by financial liberalization can be better read at the level of firms' balance sheet. The accounting framework used is the INSEE flow of funds at the level of non financial companies. Table 1 recalls the main inherited variables.

Table 1: Non financial companies' balance sheet

Asset	***Liability***
Non financial asset ($p_k K$) Other non financial assets (OK)	
Financial assets (FA) Monetary assets (M) Other assets (OA) Equities ($p_e E_e$)	Financial liabilities (FL) Loans (L) Other liabilities (OL) Equities ($p_e E$)
Total asset (A)	Net Wealth (NW)

Financial Assets = FA = Monetary assets (M) + Other assets (OA) + Equities held (pe Ee)

Total Assets = A = Non financial assets ($p_k K$) + Other non financial assets (OK) +Financial assets (FA)

Other non financial assets (OK) include housing and inventories

Financial liabilities = FL = Loans (L) + Other liabilities (OL) + Equities issued (p_e E)

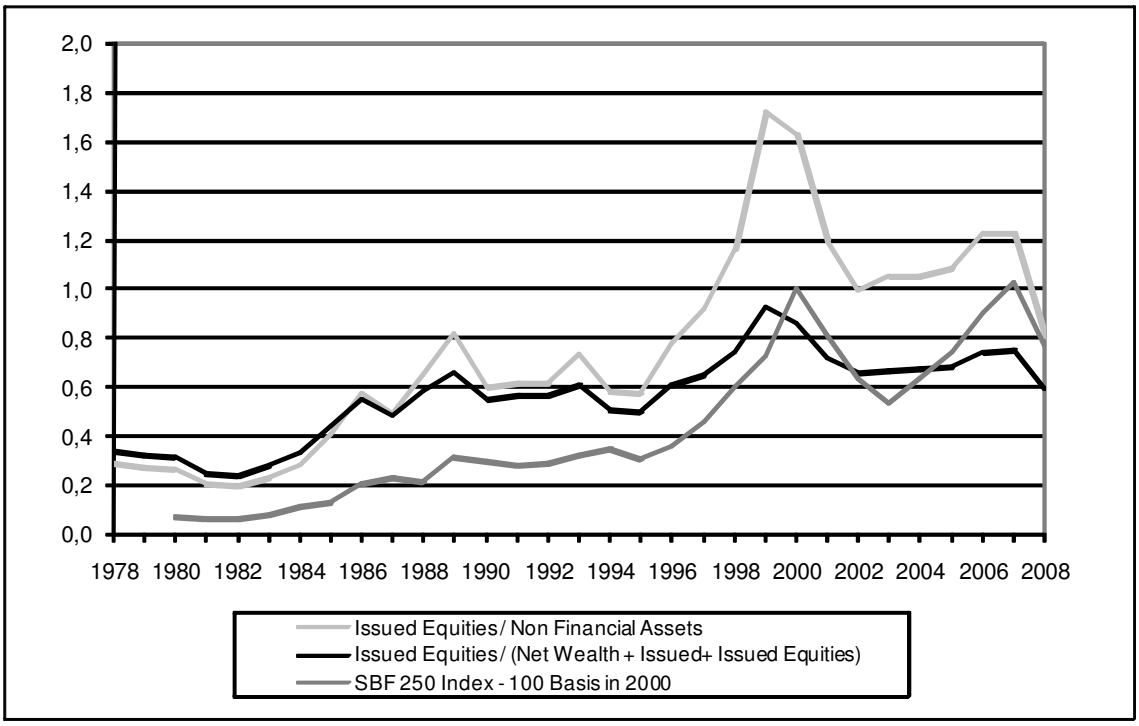
Own Funds = OF = Net Wealth (NW) + Equities issued (pe E)

Total asset (A) = Total loans (L + OL) + Own funds (OF)

Variables in stocks are measured at the end of the year.

Financialization is often illustrated by the rise of Tobin's Q ratio, either measured by using the Q_1 ratio dividing equities by non-financial assets, or by using the Q_2 ratio dividing equities by own funds. In both cases equities' share has increased in two waves in the second part of the 1980s and 1990s with the boom of the stock market (figure 3). Equities prices play an important role in this evolution with the valorisation at market prices of the stock of equities. The decrease of the Tobin's Q ratio after the bust of the stock market in 1987, 2002 and 2008 gives an other illustration. This valorisation effect explains the partial divergence which is observed between flows and stock ratios.

Figure 3: Tobin's Q ratios



Q_1= equities/non financial assets = $\frac{p_e \Delta E}{p_k K}$

Q_2= equities/own funds = equities/ (net wealth + equities) = $\frac{p_e E}{NW_e + p_e E}$

Regarding firms' indebtedness, a contrasted assessment can be given according to the definition used for the debt ratio. Expressed as a percentage of own funds or of total assets, non financial companies' debt was reduced in a significant way in two successive waves, first at the end of the 1980s in a context of restoration of profit, then at the end of the 1990s with the boom of the stock market, this whatever the indicator of debt used, in a strict sense or in a

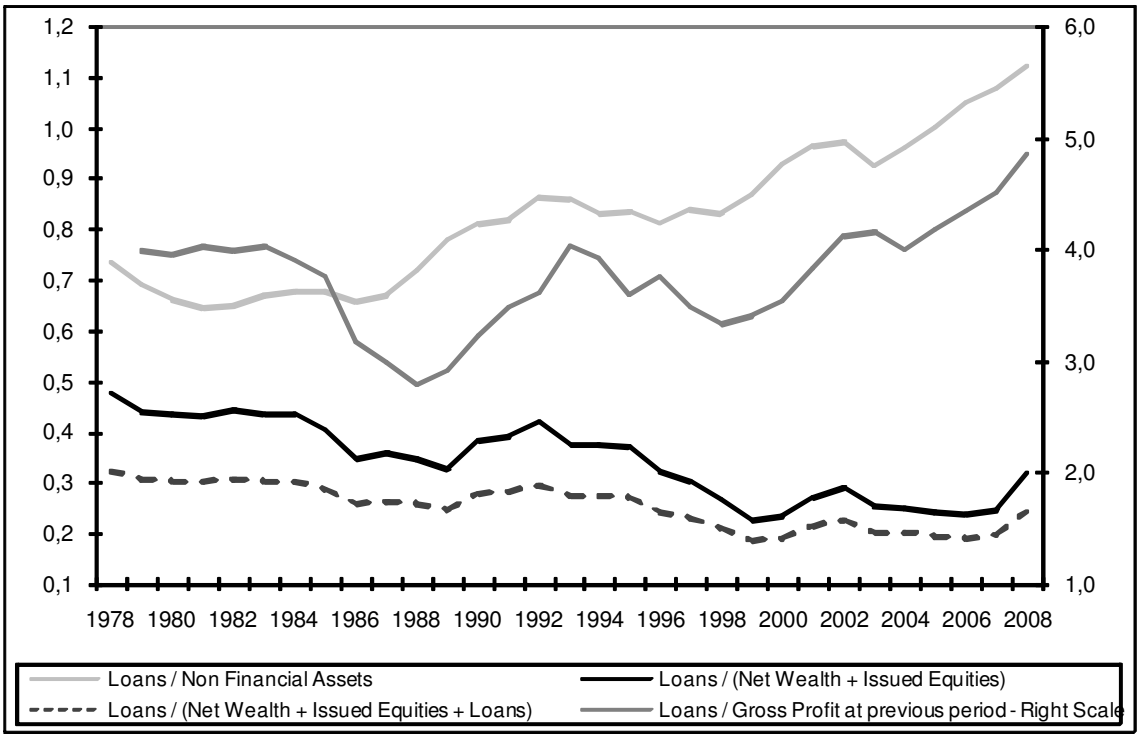
broad sense (figure 4). High level of profit rate and low inflation are favourable to a reduction of the debt ratio. However, as previously, equities' price boom plays a main role in these evolutions by increasing the valorisation of financial assets and own funds, which mechanically reduces the debt ratio's denominator. In spite of this reduction of the debt ratio, firms can be threatened by over-indebtedness in case of stock market's return.

