

Financialisation Issues in a Post-Keynesian Stock-Flow Consistent Model

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Abstract

This paper presents a stock-flow consistent growth model which is set in the post-Keynesian tradition. A key feature of the model, however, is that it contains an unusual closure: real government expenditures grow at a rate which is compatible over the long period with a constant rate of unemployment (it is compatible with an exogenously given “natural rate of growth”).

The model is large and incorporates a detailed description of the household, production, banking and government sectors. The presentation thus focuses on changes in parameters that have a link with the debate over the effects of financialisation. The effects on the following changes is examined: the target proportion of retained earnings to investment; the proportion of profits distributed as dividends; the propensity of households to hold equities; the propensity of households to take new loans as a proportion of their personal income.

Financialisation issues in a Post-Keynesian stock-flow consistent model

Recently there has been a great deal of interest among post-Keynesian economists about the topic of financialisation and its impact on major macroeconomic variables. The purpose of the present paper is to present some of the results relative to the issue of financialisation that can be obtained with the help of the growth model that constitutes the core of Chapter 11 of the book recently published by Wynne Godley and I, called *Monetary Economics: An Integrated Approach to Credit, Money, Income, Production and Wealth*. As one can see from the title, the book is rather ambitious, as it attempts to study simultaneously topics or variables which are often treated in isolation, in particular the real and the monetary sides. There are two means by which this integration task is accomplished : stock-flow consistency, and simulations.

By stock-flow consistency, we mean essentially four things (see also Dos Santos 2006). First, as mainstream authors usually insist, agents or sectors face budget constraints, and these must be explicitly taken into account. Secondly, as part of the budget constraints, there are financial constraints, so that an explicit and complex financial sector must accompany the production sector. Third, all sectors of the economy are intertwined with one another, and the links between these sectors must be explicitly recognized. From this arises the saying: everything must come from somewhere and go somewhere, without black holes. Fourth, the evolution of the entire system can be characterized as saying that at the beginning of each period, the configuration of stock variables (tangible and financial) is a summary description of past history. From there, transactions plus capital gains yield the stock variables of the next period. Thus our models are set in what we claim to be historical time. We believe, as some colleagues have put it to us, that stock-flow consistency with simple adjustment reaction functions, often linking stock-flow targets, can play an essential role in heterodox macroeconomics, as it provides a potential for common ground for all heterodox schools, just like the maximizing representative agent seems to be the standard of mainstream economics.

A model that tries to show some realistic features, with non-linearities for instance, quickly becomes quite complicated. To handle such models, we resort to simulations. This is not as fancy as analytical study, but we have stuck to it nonetheless. Its major drawback is that some of the results

could be, and in many cases certainly are, sensitive to the values taken by the assumed parameters, although we make the conjecture that stock-flow consistency reduces the range of possible outcomes. Our hope is that others, perhaps more skilled than we are, will try various combinations of these parameters in the future and will be able to assess how solid our current results are. In addition, it is also our hope that others will adopt the stock-flow consistency method, and build models of their own, with their own assumptions or closures, as Lance Taylor and Amitava Dutt call them. In fact both of these tasks are already happening (Zezza and Dos Santos 2004; Le Héron and Mouakil, forthcoming; Van Treek 2007; Skott and Ryoo 2007). I should add that it will be facilitated in the future, as there now exists Eviews versions of our models, on the website of our book built by Gennaro Zezza.¹

Our Chapter 11 model is a closed-economy growth model that combines households, firms, banks, a public sector, and the central bank. As many results are led by it, we deal immediately with the crucial issue of the closure of the model. In our model, government expenditures on goods and services grow at a rate which turns out to be the growth rate of labour productivity, which, in the simulations, we set at 3 percent. Thus, in our model, the main autonomous demand component grows at a rate which is determined by the supply side, the growth rate of labour productivity, under the assumption of zero population growth. There are many other possible closures, such as the one we had in Lavoie and Godley (2001-2002), where the rate of accumulation is not constrained by supply factors, but we thought that, under the circumstances, this was the easiest closure to make if we wanted to take inflation and unemployment rates into account. In what follows, we identify the main features of our model, and then we present the main results relevant to the financialisation issues, as they have been outlined by a variety of authors (among many others, Duménil and Lévy 2001, Stockhammer 2004, Epstein 2005). This will be done with the help of charts reproducing the evolution of key variables of the model, as they move through time.

Main features of the model

¹ See gennaro.zezza.it/software/models.

As said above, there are five sectors in the model: firms, households, banks, the public sector, and central banks. Table 1 below provides the balance sheet of the economy described by the model, and thus provides the assets and liabilities of each sector. The only unconventional feature of the balance sheet matrix is the term OF which describes the own funds of banks – the value of their equity. It is assumed that whereas production firms are corporations valued by the stock market, banks are privately-held companies, which do not issue stocks. As a result, the net worth OF_b of these banks belongs to the private owners of the banks, and must appear as part of the net wealth of households. The main drawback of our balance sheet is that (non-financial) firms do not hold any financial asset. In the real world, besides tangible capital, about half of the assets of firms are made up of financial assets. We lacked the courage to add this realistic complication. This however stops us from examining what some economists, such as Stockhammer (2004), consider as a crucial element of financialisation.

Table : The balance sheet of the Chapter 11 growth model

	Households	Firms	Govt	Central bank	Banks	Σ
Inventories		$+IN$				$+IN$
Fixed capital		$+K$				$+K$
HPM	$+H_h$			$-H$	$+H_b$	0
Money	$+M$				$-M$	0
Bills	$+B_h$		$-B$	$+B_{cb}$	$+B_b$	0
Bonds	$+BL.p_{bL}$		$-BL.p_{BL}$			0
Loans	$-L_h$	$-L_f$			$+L$	0
Equities	$+e.p_e$	$-e.p_e$				0
Bank capital	$+OF_b$				$-OF_b$	0
Balance	$-V_h$	$-V_f$	$-V_g$	0	0	$-(IN+K)$
Σ	0	0	0	0	0	0

As to the behavioural equations of the model, I first start with the main features of the firm

sector. Our firms follow normal-cost pricing procedures, based on an estimate of normal historical unit costs (they need not be the actual unit cost). The mark-up depends on planned entrepreneurial profits, which themselves depend on dividends to be distributed, based on the latest profit record, and on planned retained earnings, which depend on past investment. The rate of accumulation depends on the rate of capacity utilisation and the real interest rate. Employment adjusts partially to demand increases, so there can be a discrepancy between normal and actual labour productivity. Pricing also adjusts partially. Firms borrow essentially to finance inventories. Fixed investment which is not financed by retained earnings is normally financed by the issue of equities.

We assume that households take inflation losses on their assets into account. Households are assumed to consume on the basis of their past net wealth and on the basis of their current disposable income, net of interest payments on loans, incremented by their net additions in outstanding loans – in other words we take full account of personal loans. The crucial assumption here is that the gross amount of new loans is a fraction of personal income, and that this fraction depends negatively on the real interest rate. The other behavioural equations involve portfolio decisions, which take the usual Tobinesque form, with all their adding-up constraints. It is assumed however that cash is only held as a fraction of consumer expenditures. For simplicity we do not divide households into two classes, and households treat wage, interest and dividend income, but not capital gains, in an identical way.

As already pointed out, real pure government expenditures (excluding debt servicing) grow at a rate which is equal to that of labour productivity (or the natural growth rate). Taxes are collected on personal income only. Cash, bank reserves, bills and bonds are supplied on demand, at the short and long interest rates set by the central bank. In other words, both the short and the long interest rates are under the control of the central bank. The *monetization* of the public debt is entirely demand-determined, and is not under the control of the central bank, nor under that of the government. There is no reaction function of the central bank, however. The central bank sets nominal interest rates.

The banking sector in this model contains many non-linearities. Banks supply loans and deposits on demand (credit rationing is implicitly found in the demand functions of firms and households, for instance, by claiming that less loans will be demanded, or granted, when real interest

rates are higher). An important behavioural equation for banks is based on the bank liquidity ratio relative to its target range. The amount of bills held by banks divided by the amount of deposits is the bank liquidity ratio. When this ratio is below the target range, banks raise the deposit interest rate to attract deposits, and vice-versa when it is above the range. As to the lending rate relative to the deposit rate, it depends on how high is the actual capital adequacy ratio relative to its target (as defined by the BIS rules). When the actual ratio is below target, as when faced with unexpected non-performing loans, banks will tend to raise the lending rate relative to the deposit rate, in order to raise retained profits and hence their own funds.²

Finally, we need to explain how inflation is determined in our model. We assume, in line with a wide array of economists, both heterodox and orthodox, a kind of wage-led inflation (Cripps and Godley 1976, Rowthorn 1977, Layard et al. 1991). We assume that workers and their union target a real wage rate, which is a function of the productivity level and the level of effective demand, here proxied by the rate of employment relative to full employment. Nominal wage increases are proportional to the discrepancy between the target and the actual real wage rate. However, in line with recent empirical evidence, we assume away the impact of aggregate demand as long as the employment rate is within a “normal” range (the Phillips curve is assumed to be flat within that “normal” range).

A main feature of our models is that markets usually do not clear in the usual sense. For each sector there is a “buffer”, a variable which will absorb the shocks imparted to the economy. In the case of firms, the buffer is the stock of inventories, along with the amounts borrowed from banks, although firms attempt to bring the inventories to sales ratio to a target level over the long run. The buffer of households is their money deposits, which are the residual element of the portfolio functions. They also have a long run target about bank deposits, the target deposit to wealth ratio. In the case of the government sector, the buffer is the amount of bills which they issue, given the amount of bonds which are being demanded and given the government deficit. Had the government decided to target a certain ratio between short-term and long-term securities, the long-term interest

² Indeed, it has been shown by Hubbard, Kuttner and Palia (2002) that banks with low realized capital adequacy ratios are prone to set higher lending rates, thus providing direct empirical justification for the equation determining the interest rate on loans that we suggest.

rate would become endogenous.³ The buffer of central banks is the amount of bills which they end up holding. As to commercial banks, their buffer is also the amount of bills which they hold, since they provide loans and deposits on demand and are constrained by the legal requirements on reserves, although in the long run they attempt to control the size of their bill holdings relative to their clients's deposits.

The impact of parameter changes related to the behaviour of firms

We do two sets of experiments with parameters related to the behaviour of firms. First we increase the proportion of gross investment which firms attempt to finance through retained earnings; second, we increase the proportion of profits distributed as dividends.

Increasing the proportion of gross investment financed by retained earnings

We assume in our model that the target markup is a positive function of planned retained earnings of firms which are set as a proportion ψ_U of gross investment expenditures undertaken in the previous period. The complement of this proportion, $(1 - \psi_U)$, is to be raised on the capital markets, by issuing new shares. A possible experiment is thus to assume an increase in the target proportion of investment to be financed by internal funds (indeed, we shall assume that there is no issue of shares anymore). Such an increase simultaneously implies a reduction in new equity issues, thus reducing the relative amount of equities on the stock market. Under such circumstances, we should expect the price of equities to rise. Is this what is being observed?

Let us first deal with the target markup. Since the markup is now designed to generate more profits, a higher target proportion of gross investment financed by retained earnings generates a higher ideal costing margin.

The increase in the ideal costing margin can indeed be observed with the help of Figure 1A, with the brisk increase in the actual costing margin ϕ . The increase in prices and price inflation, and

³ We did this in Godley and Lavoie (2007, ch. 5).

hence the reduction in the real wage caused by this higher costing margin immediately generates wage inflation, as shown in Figure 1B, thus yielding a clear illustration of conflict inflation, where inflation is driven by conflicting claims over the distribution of income. In the present case, the real wage target of workers is being frustrated by the increase in the costing margin. Wage demands are however tempered by the slowdown in economic activity, but still, in the long run, wages rise at about 4.25% whereas they were rising at a 3.25% rate in the initial steady state.

Figure 1C shows that real consumption and the employment rate (and hence real output) drop like a rock in the short run, only to partially recover in the following periods, reaching new steady state levels which are still lower than those of the base line solutions. Even though we have not assumed propensities to consume that are differentiated on the basis of income sources or social classes, the reduction in the real wage arising from the higher costing margin does have negative consequences for output and the employment rate. The cause of this is however, is not the standard income distribution effect found in Kaleckian or Keynesian Cambridge models. Rather this effect is tied to the higher inflation rates associated with greater conflicts in income distribution due to the higher required mark-up.

Why are higher inflation rates associated with lower activity relative to the baseline case? The reasons are not self-evident. Higher inflation rates with constant nominal interest rates generate a real fiscal stance which is more restrictive, thus slowing down the economy relative to the baseline case (despite the favourable impact of lower real interest rates on investment).⁴ On the other hand, higher inflation rates accompanied by higher nominal interest rates (and constant real rates) generate capital losses on bonds, and indirect capital losses on equity, thus inducing a slowdown in real consumption and real activity relative to the baseline case.