On the contrary, the debt ratio measured only in percentage of the fixed capital stock (non financial fixed assets) has increased in three waves at the end of the 1980s, 1990s and 2000s. This debt increase can be linked to the rate of accumulation recovery during the first two periods and to the declining real rate of interest since the middle of the 1990s.

Lastly, a stock-flow ratio, in terms of capacity of refunding, dividing total debt at the beginning of the period by the gross profit, leads to a similar assessment as regards debt. The ratio is stable until the end of the 1990s, but with large fluctuations. It has decreased in the middle of the 1980s during the profit restoration and during the period of slow growth of the first half of the 1990s, but has increased since the 2000s, partly due to declining profitability (figure 4).

The divergence between these different debt ratios is here also mainly explained by the valorisation effect which increases own funds and reduces the corresponding debt ratios.

Figure 4: Debt structure of non financial companies

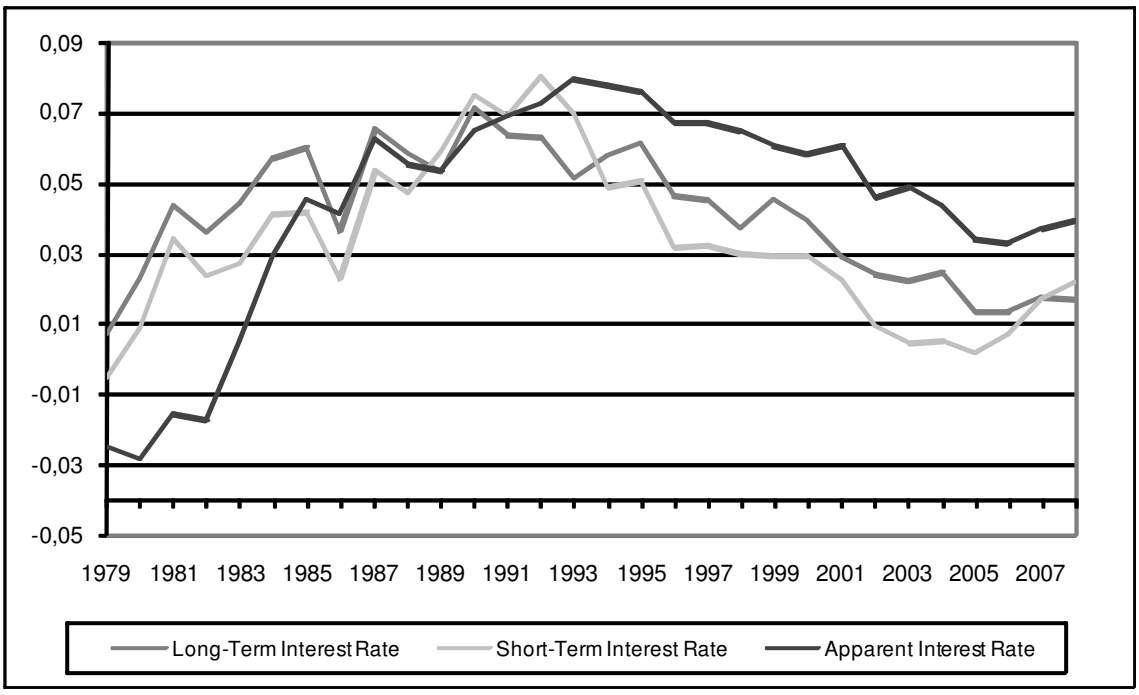


2.2 Interest rate and financial profitability

Interest rate, as remuneration of loans, and financial profitability, as rate of return of equities, can now be considered.

Interest rates have known a major rupture in 1979 following the change operated as regards monetary policy and the will to ensure a better remuneration for lenders. In spite of the progressive fall of nominal rates with the inflation slowdown, real interest rates have remained very high in France until the first half of the 1990s, partly because of tensions existing within the EMS. The decline of real interest rates appeared only in the second half of the 1990s. Beside short-term and long-term interest rates, the apparent interest rate, which relates interests paid to the stock of debt, gives another measure of the cost of debt for non financial companies. Its profile is slightly different. The initial rise is more progressive, but the apparent rate remains more durably high, especially in real terms (figure 5). This large movement of the real cost of credit had a significant impact on firms' financial behaviour, pushing them to reduce their indebtedness during the first part of the period and to issue more new equities.

Figure 5: Real interest rates (deflated by GDP price)
(apparent interest rate = interest paid/ total loans)



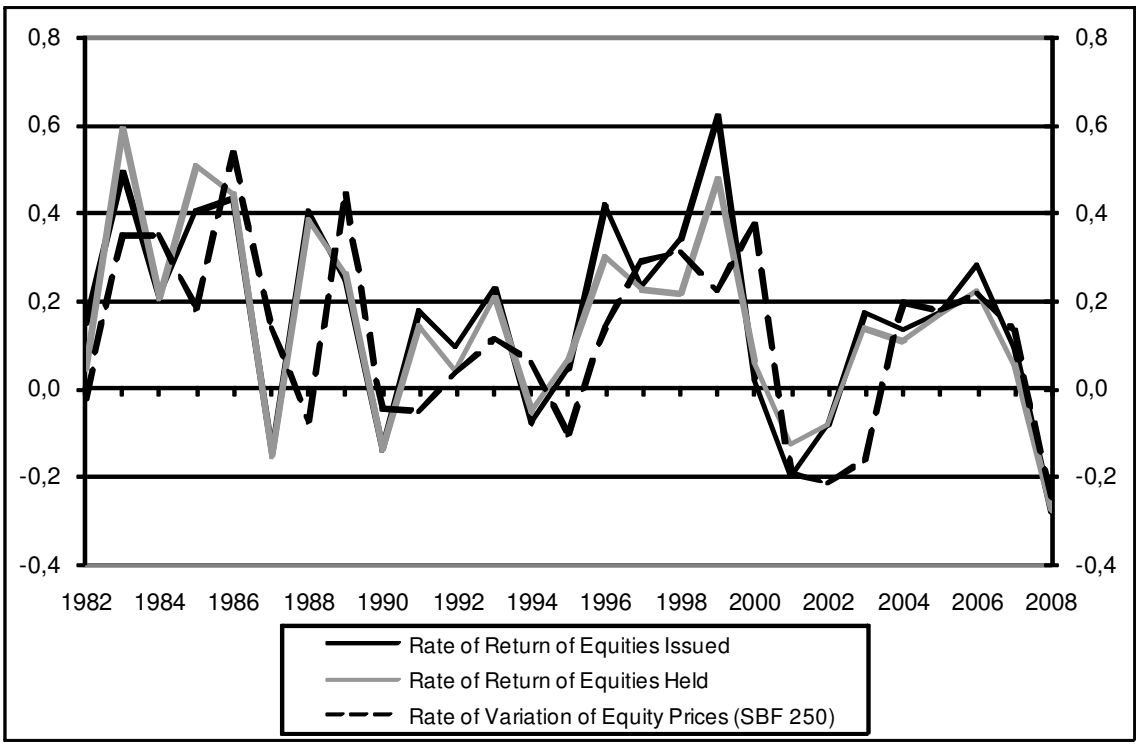
Financial profitability calculated with respect to own funds or equities must be considered. But its measure is not straightforward at the macroeconomic level. When a simple gross

financial rate of profit is used, problems of consolidation appear. Flow of funds accounts are built like an aggregation of not consolidated accounts, estimated at market values, which tends with cross participations to simultaneously inflate asset and liability of non financial companies, without increasing profit at the numerator in the same proportion. With the rise of share prices and the re-evaluation which results, net wealth and owns funds of non financial companies are revalorized without taking into account capital gains in the measurement of profit. Consequently, a considerable skew appeared in the measurement of financial profitability, whereas the return on equity (ROE), traditionally used on companies' data, incorporates exceptional incomes with realized capital gains.

Another macroeconomic indicator of financial profitability suggested by Godley and Lavoie (2001) appears preferable and is well suited to the INSEE flow of funds accounts. The rate of return on equities (r_e) is the sum of distributed dividends and capital gains divided by the value of equities issued by non financial companies and recorded as liabilities (figure 6).