INSERT FIGURES 1

Finally, as mentioned at the beginning of this subsection, the smaller issues of stock market

⁴ Since the real interest rate is lower, while the real rate of accumulation must come back to 3 percent in the long run, this implies that the rate of capacity utilization must be lower than in the baseline solution.

shares do lead to an increase in the price earnings ratio, and to a more obvious increase in Tobin's q ratio, as shown in Figure 1D. The next chart, Figure 1E shows the evolution of the growth rate in equity prices, deflated by the overall price index, as well as that of some weighted average of the growth rate in entrepreneurial profits of firms, deflated in the same manner. As one would expect, deflated profits start by growing at 3%, as all real variables do in the base line steady state, and they end back growing at 3% in the new steady state. By contrast, it may be noted that equity prices were initially growing at only 1.50%, and that they hiked up to above 5% when firms took the decision not to issue shares anymore. The (deflated) growth rate of equity prices then gravitates towards a 3% rate. Why then didn't equity prices grow at 3% in the base line steady state? It is because, in a steady state, the value of all portfolio assets must grow at the same rate. But the value of equities is made up of a price times the number of equities. The growth rate of the value of equities is thus made up of three components, the growth rate of equity prices, the growth rate of equity numbers, and the product of these two growth rates. In the base line solution, firms did issue new equities, and as a consequence the deflated growth rate of equity prices had to be smaller than 3%.

It is not quite clear how equity issues are related to financialisation. Even at the height of the stock market boom, when start-up companies were issuing billions of shares and making rich their creators, the overall amount of equities was often decreasing. Financialisation may thus be associated with lower or higher rates of share issues. In the present case, with relatively more retained earnings, the overall effects on the economy are negative, as output and employment fall relative to the base case. Rentiers however will be quite happy, with the growth rate of equity prices being much higher now than it was in the base case. Restricting share issues is thus beneficial to rentiers, at least in our model with its current parameter values.

Increasing the proportion of profits distributed as dividends

Among the many facets of financialisation that have been noted by a number of researchers is the apparent increase in the proportion of profits that are distributed as dividends to shareholders (Cordonnier 2006). This proportion is a parameter of our model. We assume that firms distribute in period t a fraction ψ_D of the profits that they realized in period $t-1$. What happens if firms decide or

accept to raise this fraction? To find out, we can examine the evolution of the exact same variables that we charted in the previous subsection.

There is a certain degree of similarity with the previous experience. Raising the fraction of profits going to dividends leads once more to an increase in the mark-up, as shown in Figure 2A, and hence to an increase in the share of profits in national income. The higher mark-up, through conflict inflation also leads to faster wage inflation, as can be seen in Figure 2B, and hence to faster price inflation. Things are however different from now on.

INSERT FIGURES 2

Soon after the increase in the dividends rate, employment, real output and real consumption rise (see Figure 2C), as households can now spend more out their dividends. There is an additional reason, however. With more dividends, the stock market booms, while price-earnings ratios rise (Figure 2D). Despite this, in the long run employment, real output, and real consumption are all lower than in the baseline case, once again because of the deflationary inflation effects.

In this case, one of the features of financialisation, a higher fraction of profits distributed as dividends, has positive short-run effects on the overall economy and the rentiers, but these effects vanish over the long run, even becoming negative when looking at the overall economy.

I have also submitted an additional chart, that of Figure 2E, which shows the evolution of the rate of interest on bank deposits and the rate of interest on loans. Some of the non-linear features of the model are now obvious. The change in the fraction of profits distributed as dividends has consequences on both the liquidity ratio and the capital adequacy ratio of banks, thus leading to unexpected changes in the deposit rate and the lending rate of banks, even though the central bank is assumed to keep constant the yield on Treasury bills. This clearly shows that all parts of the model are interrelated.

The impact of parameter changes related to households

An increase in the desire to hold equities

We now move on to discuss the impact of changes in parameters related to the behaviour of households. We start with a change in household liquidity preference. We shock our growth model by introducing an increase in the preference for stock market shares, a key feature, or so it seems, of financialisation across countries. Because of the adding-up constraints, a higher desire to hold shares in the portfolio equations implies that at least one of the other parameters of the portfolio equations must be reduced. We first assume that households decide to reduce their money deposits to acquire more stock market equities.

The implications of such a change, relative to the base line solution, are illustrated in Figure 3A. First, the share of equities in the wealth of households which is held in the form of financial market assets (money deposits, bills, bonds and equities) does rise, nearly by definition. The increase in the demand for equities gets reflected in the higher equity prices. Hence, as a result, the price-earnings ratio jumps, and so does Tobin's q ratio. There is some overshooting in the reaction of all these ratios, but long-run steady state values are all greater than in the base line case, as one would expect.

The reduction in liquidity preference leads to other substantial consequences. As shown in Figure 3B, real consumption and real output relative to the base line case increase, since real wealth, which has increased considerably because of large capital gains on stock market equities, is an argument of the consumption function. Surprisingly, the long-run level of real output, relative to the base line case, is not any higher - indeed it is somewhat lower. This would seem to be best explained by the fact that gross real investment, relative to the base line case, is dropping.

Why is the rate of accumulation dropping below the trend rate of growth? The answer must be found within the banking system. A quick look at the banking system reveals that the bank liquidity ratio has taken a hard hit, due to the fact that households have reduced the size of their bank deposit holdings in their attempt to purchase additional stock market shares. Banks can absorb this deposit drain, but the buffer is made up of their bill holdings, which must decline drastically.⁵ To recover a proper bank liquidity ratio, banks must raise the deposit rate, and this is what they do, as

⁵ In the present experiment, the number of bills held by banks even becomes negative, which implies that banks must borrow them from the central bank, but the mechanism has not been made explicit.

can be seen in Figure 3C. But since banks must also preserve their profitability and their own funds, they must also raise the lending rate, thus driving up the real rate of interest that enters into the accumulation function. This is why investment drops relative to the base case.

INSERT FIGURES 3

But things would have been completely different had households switched to stock market equities by reducing their holdings of government bonds and bills instead of reducing the size of their bank deposits. Figure 3D shows what would have had happened in this case. The bank liquidity ratio is driven up, as households sell their bonds and bills, with some of the latter being acquired by banks. As a result, with the liquidity ratio beyond the upper threshold, banks reduce the deposit rate in an attempt to get the liquidity ratio back to its normal range, and the lending rate follows the decrease in deposit rates.

Comparison of Figures 3C and 3D explains why it is important to be explicit about all portfolio equations. The implications on interest rates of an increase in the propensity to hold stock market equities turn out to be quite different depending on whether the counterpart to this increase is to be found in a decrease in the propensity to hold money deposits, which is the residual equation in the portfolio system, or in a decrease in the propensity to hold bills and bonds. Once again, only a full-fledged model can differentiate between the implications of these different assumptions regarding the portfolio behaviour of households.

An increase in the ratio of gross new loans to personal income

We now proceed to our last experiment, linked to household borrowing. Once again, this seems to be a key feature of financialisation, with households being allowed and being encouraged to borrow sums of money which represent a much larger proportion of their personal income. In our model, the major parameter of household behaviour with respect to debt is η , which represents the gross value of new loans as a proportion of personal income that households are willing to take on, or are allowed to take on, in every period.

Figure 4A shows, as one would expect, that the increase in the willingness to take on new loans leads to an increase in both the personal loans to personal income ratio and the debt-service burden of personal debt. Households thus decide to take on more debt as a proportion of their personal income, and this debt carries a heavier weight – interest payments and principal repayment – relative to their personal income. What are the consequences of this greater household willingness to go into debt (or the greater willingness of banks to grant credit to the household sector)?

Figure 4B shows the consequences for real consumption and real output. In the short run, this greater willingness to borrow leads to higher consumption and higher real GDP relative to the base line case. This positive effect, however, is only temporary. It is followed by a reversal, so that in the new steady state, real consumption and real output (and hence the employment rate) are lower than they would have been in the base line scenario. These results thus give support to the arguments advanced by Palley (1996: 213), who wrote that, in the case of household debt, “the crux of the argument is that borrowing initially serves to increase aggregate demand and output, but that debt service payments subsequently serve to reduce them”. Consumers must eventually pay more interest on their debt, thus reducing their net disposable income available for consumption.

INSERT FIGURES 4

The picture shown in Figure 4B has interesting repercussions for the evolution of many OECD countries, most notably the USA and Canada, where aggregate demand over the last ten years or so has been sustained by a continuous expansion in the personal debt of households relative to their personal income (Godley 1999; Godley and Zezza 2006; Seccareccia 2005). Several authors have wondered whether such a regime, where the growth of the economy is essentially driven by the willingness of households to accept ever higher debt to income ratio, could go on much longer. Figure 4B illustrates the fact that, even if households do nothing to reduce their debt to personal income ratio or their debt-servicing ratio, letting them rise towards their steady state levels, there is some likelihood that aggregate demand in the future will be negatively affected by the past decisions to increase the flow of new loans relative to personal income.

We also explore the implications of higher personal debt ratios for other sectors of the

economy. Figure 4C shows what happens to the main ratios of the banking sector. Despite the increase in loans to the private sector, banks have no trouble keeping their capital adequacy ratios at the proper level (indeed the lending rate does not even need to be raised; it falls as shown in Figure 4D). On the other hand, there are some large fluctuations in the bank liquidity ratio, but this ratio returns to its initial position endogenously, without any change in the deposit interest rate. Thus the banking sector is able to absorb quite large fluctuations in loans to the personal sector.

The consequences for the finances of the public sector are shown in Figure 4E. In the short run, when the economy speeds up thanks to the borrowing binge of the household sector, the government deficit to GDP ratio drops, and so does the government debt to GDP ratio. However, as the negative effects of increased household borrowing take their toll on the economy, the government to deficit ratio moves back up, at an even higher level than in the baseline case. We thus observe that the evolution of the financial ratios of the government sector depend heavily on the saving or borrowing decisions of households – a point that we hammer in our book and more specifically in a recent paper (Godley and Lavoie 2007b).

Before concluding, I should add a few words about the financial crisis that rocked the world economy in August 2007. Strictly speaking, this crisis cannot be represented in our model since it involves some financial institutions being refused intraday credit within the clearing and settlement payment system. We would need to describe at least two sets of banking institutions, whereas we have only one. However, we can presume that the financial crisis makes banks more prudent in their lending behaviour. This implies that the debt parameter η , the gross value of new loans as a proportion of personal income that households are willing, or rather, in this case, are allowed to take on, would suddenly drop down. The results that we obtained in this section would thus be reversed: in the short-run, there would be a negative effect on income and consumption; in the long-run, but how long this will be is hard to say, it would have favourable effects.

There is another parameter in our model that could take into account some of the effects of the crisis: there is a parameter that measures the proportion of bank loans made to firms that default (unfortunately, we had no similar parameter for bank loans made to households). The increase in the percentage of non-performing loans brings about a sharp decline in the capital adequacy ratio of banks. Banks however manage to bring back the actual capital adequacy ratio towards its normal

level within a short time period. How is this accomplished? Figure 5 shows us how. The spread between the lending rate and the deposit rate is pushed up; in other words, banks raise their profit margins. Because the actual bank liquidity ratio rises (banks have less loans on their balance sheet!), the deposit rate moves down, thus allowing the banks to keep the lending rate at a level which is not exceedingly higher than the base line solution lending rate. As one would expect, the short-term effects of an increase in defaulting loans is a reduction in output and consumption relative to the baseline solution.

Conclusion

In the Godley and Lavoie (2007) book we emphasized the importance of dealing with stock-flow consistent models. In its introduction, we pointed out that stock-flow monetary analysis has been a long-standing feature of post-Keynesian economics, as it can be found, without giving references, in the works of Minsky, Davidson, Chick, Eichner, and Skott. Flow-of-funds analysis, which we believe is closely tied to this stock-flow monetary analysis, has been mainly created and endorsed by other heterodox authors – Institutionalists. There is thus some obvious affinity between heterodox work and stock-flow consistent modeling. We do not say that everyone should be busily constructing stock-flow consistent models. As pointed out above, this method has some advantages but also some disadvantages, as its requirements quickly become burdensome.

In this paper we have examined the possible effects of changes in four parameters linked with increased financialisation. While some effects are to be expected, others are not, especially the impact on lending and deposit rates. Thus how exactly the banking sector reacts or is presumed to react to changes in its balance sheet makes a great deal of difference.

Another point that comes out from the last simulation, and that may be of some relevance in view of the Maastricht accord, is our assertion that the public deficit to GDP ratio and the public debt to GDP ratio are essentially determined by factors that are not under the control of the government. While the government can reduce these two ratios in the short run, for instance by reducing its public expenditures, the long-run reduction will only be sustainable if parameters related to the behaviour

of private agents do change through time. In particular a reduction in the propensity to save will tend to reduce these two ratios in the long run. This assertion corresponds clearly to the Canadian case.