The rate of return on equities is highly variable. Fluctuations are mainly determined by capital gains, i.e. by the growth rate of equities price, the dividend ratio on equities being stable. The rate of variation of share prices representative index (SBF 250) appears to be highly correlated with the rate of return on equities. Peaks of financial profitability, with nearly 60 % in 1986 and 1999, alternate with negative profitability during stock exchange crises, as in 1987, 2001 and 2007. Although fluctuations are much larger, a comparison can be made with variations of the ROE calculated for non financial companies of the SBF 250 (du Tertre and Guy, 2008). Indeed, one notes that the average return on equities issued is around 25% over the 1978-1989 period and around 19% from 1996 to 2007. However, the earlier 1980s represent a period where the value of issued or held equities was very low. Given the value reached from now on by these equities, it is crucial to note that maintaining such levels of profitability represented a significant financial effort for firms.

Figure 6: Rate of return on equities issued by non financial companies and rate of variation of equity prices



Definition of the re and ree ratios

The rate of return on issued equities re is defined as:

$$re = \frac{CG + DD}{(p_e E)_{-1}} = \frac{E_{-1}\Delta p_e + DD}{(p_e E)_{-1}} = \frac{\Delta pe}{(p_e)_{-1}} + \frac{DD}{(p_e E)_{-1}}$$

With DD = distributed dividends, CG = Capital Gains on issued equities, p_e = equities price and E = number of issued equities.

The rate of return on equities held ree is defined as:

$$ree = \frac{CGe + RD}{(p_e Ee)_{-1}} = \frac{Ee_{-1}\Delta p_e + RD}{(p_e Ee)_{-1}} = \frac{\Delta pe}{(p_e)_{-1}} + \frac{RD}{(p_e Ee)_{-1}}$$

With CGe = capital gains on equities held, RD = received dividends, Ee = number of equities held.

On the whole, the financialization of the growth regime which settled in France since the second half of the 1980s can be illustrated by the increasing share occupied by equities in the liability side of non financial companies. However, in terms of flows, the share of new issued equities in total investment has less increased. This apparent divergence between flows and stock ratios can be easily understood by the valorisation at market prices of the stock of equities which increase equities' share during periods of booms of the stock market.

Firms' debt ratios can be appreciated in a contrasted manner according to the definition used. Measured in percentage of total assets or own funds, evaluated at market prices, they have decreased, largely thanks to the equities' price boom. But, measured in percentage of fixed capital or gross profit, they have increased in the long run. Here again, the valorisation effect has played an important role.

In a context of falling interest rates, since the middle of the 1980s in nominal terms, since the second half of the 1990s in real terms, stock exchange prices flew away in three successive waves, stopped by crashes of 1987, 2001 and 2007. These flights contributed to the revalorization of own funds, while financial profitability reached high levels at the end of the 1980s and the 1990s with cyclic evolutions of large amplitude.

3. Debt and equity: a tentative Post-Keynesian framework

Finance and investment have been examined in a large and controversial literature. New Keynesians have paid a lot of attention to financial markets and their impact on growth and cycles. Their main idea is that higher firms' net wealth favours more abundant credit, lower risk and higher investment. Increasing net wealth leads to a financial accelerator effect which can generate cycles based on debt led growth mechanisms. The micro-foundations of macroeconomic are rather sophisticated, but the landing on macroeconomic modelling is sometimes rude.

Post-Keynesians privileged more directly a macroeconomic approach. They have a long tradition of analysing the links between profit and accumulation and the debt led growth regime in the line of Kalecki (1943; 1954) and Minsky (1986). Not enough attention is paid to firms' financial structure and equities, although they are key issues of the financialized accumulation regime. Among Post Keynesians, the Stock Flow Consistent (SFC) approach seems well suited to analyse these questions. Thanks to a complete description of the balance sheets of each agent and of the associated current flows, the main components of Post-Keynesian macroeconomic models can be incorporated in a consistent way: relations between capital accumulation and income distribution, wealth effects especially for rentiers, valorisation effects due to capital gains or losses, debt led regime with Minskyan perspective.

In a rather convergent manner, Lavoie and Godley (2001), Godley and Lavoie (2007), Taylor (2004), Dos Santos and Zezza (2008) have proposed SFC models including most of these factors. Although close, these models differ in some points. Godley and Lavoie use computer simulations to study the nature of the growth regime while Taylor and Dos Santos and Zezza study analytically the dynamics of their models.

Beyond this methodological divergence, the models differ in the way they deal with debt and equities issues. There are actually two alternative closures of the model to represent how firms finance their capital accumulation. Godley and Lavoie, Dos Santos and Zezza and Taylor, in one of his models, retain an equation describing the issued equities. Consequently, credit demand by firms is simply determined as a residual of the firms' financing account. Alternatively, Taylor, in two other versions of his models, retains an explicit firms' credit demand equation with no issued equities or with equities determined as a residual of firms' budget constraint[2]. These questions are not discussed in details in the SFC literature and may not be central for models' properties. But this arbitrage between debt, equity and retained profit is important in the growth regime which prevailed since the 1990s.

A more detailed analysis of the theoretical basis of these debt and equity equations seems useful to support applied econometric works. In this perspective, a very simplified SFC framework will be outlined with two model's versions corresponding to the main closures previously discussed.

3.1. A simplified SFC framework

We retain a simplified SFC framework of a closed economy with three institutional sectors, households, firms and banks. The aggregated assets and liabilities of these sectors are presented in table 2. The current flows associated with the previous stocks are described in table 3. Households keep their wealth in bank deposits and equities. They receive wages from firms, interest on their deposits from banks, dividends from firms and banks. They use their income to buy consumption goods and save. They have no housing investment, nor debt. Firms finance their fixed capital using loans, equities and retained profit. They use sales receipts to pay wages, dividends and interests on their lagged loans, retaining the rest to help finance fixed investment. Banks collect households' deposits and make loans to firms. They receive interest from their loans and use it to pay interests on households' deposits. They distribute all their profits, so their net wealth is equal to zero. In this SFC approach saving

[2] As it will be seen later, the treatment of the interest rate will not be the same according as equities are described or ignored.

flows and capital gains affect end of period stocks, which, in turn, will affect next period's income flows, as shown in table 3.

Table 2: Aggregate balance sheets of the institutional sectors

	Households	**Firms**	**Banks**	**Total**
Capital		+pK		$+p_kK$
Deposits	+D		-D	0
Loans		-L	+L	0
Equities	p_eE	$-p_eE$		0
Net wealth	V_h	V_f	0	$-p_kK$

Table 3: Current transactions and flows of funds

	Payments or uses of funds				**Receipts or sources of funds**			
	Households	Firms		Banks	Households	Firms		Banks
Goods	pC		$p_k\Delta K$			pY		
Wages		W			W			
Interests		i_lL_{-1}						i_lL_{-1}
				i_dD_{-1}	i_dD_{-1}			
Dividends		Div		F_b	$Div+F_b$			
Savings	S_h	F_u		0				
					S_h		F_u	0
ΔDeposits	ΔD							ΔD
ΔLoans				ΔL			ΔL	
ΔEquities	$p_e\Delta E$						$p_e\Delta E$	
ΔNet wealth (memo)					$\Delta V_h = S_h + E_{-1}\Delta p_e$		$\Delta V_f = F_u - E_{-1}\Delta p_e$	0

p_e = price of one equity; E = number of equities, p = price level supposed constant

pY = production, pC = consumption, pΔK = fixed investment

As our main focus is the debt-equity issue, we keep very simple equations in a broad Post-Keynesian tradition for the aggregate demand and the income distribution. Households have a usual consumption function with a wealth effect (equation 1). The investment function follows a neo-Kaleckian specification where the rate of accumulation depends of the profit

rate, the capacity utilization rate and negatively of the interest paid (equation 3). The share of wages is constant (equation 5). Dividends and undistributed profit are determined by simple rates of saving (firms with s_f in equation 6 and banks with a rate of saving equal to zero in equation 7). Other equations are accounting identities (2 and 4) or definition equations for rate of profit (8) and rate of capacity utilization (9).

$$pC = c(W + i_d D_{-1} + Div + F_b) + \alpha Vh_{-1} \quad (1)$$

$$S_h = W + i_d D_{-1} + Div + F_b - pC \quad (2)$$

$$\Delta K/K_{-1} = g_0 + g_1 u + g_2 R - g_3 i_l L_{-1}/p_k K_{-1} \quad (3)$$

$$W + i_l L_{-1} + Div + F_u = pY \quad (4)$$

$$W/pY = \lambda \quad (5)$$

$$F_u = s_f\ (pY - W - i_l L_{-1}) \quad (6)$$

$$F_b = i_l L_{-1} - i_d D_{-1} \quad (7)$$

$$R = (pY - W)/\ p_k K_{-1} \quad (8)$$

$$u = Y/\ K_{-1} \quad (9)$$

$$pY = pC + p_k \Delta K \quad (10)$$

Regarding households' financial behaviour and following Godley and Lavoie (2007), households are supposed to share their wealth between deposits and equities in relation with the relative rates of return of the two assets, the interest rate i_d for the deposits and the rate of return on equities r_e (equations 11 and 12 where $p_e E^d$ represents households' equities demand). The rate of return on equities is, as previously explained, the sum of dividends and capital gains divided by the value of equities (equation 13). Last, the increase of the value of households' wealth is given by their budget constraint (equation 14).

$$peE^d = V_h\ (\beta_0 - \beta_1\ i_d + \beta_2\ r_e) \quad (11)$$

$$D = V_h - p_e E^d = V_h\ (1 - \beta_0 + \beta_1\ i_d - \beta_2\ r_e) \quad (12)$$

$$r_e = (Div + E_{-1}\Delta p_e)/\ (p_e E)_{-1} \quad (13)$$

$$\Delta V_h = \Delta D + p_e \Delta E + E_{-1}\Delta p_e = S_h + E_{-1}\Delta p_e \quad (14)$$

Regarding firms' and banks' financial behaviours, two alternative closures of the model can be considered.

3.2 A first closure with issued equities

According to Lavoie and Godley (2001), Godley and Lavoie (2007) and Taylor (2004, page 273, Taylor 1 later on), firms are supposed to finance a percentage x of their fixed investment by issuing new equities (equation 15). This is regarded as a simplification which can also be found in Kaldor (1966). In the same line, Dos Santos and Zezza (2008) adopt a slightly different hypothesis assuming that firms keep a fixed rate χ between the number of issued equities E and the volume of fixed capital K (equation 15bis). They consider that this is roughly in line with the New-Keynesian literature on equities rationing which will be discussed more in details below.

$$p_e \Delta E^s = x\,(p_k \Delta K) \qquad (15)$$

$$E^s = \chi K \qquad (15\text{bis})$$

As equities' price p_e is supposed to clear the market, it is given by the equality between equities' supply and demand.

$$E^s = E^d \qquad (16)$$

Firms' demand for bank loans is obtained from their budget constraint (equation 17).

$$\Delta L^d = p_k \Delta K - F_u - p_e \Delta E \qquad (17)$$

Last, banks are assumed to be passive and to provide loans as demanded by firms (equation 18). In this pure credit banking system the supply of money is endogenous with deposits held by households as liability and loans to firms as asset. Banks distribute all their profit and their net wealth is equal to zero (equation 19). Interest rate on credit i_l is just a fixed mark up on interest rate on deposit i_d which is regarded as exogenous and determined by the monetary policy (equation 20).

$$L^s = L^d \qquad (18)$$

$$L = D \qquad (19)$$

$$i_l = (1+m)\, i_d \qquad (20)$$

The short term macro equilibrium can be computed from equations 1 to 10. We obtain a traditional IS curve (equation (21)) linking the capacity rate of utilization (u), the rate of interest ($i = i_l = i_d$ for simplification), the lagged debt ratio ($\frac{L}{p_k K}$) and the lagged households' wealth ratio ($\frac{V_h}{p_k K}$). As pointed by Taylor (2004), effective demand is generally debt burdened, but can be debt led through interest received by households and profit distributed.

$$c[(\lambda + (1 - s_f)(1 - \lambda))u + s_f i L_{-1}/p_k K_{-1}] + \alpha V_{h-1}/p_k K_{-1} + g_0 + (g_1 + g_2(1 - \lambda))u - g_3 i L_{-1}/p_k K_{-1} = u \quad (21)$$

The evolution of these two ratios, debt ratio of firms and wealth ratio of households, and the two other key variables, the equities price and the equity ratio $\frac{E}{K}$, are given by a system of four dynamic equations which have been studied in more details by Dos Santos and Zezza (2008). Derived from the firms' budget constraint, the debt ratio is given by equation (17').

$$\Delta L/p_k K_{-1} = g - s_f\,[(1 - \lambda)u - i L_{-1}/p_k K_{-1}] - p_e \Delta E/p_k K_{-1} \quad (17')$$

Derived from the households' budget constraint, the wealth ratio is given by equation (14').

$$\Delta V_h/p_k K_{-1} = (1 - c)\,[(\lambda + (1 - s_f)(1 - \lambda))u + s_f\, i L_{-1}/p_k K_{-1}] + E_{-1}\, \Delta p_e/p_k K_{-1} \quad (14')$$

The equities price p_e and the equity ratio $\frac{E}{K}$ result from households' equities demand (equation 11') and equities issued by firms (equations 15')

$$p_e E^d /pK_{-1} = V_h /p_k K_{-1}(\beta_0 - \beta_1 i_d + \beta_2 r_e) \quad (11')$$

$$pe\, \Delta E^s /p_k K_{-1} = x\, g \quad (15')$$

or $E^s/K = \chi$

with g= rate of accumulation = $\Delta K/ K_{-1} = g_0 + (g_1 + g_2(1- \lambda))u - g_3 i L_{-1}/p_k K_{-1}$

3.3 An other closure with loan demand

Following Taylor (2004) in another model on Minskian financial cycles (page 299, Taylor 2[3]), a loan demand by firms can be introduced with a negative effect of interest rate and a positive effect of expected profit rate $R^e = R + \rho$, where R is the observed rate of profit and ρ an indicator of business confidence.

$$L^d/p_k K_{-1} = \alpha_0 - \alpha_1 i_1 + \alpha_2 R^e \qquad (22)$$

$$R^e = R + \rho \qquad (23)$$

The model is now closed by new issued equities determined as a residual by firms' budget constraint (equation 24).

$$pe\Delta E^s = p_k \Delta K - F_u - \Delta L^d \qquad (24)$$

Equities' price p_e is always supposed to clear the market and is given by the equality between equities' supply and demand (equation 16). The rest of the model is unchanged with banks providing all loans demanded by firms (equations 18 to 20).

In spite of a difference in the closure, the two models are rather close. In the previous one, firms' demand for bank loans is obtained as a residual from their budget constraint (equation 17) and can be written

$$\Delta L^d /p_k K_{-1} = \Delta K/K_{-1} - F_u /p_k K_{-1} - pe\Delta E/p_k K_{-1} \qquad (17)$$

Equations 15 and 6 allow us to write firms' demand for bank loans in the previous model as:

$$\Delta L^d /p_k K_{-1} = (g_0 + g_1 u + g_2 R - g_3 iL_{-1}/p_k K_{-1})(1 - x) - s_f [R - iL_{-1}/p_k K_{-1}] \qquad (25)$$

Equations (22) and (25) are close. In both models firms' credit demand includes a positive effect of the profit rate R (if $g_2(1 - x) - s_f > 0$) and a negative effect of the interest rate (if $g_3(1 - x) - s_f > 0$. In the first model demand for bank loans is obtained as a simple residual of

[3] Actually it must be noticed that the whole framework of Taylor 2 model is different as it includes a loan supply by banks, an endogenous rate of interest i and an exogenous money supply as in a traditional IS-LM model.

firms' budget constraint. In the second it reflects explicitly firms' financial behaviour with, consequently, new issued equities determined as a residual.