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Figure 1A: Evolution of the costing margin of firms, following an increase in the target proportion of gross investment being financed by gross retained earnings

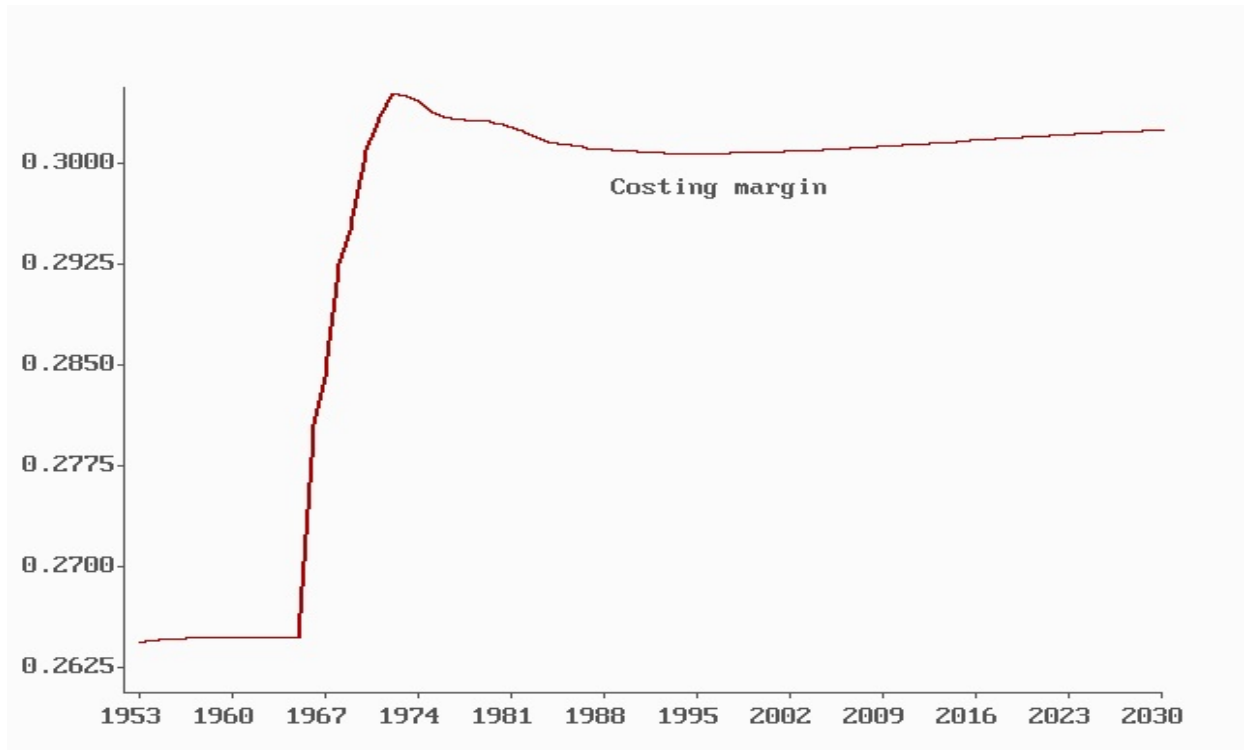


Figure 1B: Evolution of the wage inflation rate, following an increase in the target proportion of gross investment being financed by gross retained earnings

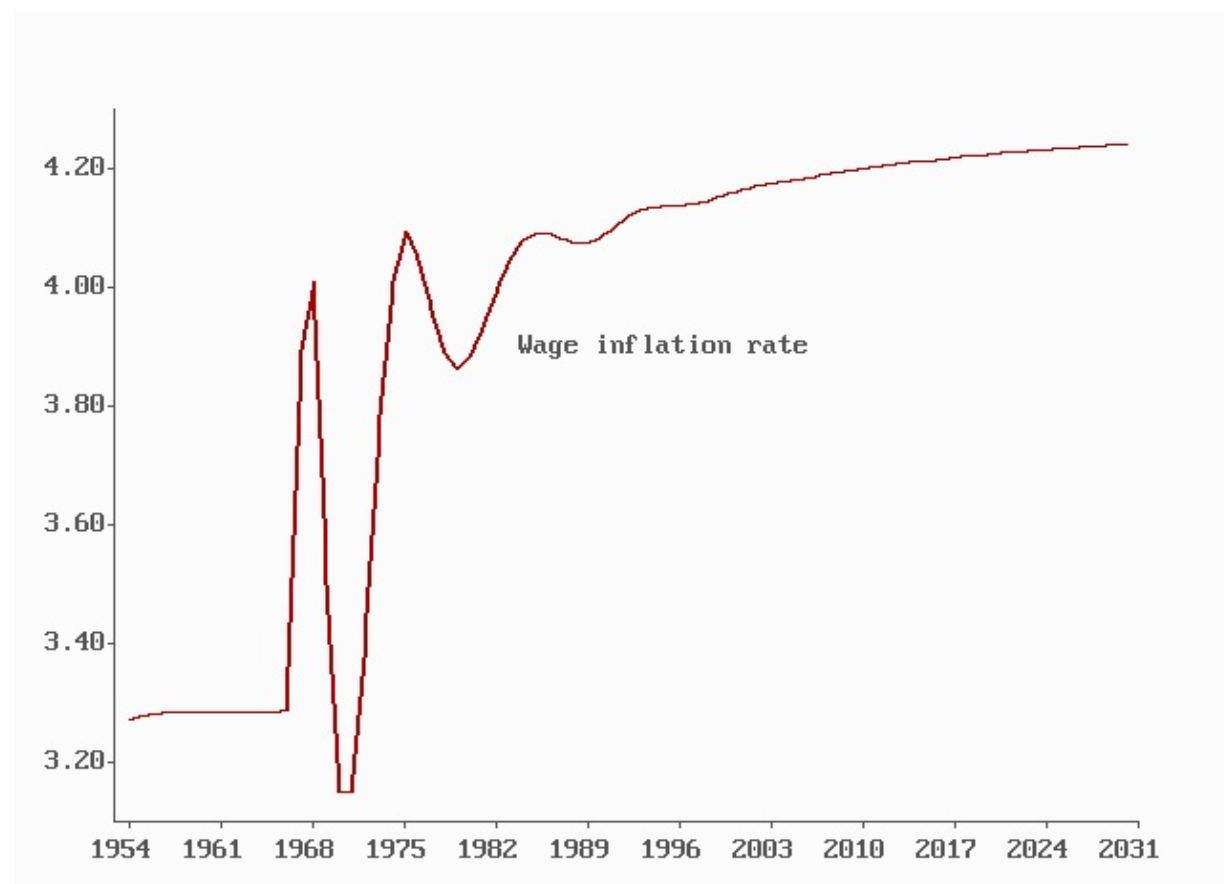


Figure 1C: Evolution of the employment rate and of real consumption, relative to the base line solution, following an increase in the target proportion of gross investment being financed by gross retained earnings

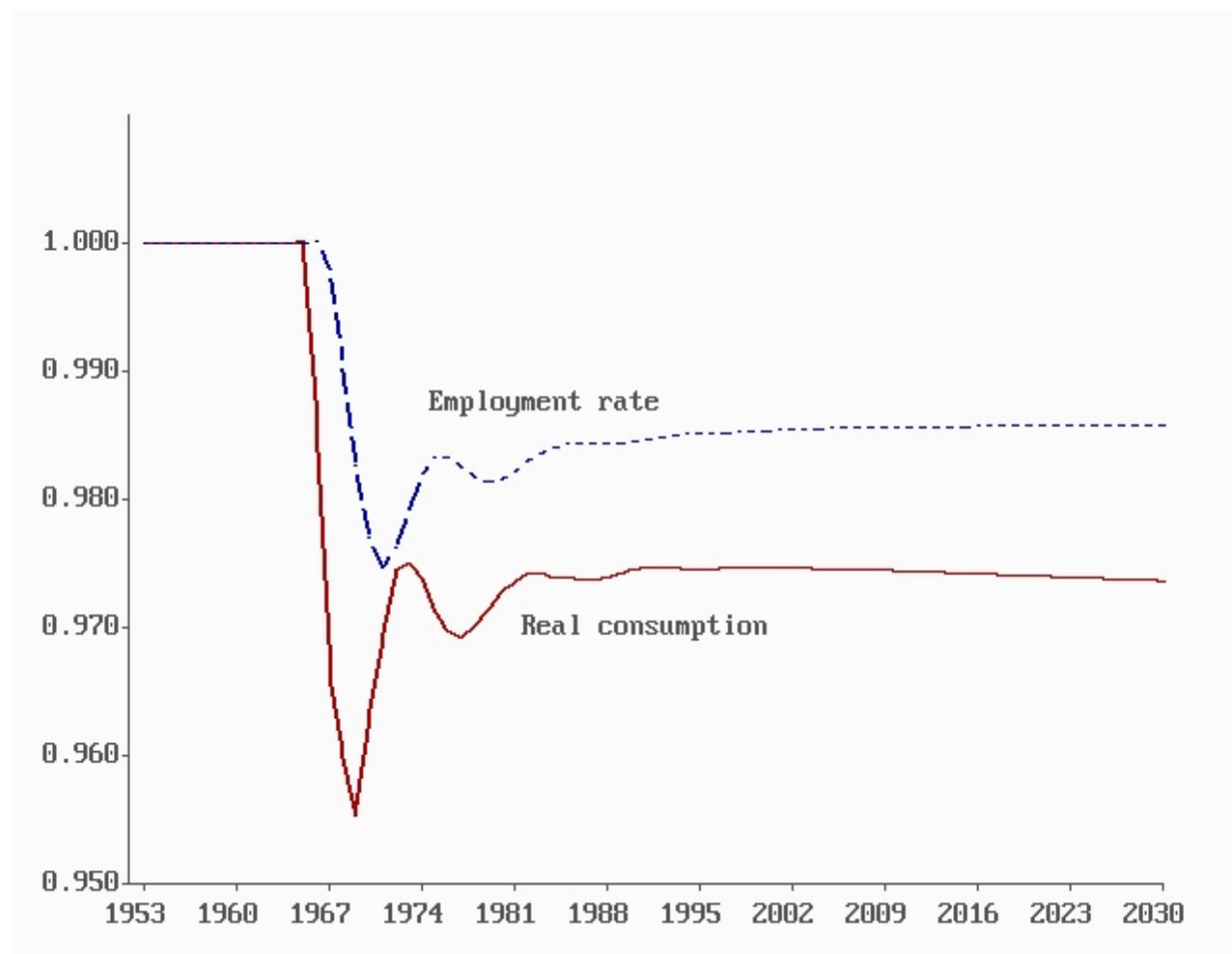


Figure 1D: Evolution of Tobin's q ratio and of the price earnings ratio, relative to the base line solution, following an increase in the target proportion of gross investment being financed by gross retained earnings, which also corresponds to a decrease in the proportion of investment being financed by new equity issues

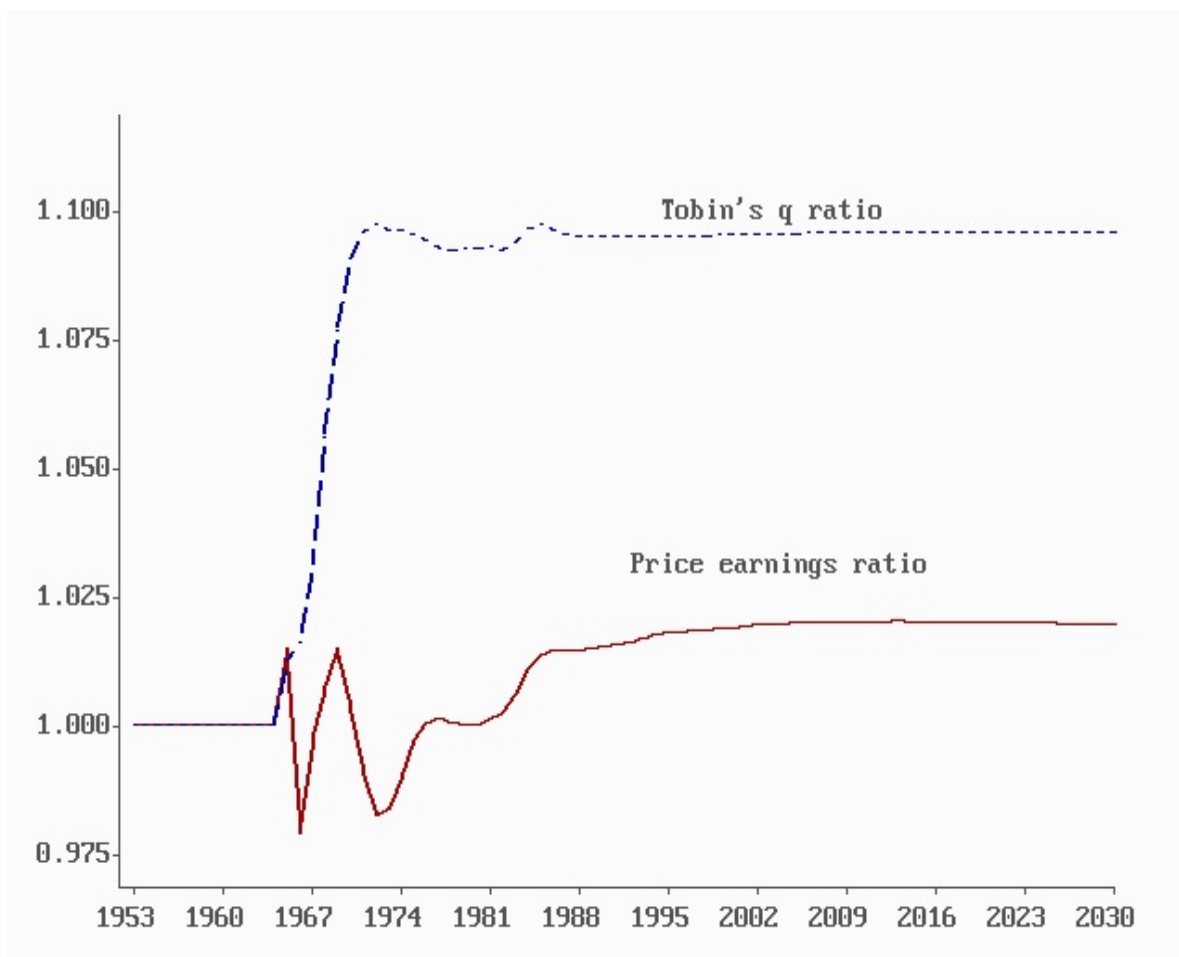


Figure 1E: Evolution of the deflated averaged growth rate of the entrepreneurial profits of firms and of the deflated growth rate of equity prices, following an increase in the target proportion of gross investment being financed by gross retained earnings and no new equity issues

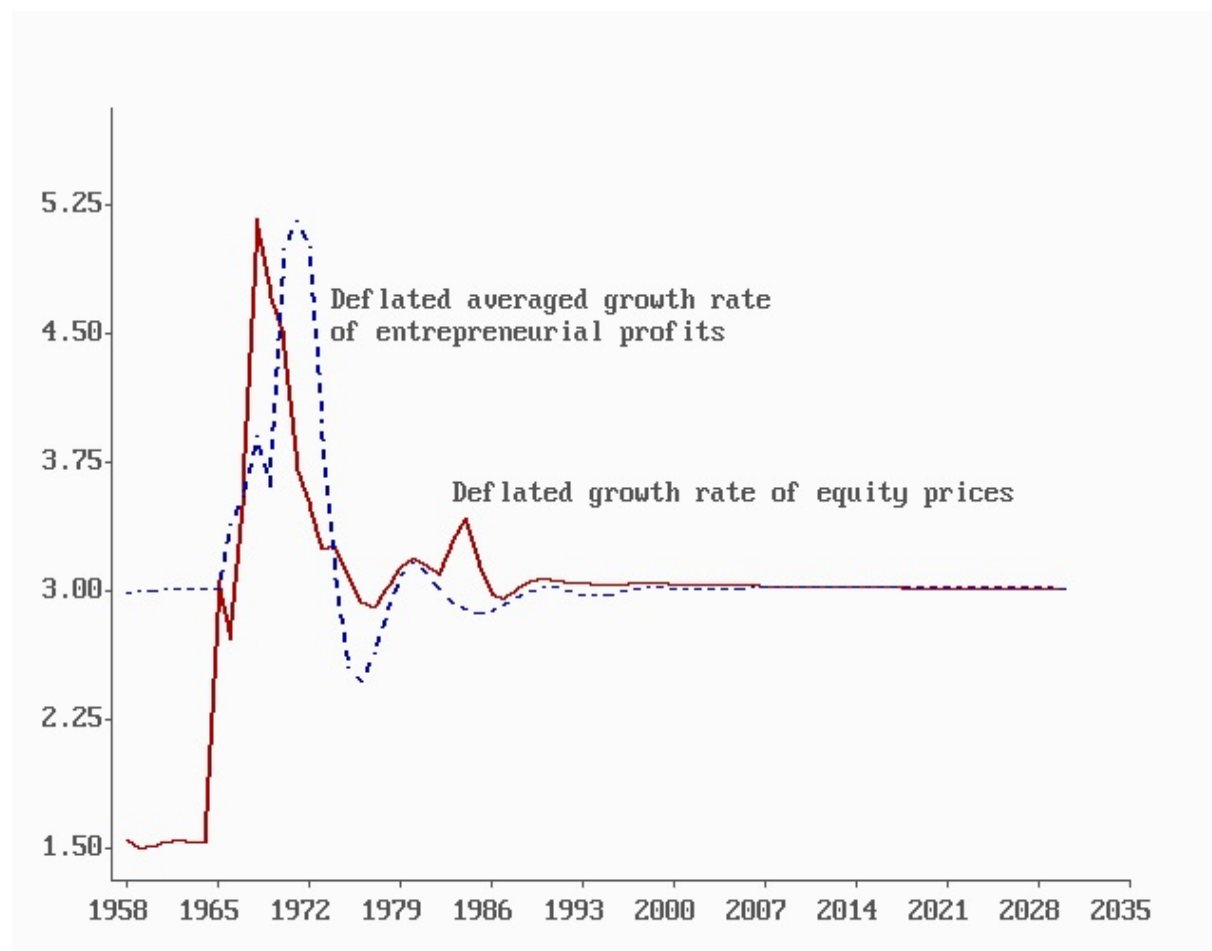


Figure 2A: Evolution of the costing margin of firms, following an increase in the fraction of profits which is distributed as dividends

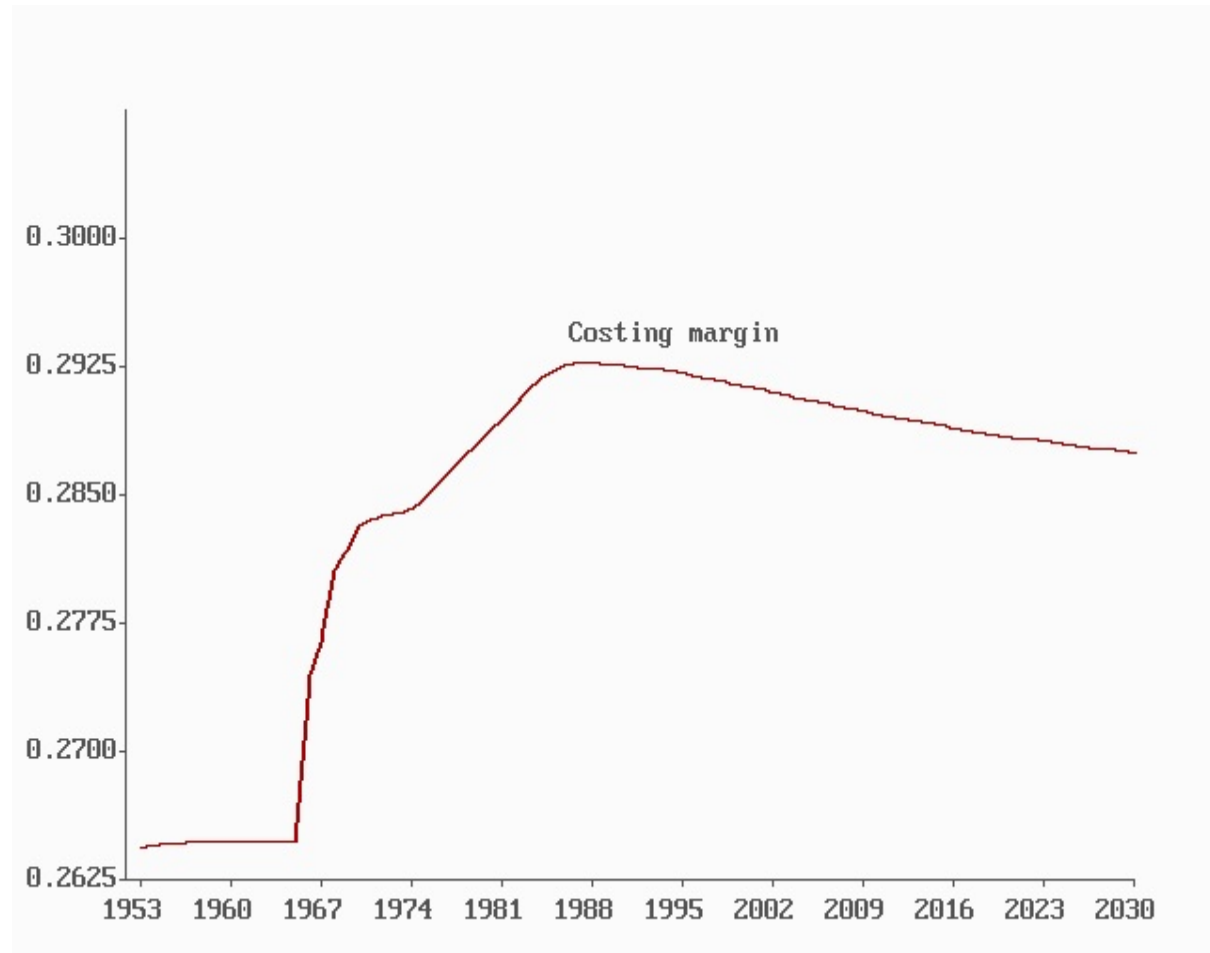


Figure 2B: Evolution of the wage inflation, following an increase in the fraction of profits which is distributed as dividends

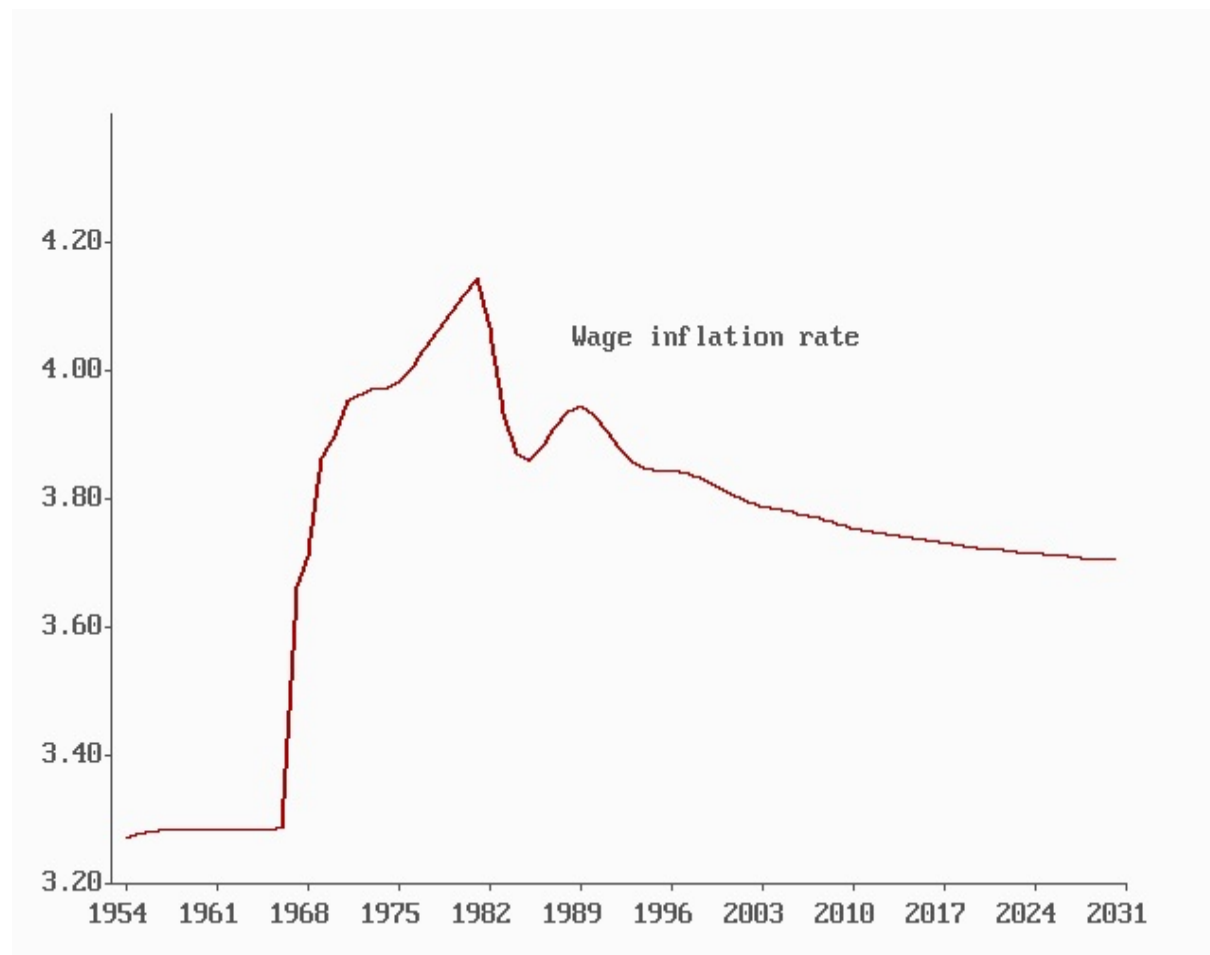


Figure 2C: Evolution of the employment rate and of real consumption, relative to the base line solution, following an increase in the fraction of profits which is distributed as dividends