In a third model by Taylor (2004, page 267, Taylor 3) on endogenous money via bank lending, it is also assumed that firms have a loan demand function such as:

$$L^d/p_k K_{-1} = f^d (i_l, g) \qquad (26)$$

in which g is the rate of accumulation ($\frac{\Delta K}{K_k}$) with a positive influence and i_l the credit interest rate with a negative effect. This specification is close to the previous ones (22) and (25). But the whole framework of this Taylor 3 model is rather different. It includes a loan supply by banks, an endogenous rate of interest clearing the loan supply and demand and firms have no equities. It will not be developed in more details and we will only keep the idea of a loan demand function.

In conclusion, issued equities equation and loan demand can be alternatively introduced to close the financial part of Post-Keynesian growth model but the specification adopted remains rather simple. The lessons which can be drawn from the New-Keynesian literature can give some support in spite of the difference of methodology.

3.4 Lessons from New-Keynesian literature

New Keynesians have examined in details the impact of financial markets on growth and cycles. Detailed microeconomic foundations are developed and based on asymmetric information. Two approaches seem more relevant for our purpose, the first by Greenwald and Stiglitz on financial market imperfections and business cycles, the second by Bernanke, Gertler and Blinder on agency costs, net wealth and credit.

In several papers Greenwald and Stiglitz (1993; 2003) focus on asymmetric information between firms issuing new equities which know ex ante more about the efficiency of project investments than potential buyers. Firms face the risk of bankruptcy, but can lower bankruptcy costs with higher net wealth, which lead them to invest more. A succession of upswing and downturn can be generated. During upswing, real wages rise and the growth of net wealth slowdowns. With increased bankruptcy risk, firms hesitate to issue more equities

and cut their investment, causing a downturn. In that sense there is equity rationing. During the slowdown, profit and net wealth are progressively restored and the cycle can continue.

The active role played by issuing new equities in Greenwald and Stiglitz's models can be compared with the first closure of the financial part of our model (equations (15) or (15bis) for equities issued). In spite of some convergence in the approach, the notion of equity rationing of New Keynesians with its impact on investment is more constraining, as it induces investment cut in case of rationing. On the contrary, in Godley, Lavoie and Taylor 1 approach, bank loans appear as an adjustment variable in the firms' budget constraint without constraining investment. Secondly, the treatment of equity prices is different. They are not studied as such in Greenwald and Stiglitz's model and the general price is a random variable submitted to shocks.

Bernanke and Gertler (1990) analyse the relation between lenders and borrowers in which only the second know ex post exactly how the investments have worked. Lenders have to build a system of monitoring to reduce their uncertainty but they support agency costs. As higher firms' net wealth reduces these agency costs, it reduces lender's risk cost and favours more abundant credit and higher investment. Redistribution of wealth between creditors and debtors happen over the cycle. Increasing net wealth leads to a financial accelerator effect which can generate cycles based on debt led growth mechanisms.

It can be linked to a more traditional model of Bernanke and Blinder (1988) where firms finance their investments by bank loans or by issuing bonds. Bonds' interest rate and credit cost differ, due to financial markets imperfection. They have both a negative effect on investment, but influence loan demand and bonds issuing with opposite signs. A high credit cost leads to finance more by issuing bonds and less by credit while high bonds' interest rate favours loans at the expend of bonds. The equilibrium of the loan market, with loan demand by firms and loan supply by banks, based on their unborrowed reserves, lead to a relation between bonds' interest rate and credit cost. Consequently, the monetary policy, through banks' reserves, has a broader impact on loan supply and on investment without variation of bonds' supply and of bonds' interest rate.

A comparison can be made with the second closure of our model. In both cases there is a loan demand function by firms (equation (22) in our model). But in the New Keynesian approach banks are more active with a loan supply function related to risk costs and firms' net wealth. This is closer to Taylor 2 and 3 models where banks have a loan supply function and

credit interest rate clears the loan market. On the opposite, in Godley, Lavoie and Taylor 1 models, banks are assumed to be passive and to provide loans as demanded by firms.

The micro-foundations of New Keynesian macroeconomic are far from Post-Keynesian macro-modelling, even if their macroeconomic stories present, at the end, some similarities with Post-Keynesian ones. However some support can be found for the two alternative closures of the financial part of Post-Keynesian growth models, an issuing equities equation on the one hand, a loan demand function on the other.

Following Greenwald and Stiglitz's formulations, issuing equities could be related positively to firms' net wealth or economic rate of profit, as representative of good environment and low risk. Two other variables could be added. Following Bernanke and Linder's formulations, credit cost would play positively while the rate of return on equities would play negatively. Symmetrically, loan demand function would be explained negatively by the interest rate and positively by the rate of return on equities.

3.5. Equity and debt: key equations

Based on the previous analysis, the content of these two equations can be specified before beginning econometric analysis.

Equity issuing

Issuing equities is a few explored territory from an econometric point of view. Two versions can be considered according as we focus on new issued equities or on the total stock of issued equities.

New issued equities can be kept constant, in percentage of fixed investment only as a first simplification as in Godley and Lavoie or Taylor 1 model (equation 15). In flow of funds accounts, firms don't hold only fixed investment, but also financial assets (see table 1 at the beginning of the article). Consequently, it is preferable to write new issued equities in percentage of the total flow of non financial and financial investment $\frac{p_e \Delta E}{p_k \Delta K + \Delta FA}$. Furthermore, the ratio is not constant and depends of several variables, as it has been analysed previously.

First, it is determined by the two alternative capital costs, the rate of interest of credit (i_l) with a positive effect ($a_1 > 0$), as higher credit cost leads to lay more on equities to finance accumulation, the rate of return on equities (r_e) with a negative sign ($a_2 < 0$), as a higher rate of return on equities makes loan comparatively cheaper. The economic rate of profit (R) plays also positively ($a_3 > 0$) as a safe economic environment and low risk facilitate the recourse to the financial market.

As the equity relative price ($\frac{p_e}{p_k}$), compared with the fixed capital price index, fluctuates largely with the phases of boom and bust of the stock exchange, it has to be introduced as another explicative variable.

Last, the level of indebtedness at the end of the previous year can intervene positively ($a_5 > 0$) if a high debt ratio incites firms to improve their financial structure. Conversely, an important indebtedness may increase the risk and make equity issuing more difficult. So, there is incertitude on the exact sign which is expected.

Consequently, the following medium run specification will be estimated:

$$p_e\Delta E/ (p_k\Delta K + \Delta FA) = a_0 + a_1 i_1 + a_2\ re + a_3\ R + a_4\ p_e/p_k + a_5 (L/p_k K) \qquad (27)$$

with a_1 , a_3, $a_4 > 0$, $a2 < 0$ and $a_5 > 0$ or < 0.

$p_e\Delta E$ = new issued equities, $p_k\Delta K$ = fixed investment, ΔFA= variation of firms' financial assets, $p_k\Delta K + \Delta FA$ = total firms' investment (variation of total firms' assets), i_l = rate of interest on credit, R= economic rate of profit, $\frac{p_e}{p_k}$ = equities' relative price to investment price, $\frac{L}{p_k K}$ = debt ratio, L = total loan, OF = own funds = issued equities + net wealth, L + OF = total firms' assets.

Regarding issued equities, it is also preferable, with flow of funds accounts, to scale them by the total liability (or the total asset) and not by the sole fixed capital, as proposed by Dos Santos and Zezza (2008) in their theoretical model.

The ratio issued equities/total liability $\frac{p_e E}{L + p_e E}$ is determined by the same set of variables as in the case of new issued equities, the rate of interest of credit (i_l) with a positive effect ($b_1 > 0$), the rate of return on equities (r_e) with a negative sign ($b_2 < 0$), the economic rate of profit (R) with a positive impact ($b_3 > 0$), as a good economic environment and low risk facilitate

the recourse to the financial market. In the same way, a sustained accumulation of fixed capital is representative of good expectations and can have a positive impact.