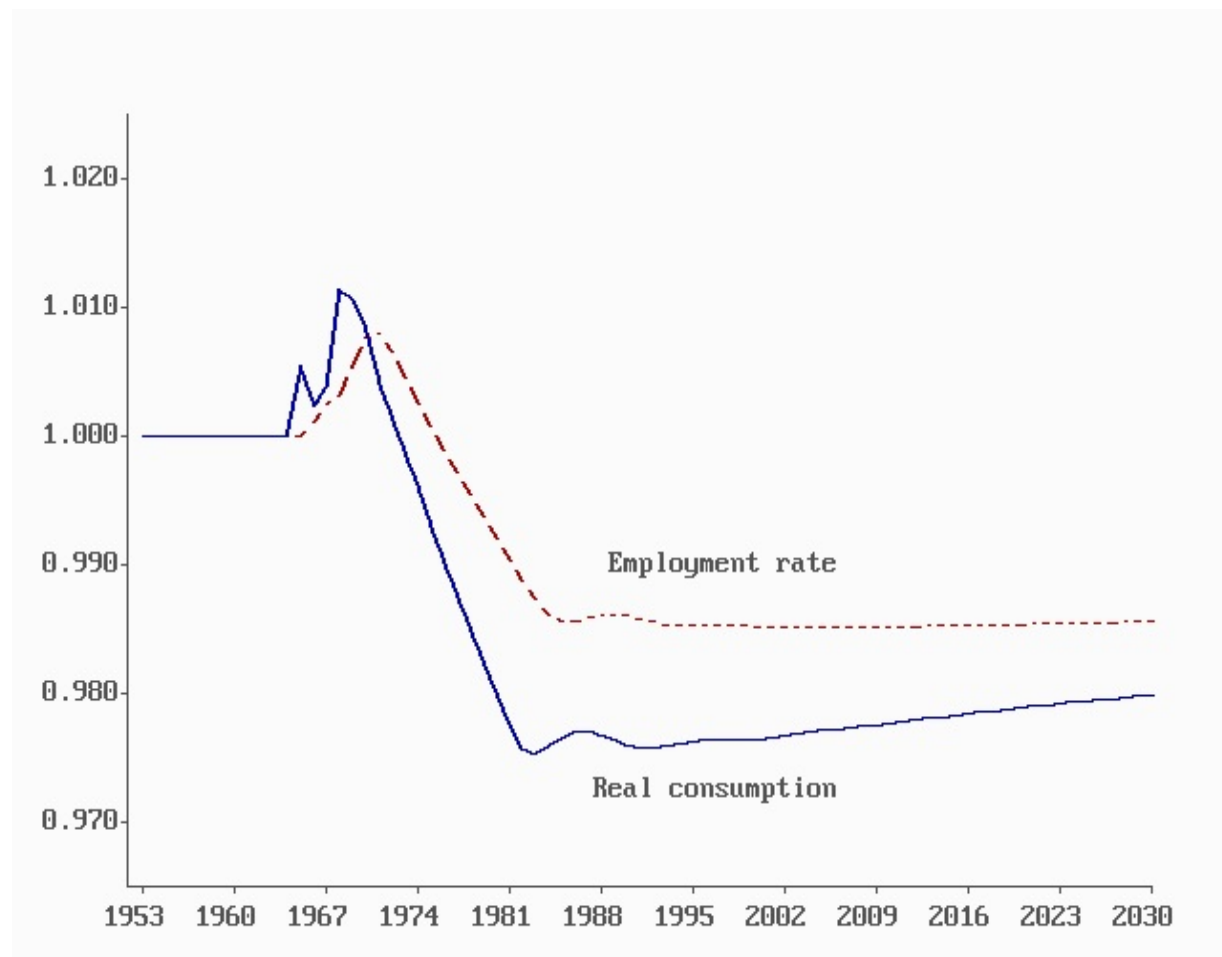


Figure 2D: Evolution of Tobin's q ratio and of the price earnings ratio, relative to the base line solution, following an increase in the fraction of profits which is distributed as dividends

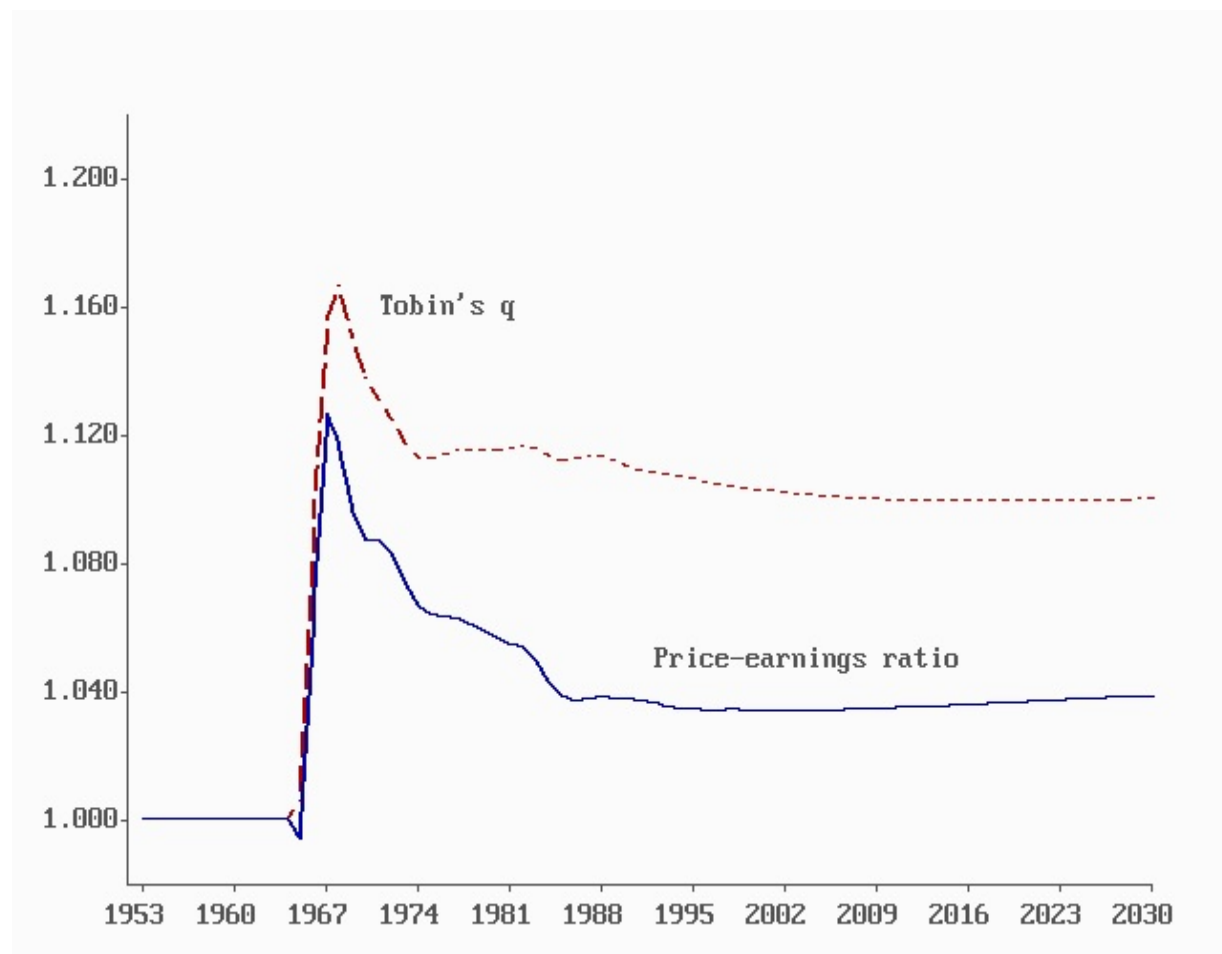


Figure 2E: Evolution of the lending and deposit rates, following an increase in the fraction of profits which is distributed as dividends

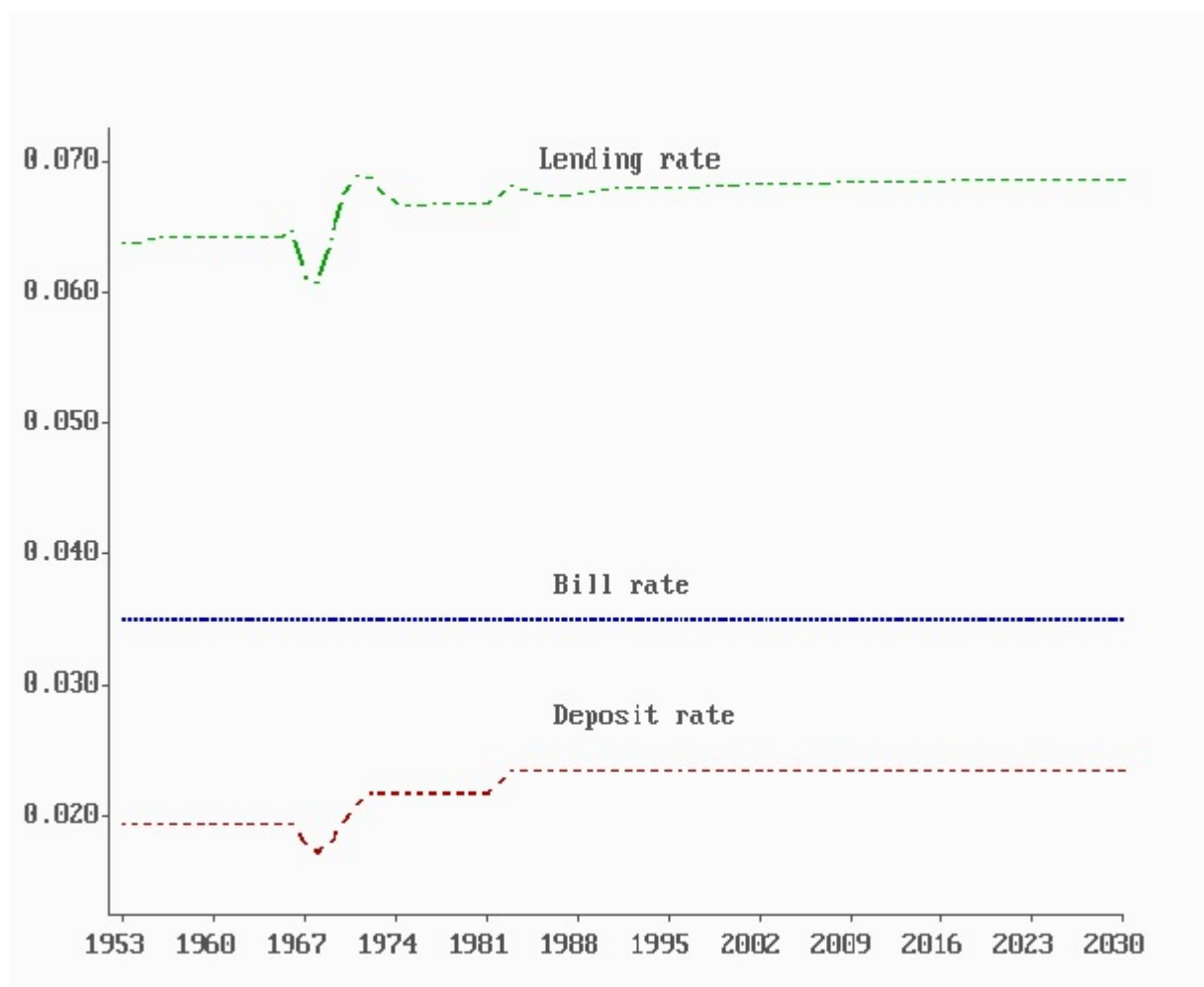


Figure 3A: Evolution of Tobin's q ratio, the price earnings ratio and the share of equities in household wealth detained in the form of financial market assets, all relative to the baseline solution, following an increase in the household desire to hold stock market shares

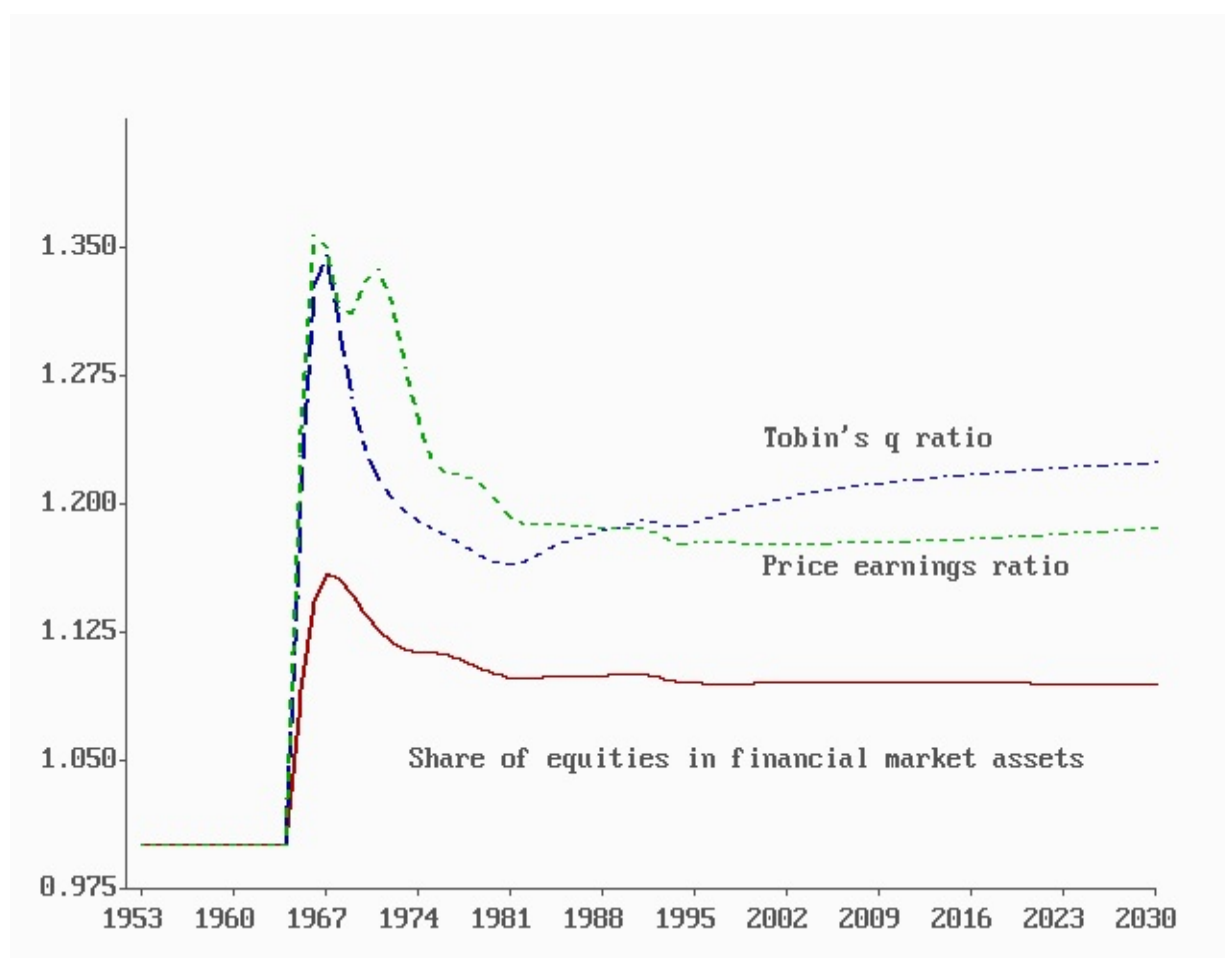


Figure 3B: Evolution of real wealth, real consumption, real output and real gross investment, all relative to the baseline solution, following an increase in the household desire to hold stock market shares

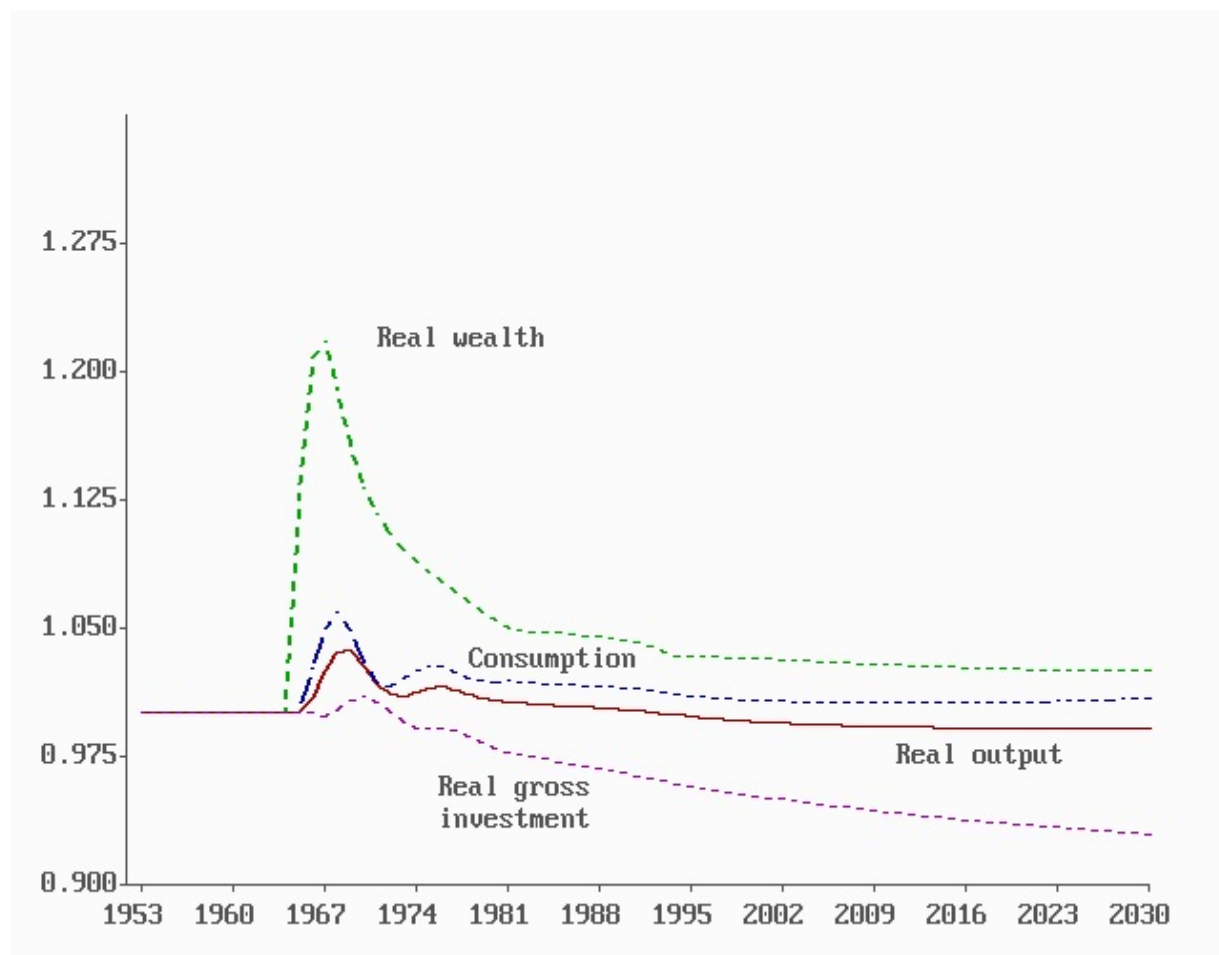
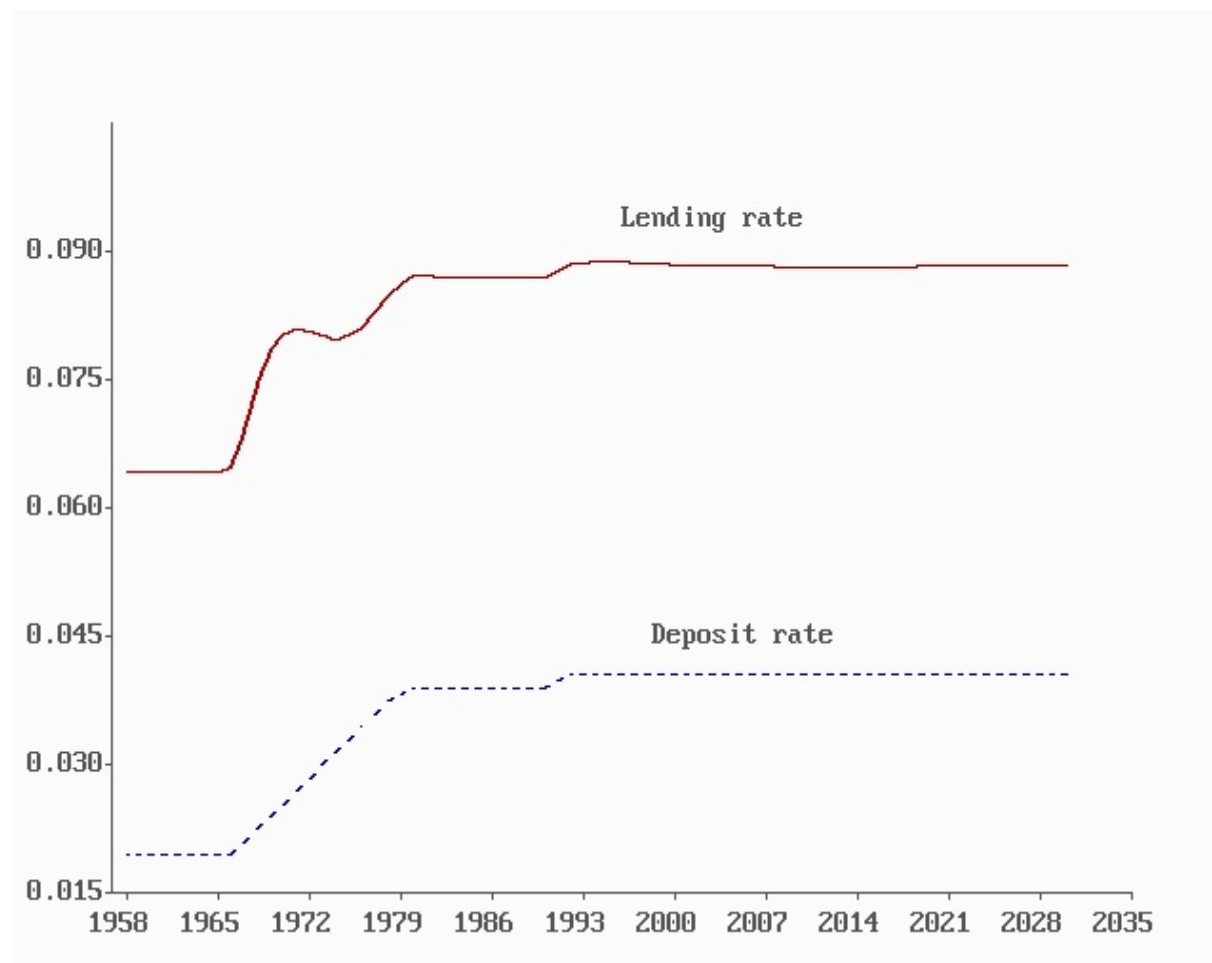


Figure 3C: Evolution of the lending rate and the deposit rate, following an increase in the household desire to hold stock market shares, when this desire is compensated by a drop in the



desire to hold bank deposits

Figure 3D: Evolution of the lending rate and the deposit rate, following an increase in the household desire to hold stock market shares, when this desire is compensated by a drop in the desire to hold bills and bonds

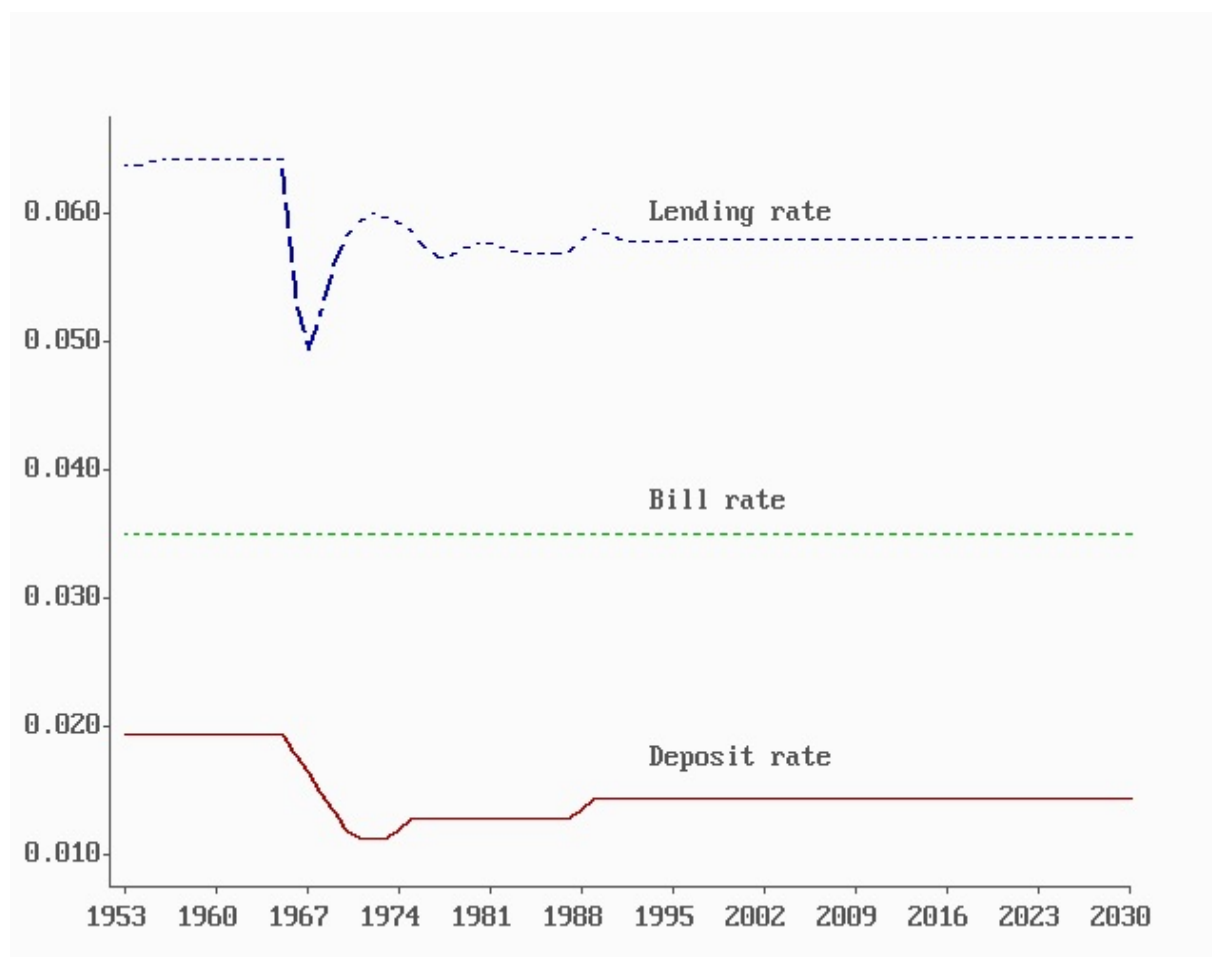


Figure 4A: Evolution of the personal loans to personal income ratio and of the burden of personal debt, following an increase in the gross new loans to personal income ratio