Two last variables are introduced, the relative equities price ($\frac{p_e}{p_k}$) for taking into account the fluctuations of equities prices ($b_4 > 0$), the level of indebtedness with a positive effect, as a too high level of debt leads firms to try to improve their liability structure ($b_5 > 0$).
The following medium run specification will be estimated:

$$p_e E/ (L + p_e E) = b_1 i_1 + b_2 r_e + b_3 R + b_4 p_e/p_k + b_5 (L_{-1}/P) \quad (28)$$

$$p_e E/ (L + p_e E) = b_1 i_1 + b_2 r_e + b_3 \text{Log } K + b_4 p_e/p_k + b_5 (L_{-1}/P) \quad (28\text{bis})$$

with $b_1 > 0$, $b_2 < 0$, $b_3 > 0$, $b_4 > 0$, $b_5 > 0$.

p_eE = issued equities at market prices, $L + p_eE$ = total liability, r_e = rate of return on equities, K = fixed capital, L/p_kK = ratio of total loans and fixed capital assets (alternatively, the ratio L_{-1}/P = Total (t-1) debt on gross profit will be used).

This specification is close to the one used in the Bank of France's macro-econometric model during the 1990s (Banque de France, 1993). Issuing equities was determined in the long run by the rate of return on equities and comparative costs of various modes of financing. Firms operated arbitration between financing by debt and issuing equities. The structure of the financial liability (in terms of share of equities) depended thus on three series of factors. A rise in the credit cost encouraged firms to more finance on own funds, whereas a rise of the rate of return on equities pushed to resort to the credit. Firms were also sensible to their debt structure. A degradation of their capacity of refunding could encourage firms to finance more with new issuing equities.

Loan demand and indebtedness norm

A loan demand function is more traditional in applied macro-econometric modelling, although not always with the specification we proposed. It has three main determinants, the interest rate on credit (i_l) with a negative impact ($c_1 < 0$), the rate of return on equities (r_e) with a positive effect, as higher rate of return on equities incites firms to borrow more and issue less equities ($c_2 > 0$) and the rate of profit (R) with a more controversial impact, as it may be positive following Taylor (2004), but can also be negative if a gross profit's decrease limits the retained profit and incites to borrow more ($c_3 >$ or < 0).

Lastly, according to Taylor 3 model, the capital rate of accumulation has a positive effect on the loan demand (c4 > 0).

Loan demand can be written in terms of debt ratio, related to the fixed capital stock $\frac{L}{p_k K}$, or in terms of a capacity of long-term refunding, measured by the stock of debt divided by profit (L_{-1}/P). It leads to the following medium term specifications which will be estimated:

$$L/p_k K = c_0 + c_1\, i_1 + c_2\, r_e + c_3\, R + c_4\, \text{Log}\, K \qquad (29)$$

$$L_{-1}/P = c_0 + c_1\, i_{1\text{-}1} + c_2\, r_{e\text{-}1} + c_3\, R_{-1} + c_4\, \text{Log}\, K_{-1} \qquad (29\text{bis})$$

with $c_1 < 0$, $c_2 > 0$, $c_3 > 0$ or < 0, $c_4 > 0$.

This specification is closed to the approach in terms of firms' norm of indebtedness which is interpreted as a reduced equation resulting both from banks' and firms' behaviour. Banks impose a maximum debt due to the risk of insolvency. Shareholders seek to increase financial profitability through the leverage effect, which induces a minimum debt. This analysis can be found in Breton and Aglietta (1999) and also in the macro-econometric model of the Bank of France already mentioned (Banque de France, 1993).

4. Econometric results

4.1. Data

The following results have been obtained for non-financial companies in France between 1978 and 2008, with annual data to respect the coherence of flow-of-funds accounts established by the INSEE. Almost all the data are estimated in accordance with the new 2000 base. Thanks to an analysis of the overlapping period, it appears clearly that the studied variables are only little affected by the choice of base, in level as in evolution.

K is the *fixed capital stock* (INSEE data AN11 – AN1111); R is the economic rate of profit which reports the *profit* earned during the present period on the past *stock of fixed capital* (INSEE data B2); i_{ltr} is the long-run real *interest rate*, i.e. the inflation-adjusted average long-run interest rate of French financial markets (OECD data); r_e is the rate of return on equities presented above (ratio of INSEE data D421 resources plus PF3 stock revaluations and PF3 stocks, lagged once); L/p_kK is the debt ratio of loans on fixed capital assets; L/(L+OF) is the debt ratio of share of *loans* in *loans* plus *own funds* (Ratio of INSEE data PF4 stocks and PF5

stocks plus B90 stocks: "own funds" in French National Accounts corresponds to the notion of total common equity in private accounts, and is measured as *issued equities* plus *net wealth*, the latter measuring the difference between assets and liabilities valorised at market value); p_eE is the stock of issued *equities* (INSEE data AF5 Stocks); p_e is equities price index; p_e/p_k is equities relative price to investment price (INSEE data B1).

4.2 Method for econometric tests

The econometric relations estimated are the results of vector error correction models. This method was selected, because many variables are non-stationary in terms of their level, but stationary in terms of their first difference. The ADF unit root tests are given in an appendix. The corresponding results clearly show that the majority of the tested variables in our models are integrated of order 1. Only financial profitability is stationary.

For each specification, we estimate the number of cointegrating relation starting from the two tests suggested by Johansen : the Cointegration Trace Test and the Maximum Eigenvalue Test. However, considering the restricted size of our sample, these cointegration tests are known to reject in an excessive way the assumption of absence of cointegrating relations. Also, to avoid this problem, we weight the statistics obtained through the cointegration tests by a coefficient of small sample bias correction (as made for example by Fischer, Köhler & Seitz (2004) or by Fernandez-Corugedo, Price & Blake (2003)) for the construction of Vector Error Correction Models relating to other subjects). We resort with this intention to the coefficient of Reinsel & Ahn (1992). The results are presented respectively in table 4 and table 5. For each VECM tested, the tests indicate the presence of one relation of cointegration.

Table 4: Cointegration Trace tests

Trace tests					
Eq.	*Number of CE*	*Eigenvalue*	*Trace statistic*	*Critical value at 5% level*	*Critical value at 10% level*
(a)	At most 1	0.434	21.06**	20.26	17.98
(b)	At most 1	0.391	14.58*	15.49	13.91
(c)	At most 1	0.303	8.07*	15.49	13.91
(d)	At most 1	0.184	8.22*	15.49	13.91
(j)	At most 1	0.329	14.52*	20.26	17.98
(e)	At most 1	0.643	18.23*	20.26	17.98
(f)	At most 1	0.637	18.75*	20.26	17.98

Note : * Indicates significance at 5% level, ** Indicates significance at 10% level. The Trace statistics are all weighted by Reinsel-Ahn small sample adjustment.

Table 5: Cointegration Eigenvalue tests

Eigenvalue tests					
Eq.	*Number of CE*	*Eigenvalue*	*Maximum Eigenvalue statistic*	*Critical value at 5% level*	*Critical value at 10% level*
(a)	At most 1	0.434	14.23*	15.89	13.91
(b)	At most 1	0.391	12.38*	14.26	12.30
(c)	At most 1	0.303	16.43*	14.26	12.30
(d)	At most 1	0.184	5.29*	14.26	12.30
(e)	At most 1	0.329	9.97**	15.89	13.91
(f)	At most 1	0.643	10.83*	15.89	13.91
(g)	At most 1	0.637	14.86*	15.89	13.91

Note : * Indicates significance at 5% level, ** Indicates significance at 10% level. The Maximum Eigenvalue statistics are all weighted by Reinsel-Ahn small sample adjustment.

In spite of the single cointegrating relation for each specification, the VECM are estimated by a maximum likelihood method, as suggested by Johansen (1988) (as is done for example by Fernandez-Corugedo, Price & Blake (2003) with 31 periods). Indeed, one chose not to use the Engle & Granger method for two main reasons. First, as explain it Muscatelli & Hurn (1992), this last method suffers precisely from a small sample bias, whereas it is on the contrary more powerful than others for the large samples ("super-consistent" estimator). Muscatelli & Hurn introduce an example about the demand for money in the United Kingdom with a specification which comprises only one cointegrating relation. They demonstrate through this example that the Johansen method is more robust for the estimate of cointegration equation than that the Engle and Granger method because of the small sample size.