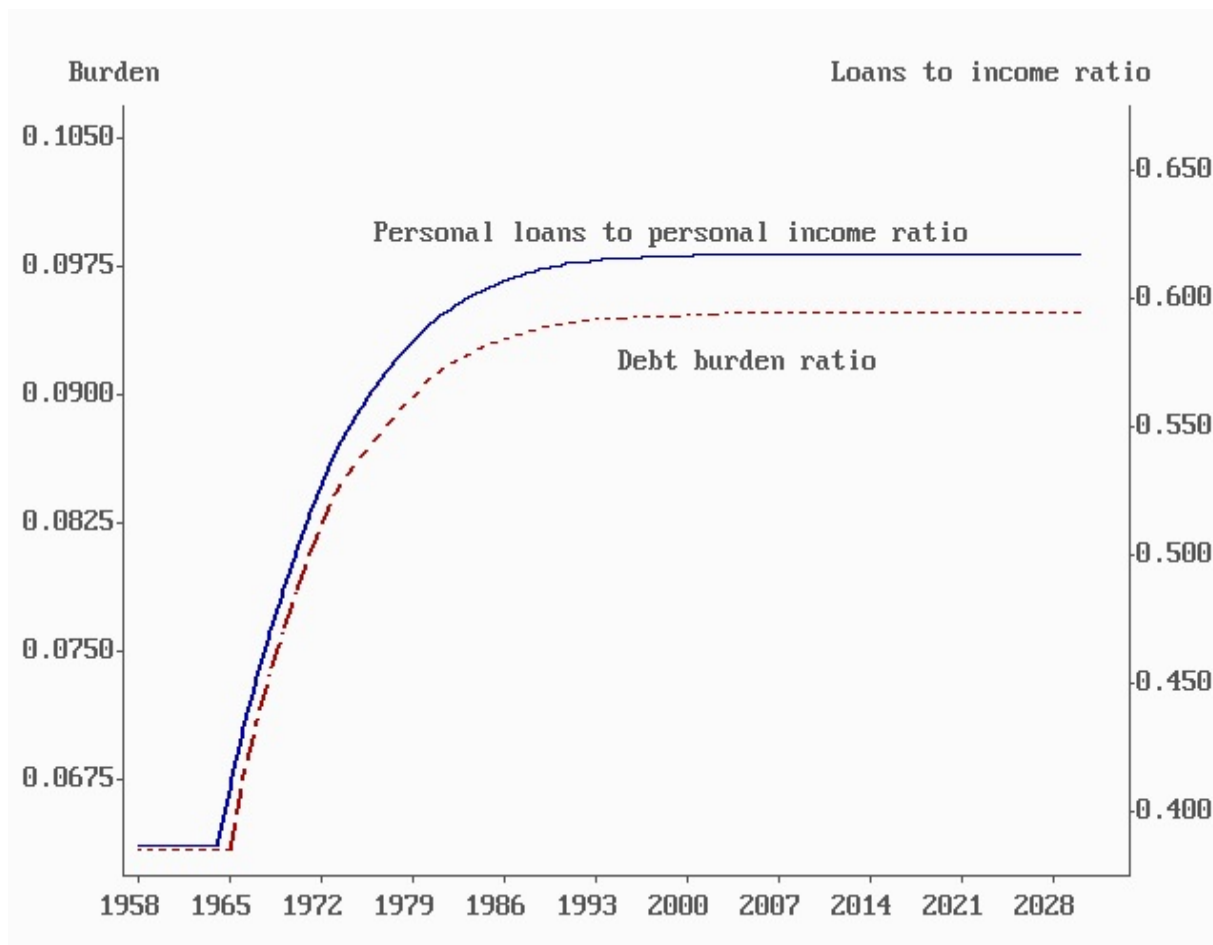


Figure 4B: Evolution of real output and real consumption, relative to the base line solution, following an increase in the gross new loans to personal income ratio

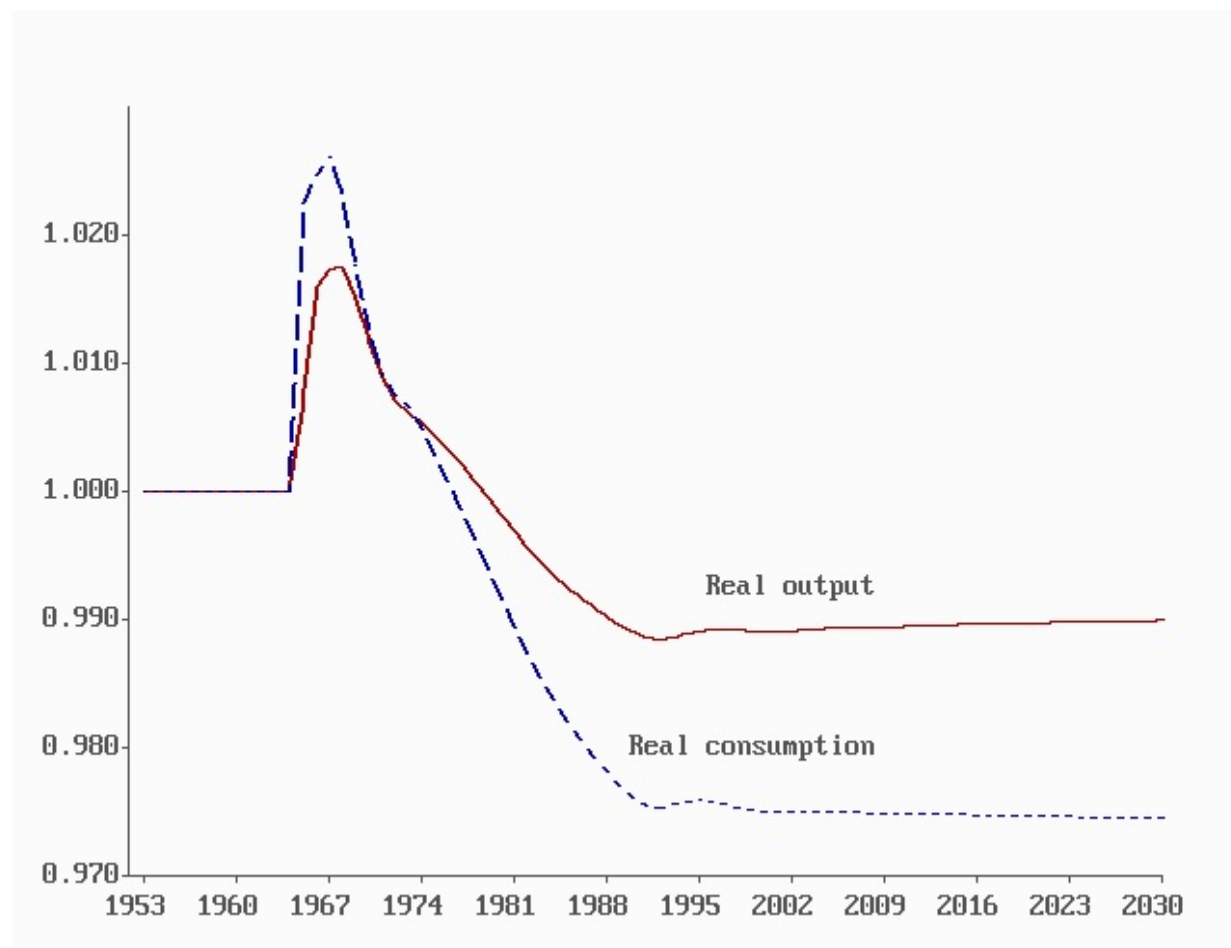


Figure 4C: Evolution of the bank capital adequacy ratio and of the bank liquidity ratio, relative to the base line solution, following an increase in the gross new loans to personal income ratio

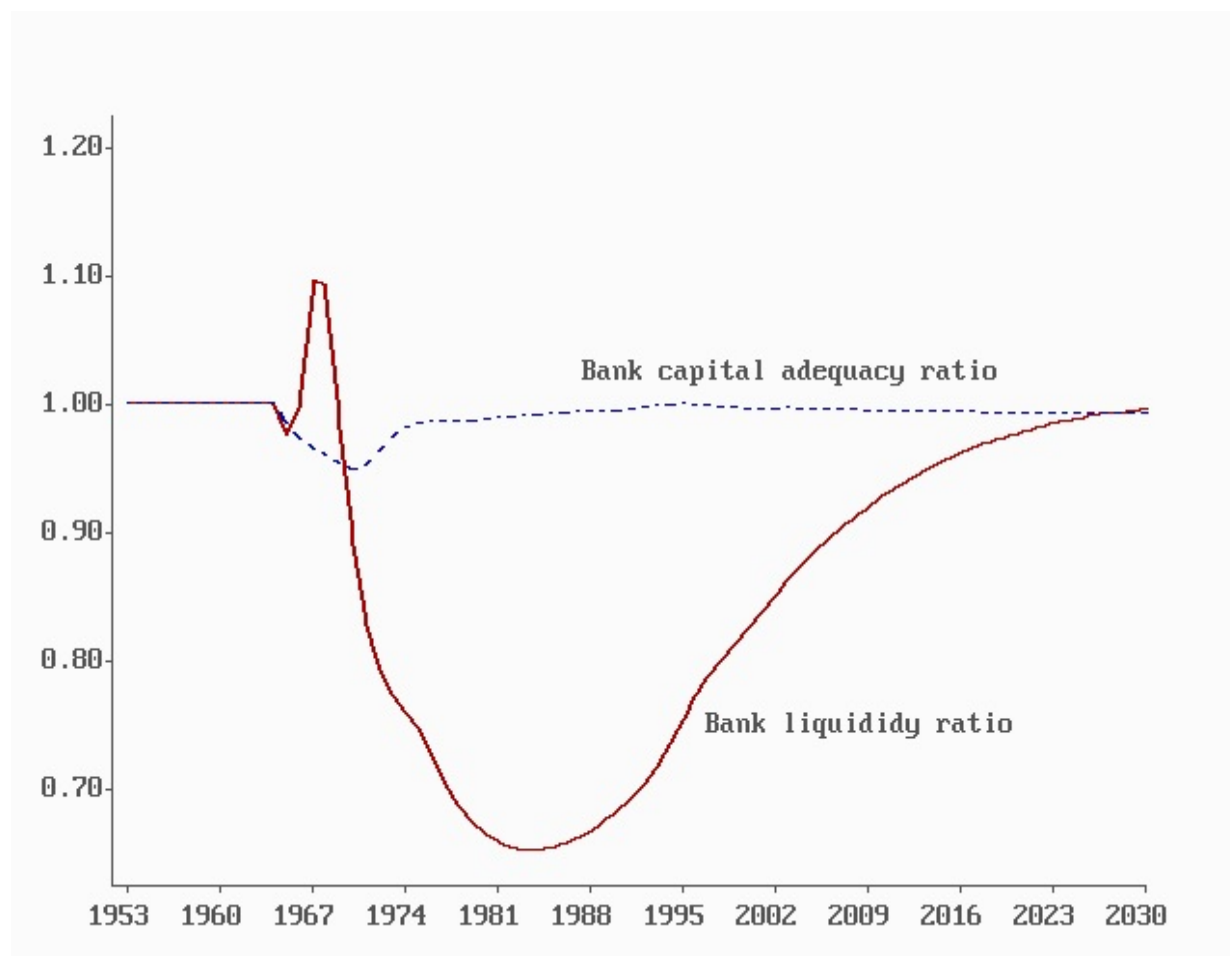


Figure 4D: Evolution of the lending rate set by banks, following an increase in the gross new loans to personal income ratio

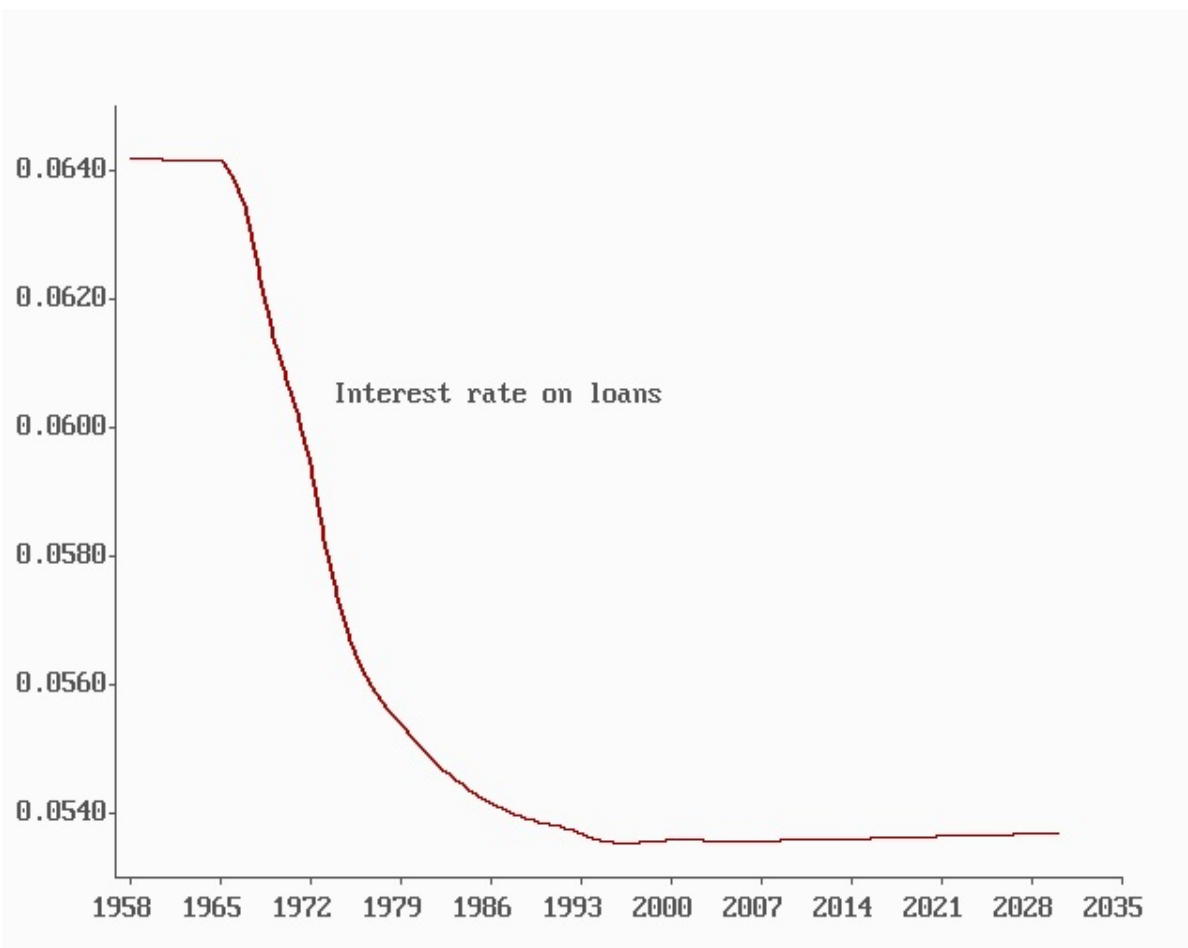


Fig 4E: Evolution of the government deficit to GDP ratio and of the government debt to GDP ratio, relative to the base line solution, following an increase in the gross new loans to personal income ratio

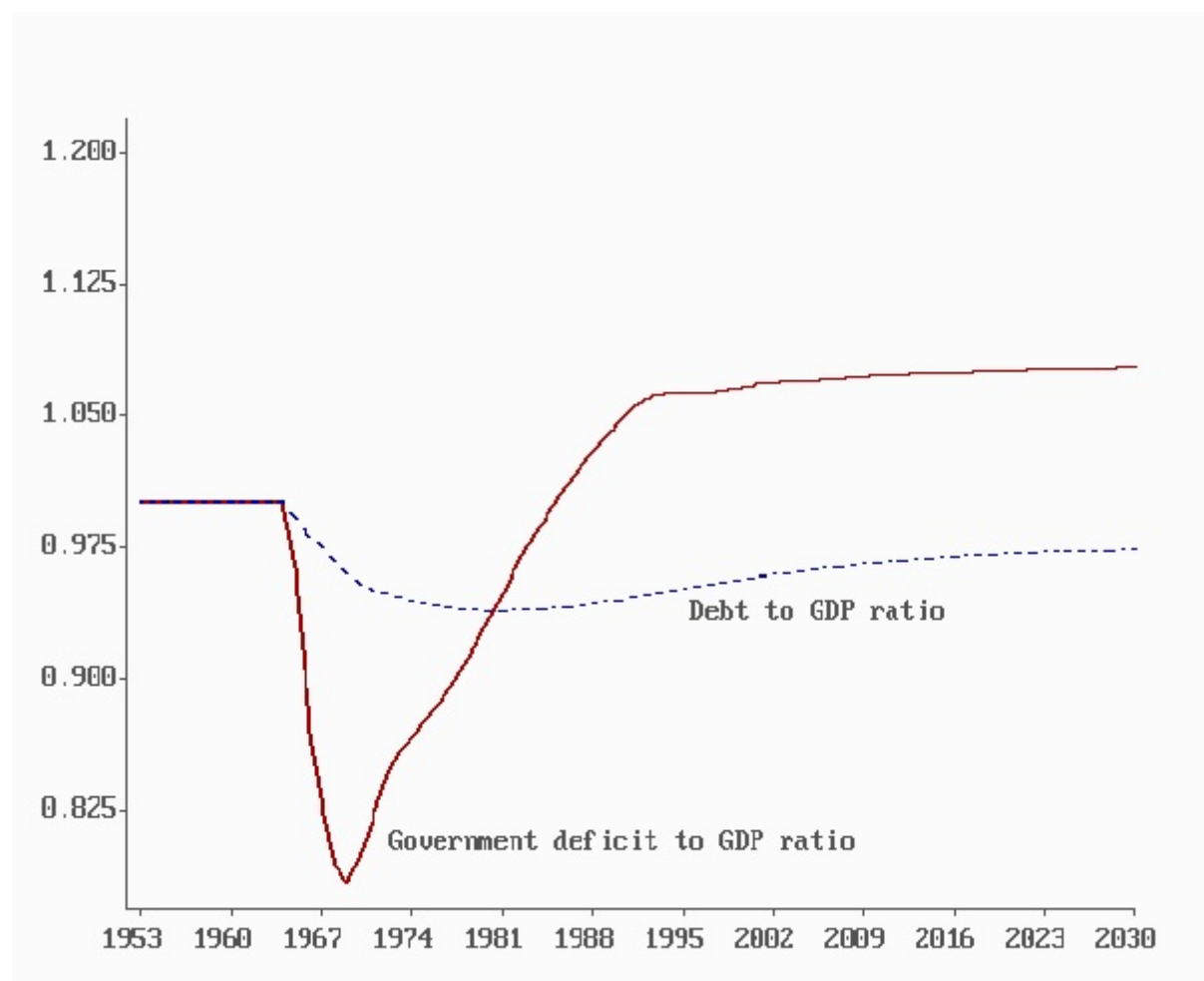


Figure 5A: Evolution of the actual bank capital adequacy ratio, following an increase the percentage of non performing loans (defaulting loans)

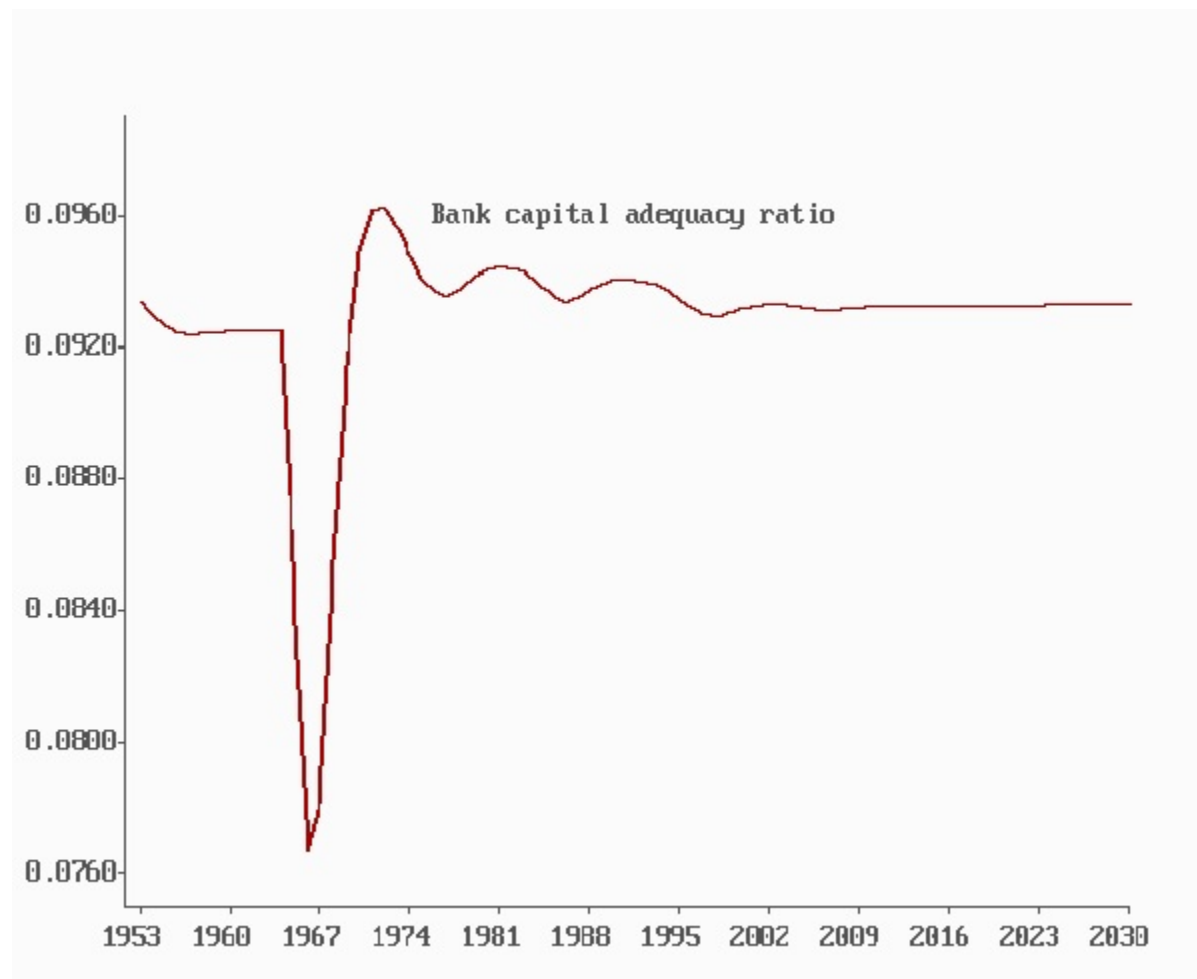


Figure 5B Evolution of the deposit and lending rates set by banks, relative to the baseline solution, following an increase in the percentage of non-performing loans

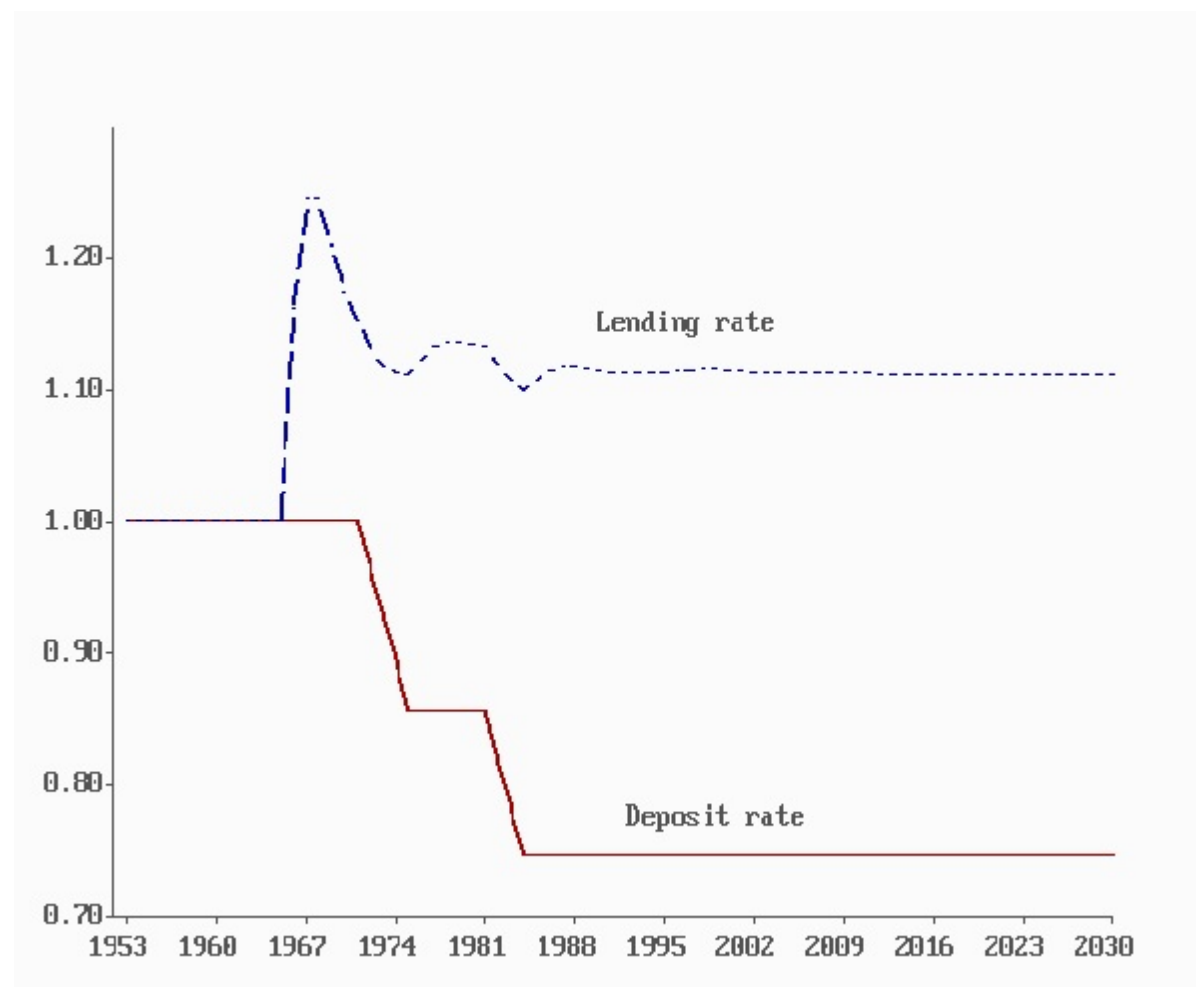


Figure 5C Evolution of output and consumption, relative to the baseline solution, following an increase in the percentage of non-performing loans