Secondly, some of the variables we want to test are stationary in level: such is the case for the key variable ree (rate of return on equities). Consequently, we have to test them as I(0) exogenous variables, which is only possible with the maximum likelihood method. Indeed, Bourbonnais (2005) explains that with exogenous variables, "*we cannot apply the OLS method, because we have identification problems similar to those we find […] in simultaneous equations models. It is advisable to use a maximum likelihood method*" (p.

289)[4]. Thus, the estimated equations are such as in equation (30) below, derived from the equation proposed by Johansen & Juselius (1990):

$$\Delta y_{1,t} = \alpha(y_{1,t-1} + a_1 + a_2 y_{2,t-1} + a_3 y_{3,t-1} + ...) + (A_1 \Delta y_{1,t-1} + A_2 \Delta y_{2,t-1} + ...) + Bx_t + \varepsilon_t \quad (30)$$

Where y_1 is the explicate variable, the y_i are all I(1) endogenous variables and x_j is a vector of I(0) exogenous variables. The coefficient α measures the speed of adjustment of the endogenous variable toward the equilibrium and must be significantly negative, Δ is the operator of first difference, while a_1, a_2... A_1, A_2... and matrix B represent econometric coefficients.

As soon as the models are estimated in one stage using the Johansen method, all the variables introduced into the y_i vector as endogenous variables are necessarily and automatically include in first difference form in the error correction model. However, in the tables containing our tests results, we do not present insignificant results, to facilitate the reading. This explains partly why short-run variables do not entirely correspond to the difference of long-run variables as in equation (30), but only in the presentation. Moreover, I(0) exogenous variables are, as explained above, introduced into our specifications. Those are not, by definition, present in the cointegration equations, which explains another part of the apparent shift between the short and long run variables of in our tables.

Lastly, the ordinary tests of normality, autocorrelation, and heteroscedasticity of the residuals are carried out and presented. For each equation, the Jarque-Berra test confirms that the hypothesis of normality cannot be rejected. The White test makes it possible to reject the heteroscedasticity in the residuals, and the absence of autocorrelation is confirmed by the LM test. The lag structure is chosen by minimizing SIC (Schwarz) and AIC (Akaike) criteria. For the different models we specified alternatively no lag or one lag for short-run variables, so that certain equations in Tables (6) and (7) only present constant and/or exogenous variables.

[4] Authors' translation.

4.3 Equity issuing

Econometric results confirm the main lines of the models presented above (table 6).

New issued equities, in percentage of the total financial and non financial investment, are positively influenced by the real rate of interest and by the economic rate of profit. At medium term an increase of 1% of the real interest rate induces a rise of 0.3% of the share of total investment financed by issuing new equities, as borrowing becomes more expensive. The rise during the 1980s and the fall during the second half of the 1990s of real interest rates have played a significant role in the dynamic of new issued equities. In the same way a rise of 1% of the economic rate of profit induces a rise of 0.8% of the share of new issued equities, thanks to the improvement of the economic environment. The recovery of the profit rate during the 1980s and its stabilisation later on have been important in that sense.

The equity relative price ($\frac{p_e}{p_k}$), compared with the fixed capital price index, has a positive influence. This influence seems limited as the coefficient is only 0.2 but it must be recalled that the equity relative price fluctuations are of a large magnitude and contribute to explain the dynamics of the new issued equities. A high level of indebtedness appears to have also a positive impact. It incites firms to improve their financial structure by issuing new equities. This effect appears stronger than the negative impact of increasing risk due to higher debt that has been also considered.

Last, the equities rate of return has a negative influence on new issued equities as it makes loan comparatively cheaper but the effect is not highly significant.

The ratio of issued equities on total liability is following, on the whole, the same determinants and results appear rather convergent. The real rate of interest plays positively at medium term. The rate of profit or the level of capital accumulation has a significant impact at medium term, as representative of a favourable environment. The equity relative price has also a clear positive impact at medium term and a high debt ratio plays a positive role, as it incites firms to strengthen their liability structure.

Last, the equities rate of return has a negative effect as it was expected and the result is more significant than in the previous case.

Far all the models the R^2 are rather acceptable. The fact that results appear convergent for the two specifications (new issued equities in percentage of total investment and issued equities in percentage of total liability) can be seen as a test of robustness.

Table 6: Equity issuing - Cointegration equations

(French non financial companies, 1981-2008)

All variables are log-linearized.

Cointegration equations							
Eq.	$(p_eE/(L + p_eE))_{-1}$	*Constant*	R_{-1}	$rltr_{-1}$	K_{-1}	$(L_{-1}/P))_{-1}$	$(p_e/p_k)_{-1}$
(a)	1	-1.62	0.37		0.27		
	t-stat	(-3.6)	(6.1)		(5.1)		
(b)	1	-1.63		0.21	0.24		
	t-stat	(2.0)		(2.8)	(6.8)		
(c)	1		0.59			0.39	0.16
	t-stat		(8.3)			(5.3)	(8.9)
Eq.	$(p_e \Delta E)/(p_kI + \Delta FA))_{-1}$	*Constant*	R_{-1}			$(L/p_kK))_{-1}$	$(p_e/p_k)_{-1}$
(d)	1	-0.001	0.78				0.23
	t-stat	(3.0)	(3.5)				(4.1)
(e)	1	0.58	1.46			0.84	
	t-stat	(2.0)	(7.0)			(3.7)	

Error Correction Models						
Eq.		*Speed of Adjustment*	$\Delta(p_eE/(L + p_eE))_{-1}$	ΔK_{-1}	*Constant*	*re*
(a)	$\Delta(p_eE/(L + p_eE))$	-0.58	1.12			-0.05
		(-2.3)	(2.7)			(-2.1)
(b)	$\Delta(p_eE/(L + p_eE))$	-0.27		-3.89	0.10	
		(-2.0)		(-1.8)	(1.9)	
(c)	$\Delta(p_eE/(L + p_eE))$	-0.89				-0.04
		(-2.8)				(-2.2)
Eq.		*Speed of Adjustment*				re_{-1}
(d)	$\Delta(p_e \Delta E/(p_kI + \Delta FA))$	-0.66				
		(-3.0)				
(e)	$\Delta(p_e \Delta E/(p_kI + \Delta FA))$	-0.83				-0.07
		(-2.0)				(-1.8)

Validation tests					
	(a)	*(b)*	*(c)*	*(d)*	*(e)*
R^2	0.43	0.43	0.44	0.25	0.26
Jarque-Bera	6.95	7.25	9.55	2.25	4.90
	(0.32)	(0.30)	(0.30)	(0.90)	(0.56)
White	68.38	55.27	127.20	13.45	62.54
	(0.21)	(0.22)	(0.31)	(0.34	(0.39)
LM	5.23	4.81	12.72	10.04	9.35
	(0.81)	(0.85)	(0.69)	(0.35)	(0.41)

Notes: T-statistics are in parenthesis and significant at 5% level for the results of the estimations. For the validation tests, p-values are in parentheses. Insignificant coefficients in the error correction models are not presented. $p_eE/(L + p_eE)$ = ratio of equities issued on total financial liability, $p_e\Delta E/(p_kI + \Delta FA)$ = ratio of new issued equities on total investment (productive and financial), R = economic rate of profit, rltr = long-term real interest rate, K = productive capital assets, p_e/p_k = ratio of equity price on fixed capital assets price, re = rate of return on issued equities, L/p_kK = ratio of total loans and fixed capital assets, L_{-1}/P = Total (t-1) debt on gross profit.

4.4. Loan demand and indebtedness norm

Two specifications have been estimated, the first in terms of debt ratio related to capital stock, the second in terms of capacity of refunding, closer to the notion of indebtedness norm. Although not similar, econometric results are rather convergent. For all the R^2 are acceptable (table 7).

At medium term the debt ratio related to the capital stock is determined by two main variables. The real rate of interest has a traditional and important negative effect. A decrease of 1% of the rate of interest induces an increase of 0.5% of the debt ratio at medium term with a strong short term effect also. The level of accumulation and the rate of accumulation at short term are the second main determinants with a positive effect on the debt ratio. These two factors have contributed to the increase of the debt ratio since the 1980s.

At short term a third main variable, the equities rate of return, interacts with a strong positive impact. Higher requirements on equities incite firms to borrow more. This can be seen as complementary to the results previously obtained with equities issuing. Lastly, the economic rate of profit has a short term negative effect as higher profitability reduces the recourse to indebtedness.

With the capacity of refunding, debt divided by the gross profit, rather similar results are obtained and confirm the main lines of a model interpreted in terms of indebtedness norm, resulting both from banks' and firms' behaviours. The level of capital accumulation and the rate of accumulation at short term play positively as in the previous model while the rate of

profit has a negative impact. The traditional negative impact of the real interest rate is significant, but only at short term.

Last, the rate of return on equities appears once again significant. A higher rate of return on equities leads to borrow more since it contributes to make more favourable the cost of credit. The effect is rather strong, as variations of the rate of return on equities are of large amplitude.

Table 7: Indebtedness – Cointegration equations

(French non financial companies, 1981-2008)

Cointegration equations						
Eq.	L/p_kK_{-1}	*Cst*	R_{-1}		*Log* K_{-1}	rr_{-1}
(f)	1	-0.53			0.10	-0.51
	t-stat	(7.7)			(10.0)	(7.2)
Eq.	$(L_{-1}/P)_{-1}$	*Cst*	R_{-2}		*Log* K_{-2}	rr_{-2}
(g)	1	-9.32	-7.25		1.68	
	t-stat	(-7.0)	(-4.7)		(8.2)	

Error Correction Models							
Eq.		*Speed of Adjustment*	$\Delta(L/p_kK)_{-1}$	Δ*Log* K_{-1}	Δrr_{-1}	*Log(ree)*	ΔR
(f)	$\Delta L/p_kK_{-1}$	-0.15		2.03	-0.89	0.02	-0.78
		(-3.8)		(5.8)	(-2.3)	(4.0)	(-2.3)
Eq.		*Speed of Adjustment*		Δ*Log* K_{-2}		$Log(ree)_{-1}$	Δ rr_{-1}
(g)	$\Delta(L_{-1}/P)_{-1}$	-0.28		33.73		0.08	-4.85
		(-6.1)		(9.6)		(2.7)	(-2.1)

Validation tests		
	(f)	*(g)*
R^2	0.80	0.92
Jarque-Bera	8.44	6.66
	(0.21)	(0.35)
White	86.80	72.12
	(0.11)	(0.47)
LM	5.56	9.05
	(0.78)	(0.43)

Notes: T-statistics are in parenthesis and significant at 5% level for the results of the estimations. For the validation tests, p-values are in parentheses. Insignificant coefficients in the error correction models are not presented. L/p_kK_{-1} = Total debt of fixed capital stock, L_{-1}/P = Total (t-1) debt on gross profit, R = economic rate of profit, K = fixed capital stock, rr = apparent real interest rate, ree = rate of return on equities held. With a more large period, ree is not significant.

5. Conclusion

The paper has investigated the financialised nature of the growth regime which settled in France since the second half of the 1980s by focusing on debt and equity, i.e. on firms' liability side. The analysis has been made at the level of non financial companies with annual data from flow of funds accounts of INSEE. While a lot of effort is often devoted to the sole analysis of capital accumulation and profit rate, it has seemed useful to examine more in detail these questions of debt and equity, both because they were key issues in the financialized growth regime and because their treatment in macroeconomic models called some complementary investigations.

The financialization of the growth regime has been illustrated by the increasing share occupied by equities in the liability side of non financial companies. In terms of flows, the share of new issued equities in total investment has also increased during the 1990s but this evolution has been partly offset during the 2000s.. This partial t divergence between flows and stock ratios has been simply explained by the valorisation at market prices of the stock of equities which increased equities' share during periods of booms of the stock market.

Firms' debt ratios have been evaluated in a contrasted manner according to the definition used. Measured in percentage of total assets or own funds, evaluated at market prices, they have decreased, largely thanks to equities' price boom. In spite of this reduction of the debt ratio, firms could be threatened by over-indebtedness in case of stock market's return. Measured in percentage of fixed capital or gross profit, the debt ratios have on the contrary increased in three waves. Here again, the valorisation effect has explained this apparent divergence between debt ratios.

In a context of falling interest rates, since the middle of the 1980s in nominal terms, since the second half of the 1990s in real terms, equities prices have increased sharply in two successive waves, stopped by crashes of 1987, 2001 and 2008. These flights contributed to the revalorization of own funds, while financial profitability reached high levels at the end of the 1980s and the 1990s with cyclic evolutions of large amplitude.

A Post-Keynesian framework has been developed to interpret these evolutions of debt and equity. Based on a simplified SFC model, two alternative closures have been considered, one in terms of issuing equities, the other in terms of loan demand. Econometric results, using flow of funds accounts for non financial companies in France, have broadly confirmed the main lines of these two equity and debt equations.

Issuing equities is few explored in macro-econometric modelling. Two versions have been proposed according as we focused on new issued equities, in percentage of total investment, or on total stock of equities, in percentage of total liability. In both cases, results seemed rather convergent.

New issued equities appeared positively influenced by the real rate of interest. Higher credit cost led to lay more on equities to finance accumulation, as it has been the case until the middle of the 1990s. The economic rate of profit played also positively. A safe economic environment and low risk facilitated the recourse to stock market since the end of the 1980s. The equity relative price, linked to the phases of boom and bust of the stock market, played positively and the level of indebtedness at the end of the previous period appeared to have also a positive impact. It incited firms to improve their financial structure by issuing new equities. This effect seemed stronger than the negative impact of increasing risk due to higher debt that has also been considered. Last, the equities rate of return had a negative impact, but slightly significant, on new issued equities.

Loan demand is more traditional in theoretical and applied models. Two specifications have also been estimated, one in terms of debt ratio related to capital stock, another in terms of capacity of refunding.

Three main determinants have been found in these two cases. The real rate of interest appeared to have a traditional and important negative effect. The level of accumulation and the rate of accumulation at short term have contributed on the contrary to increase the debt ratio. The economic rate of profit had a negative impact as higher profitability reduced the appeal to indebtedness. Last, an interesting variable, the equities rate of return interacted with

a strong positive impact since higher rate of return on equities made the cost of credit more favourable.

These results contributed to a better understanding of the changes which occurred in the liability side of the French non financial companies since the 1980s. They underlined the role played by the equities rate of return during this period. They also brought some complements to Post-Keynesian models à la Godley-Lavoie or Taylor where equity issuing or loan demand were specified in a too simplified way. Last these equations of issued equities or debt ratios could be tested in other countries, especially in the case of the USA, to give a complementary highlight of the financial growth regime.

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Appendix . Augmented Dickey-Fuller Test

Unit root tests: ADF method

Series	Level		Firsts differences		Process
	T(ADF)	Specification	T(ADF)	Specification	
K	-1.73	inter. ; trend	-2.88	inter.	I(1)
R	-2.09	inter.	-2.53	-	I(1)
L_{-1}/P	-1.13	inter.	-2.44	-	I(1)
L/p_kK	-2.68	inter. ; trend	-2.49	-	I(1)
$p_eE/(L + p_eE)$	-1.94	inter.	-1.68	-	I(1)
$pe\Delta E/(p_kI + \Delta FA)$	-2.02	inter.	-5.06	-	I(1)
ree	-2.40	-	-	-	I(0)
re	-3.95	inter.	-	-	I(0)
$rltr$	-3.17	inter. ; trend	-5.99	-	I(1)
rr	-2.55	inter. ; trend	-2.30	-	I(1)
p_e/p_k	-2.98	inter.	-350	-	I(1)

Note: Tests are made on the 1978-2005 period. Considering the small sample, the maximum value of the number of lags of the dependent variable is alternately 0 or 1. All coefficients are significant at 5% level. Critical values are given in McKinnon (1996).