

Investment decision and the interest rate in normal and exceptional times

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Abstract. Macroeconomics is a historical discipline. Comparing investment decisions and the interest rate in Brazil in 1970 and 1990, I show that in 'normal times' (early 1970s) firms give more attention to the expected rate of profit than to the interest rate because a "cushion pad" tends to exist setting apart the interest rate and the expected profit rate. Yet, in 'abnormal times' (early 1990s), when the country confronts a deep economic crisis, the expected rate of profit falls sharply while the market rate of interest rises, and the rate of interest assumes a more important role to explain autonomous investment behavior.

The rate of investment in Brazil fell substantially from the 1970s to the 1980s. In the previous decade gross capital formation represented around 22 percent of GDP; in the 1980s, around 17 percent. The private rate of investment fell accordingly from around 17 to 13 percent. How to explain this sharp decrease? Do the investment decision theories offer an acceptable explanation to it? Or these macroeconomic theories are too theoretical, too far away from reality?

In this paper I will try to give a short answer to this question, using as evidence two surveys I undertook with a lag of twenty years: one in 1970, when the Brazilian economy experienced an economic "miracle"; the other in 1990, in the middle of a deep economic crisis. My general conclusion on this part of the paper will be that, indeed, macroeconomic theories of investment have a reasonable explanatory power in "normal times", but in "exceptional times", when the country's economy is victim rather of structural (usually fiscal) crisis than of a cyclical crisis their explanatory power is reduced, whereas the significance of variables change.

A second objective of this paper will be to offer some evidence on the historical character of macroeconomics, using as object the investment theories. Microeconomics, where neoclassical thought is dominant, is generally viewed as a theoretical, logical, tool to analyze the economy. It seldom deals with reality. It rather develops a logic for the understanding of this reality, subordinated to extremely abstract assumptions. Macroeconomics used to be less abstract, but it is increasingly being also transformed into a logical science rather than a substantive and historical one. It is increasingly formed of logical models that show how economic agents maximize utility in an aggregate form.

The two surveys, however, present the possibility of showing how economic agents change their views or, rather, their logic in relation to investment, as the economic environment changes.

In this paper I will reaffirm the classical view that privileges the rate of profit rather than the rate of interest in the explanation of investment behavior. Besides, I will criticize the neoclassical view that the market for investment is cleared when the expected rate of profit or the marginal product curve, that defines the investment demand, equals the interest rate or the cost of capital. Firms usually give much more attention to the expected rate of profit than to the long run interest rate (or the average expected rate of interest in the time horizon of the investment) when they are deciding to invest or not, because in normal times a "cushion pad" tends to exist setting apart the interest rate and the expected profit rate. The market is not really "cleared" and yet investment takes place. In a structural economic crisis, however, particularly in a fiscal crisis, when the expected rate of profit falls sharply while the market rate of interest rises crowding out private investments, the rate of interest seems to assume a more important role to explain autonomous investment behavior. But even in these moments it is difficult to say if investment fell because the interest rate is exceptionally high or because the expected profit low is unusually low if not negative.

Theories of investment

It is possible to distinguish five theories of investment behavior: the classical expected profit theory of investment, the neoclassical interest-profit theory, the neoclassical synthesis (neo-Keynesian) cost of capital theory (Modigliani-Miller), the accelerator theory of investment and the retained profits or liquidity theory.

These theories deal rather with "autonomous" than with "induced" investment, yet not always this is clear, because the distinction itself is not very clear. Schumpeter used the concept of autonomous investment as related to innovation, that is, to the expected rate of profit, while induced investment is dependent on the level of income. An alternative, if we want to stress technology and market share rather than income, would be to call induced investment "required" investment. Required is the investment that the firm has no other alternative but undertaking in order to maintain market share and keep up with technological development. Autonomous is the investment over and above this level freely decided by the entrepreneur or by management.

The classical expected profits theory of investment says quite simply that investment, I , is a function of the expected rate of profit, r' . Given income, Y , that determines the level of induced or required investment, autonomous investment would be higher the higher the expected rate of profit. The interest rate is assumed to maintain a relatively stable relation to the profit rate. Thus the strategic variable would be the confidence or level of optimism of business firms about the prospects of future profitability of investments.

$$I = f(Y, r')$$

The neoclassical interest-profit theory says that investment depends on the interest rate, j , given a demand schedule for investment defined by a decreasing marginal product (that corresponds approximately to the Keynesian marginal efficiency of capital). The objective is to maximize the market value of the firm. "The (neoclassical) theory states that the size of the capital stock and the rate of interest are mutually determined by the supply and demand of capital services, both of which are expressed as a function of the rate of interest" (Lund, 1971: 26). Investment will be undertaken as long as the expected rate of profit is higher than the rate of interest. The expected rate of profit is assumed constant, moving only along the marginal product curve. Thus changes in the interest rate become the strategic variable that will clear the market.

$$I = f(Y, j)$$

The neoclassical synthesis cost of capital theory of investment replaces the interest rate by the "cost of capital", saying that investment is dependent on opportunity cost of investment, i.e., on the weighted average of the expected return to capital, c' (Modigliani and Miller, 1958). This theory, that influenced strongly modern mainstream economics, represents a kind of compromise between the two previous ones. It was adopted by Jorgenson and Siebert (1968a, 1968b) whose researches on the investment function, in the end of the 1960s, exhausted the subject for mainstream economics.¹ In 1971 Jorgenson published a survey of econometric studies on investment behavior that remains reasonably complete today, given the relatively small attention the theme received since then. It is also a market clearing theory: the interest rate or the cost of capital clears the demand for investments.

$$I = f(Y, c')$$

The accelerator theory, that has a long tradition in economic thought, was fully developed by Clark (1917). After Harrod (1936), it became part of standard Keynesian analysis. Keynes' observation that savings do not depend on the interest rate but on income gave it a stronger theoretical basis. The accelerator theory says simply that investment depends on expected increase in consumption, C' .

$$I = f(Y, C')$$

The rationale behind the accelerator theory is that, given a certain level of capacity utilization, businessmen will invest as they predict that demand, particularly final demand of consumption goods, will increase. The accelerator

¹ - According to Jorgenson's model, the desired capital stock, K^* , is a function of the cost of capital and of desired output, Y^* , given the prices, p , additional output will be sold: $K^* = f(c', p, Y^*)$. As Coen and Eisner observe, "with an implicit unitary elasticity of K^* to respect to c' , this formulation implies strong effects of monetary policy, via the interest rate, and of tax policy..." (1987: 982).

is a powerful tool to understand the business cycle. Investments depends on the variation of consumption (or, more broadly, of income) that, through the multiplier, determines the new level of income. Yet, although there is large evidence in favor of the relation between income or consumption and investment, it was never possible to define the coefficient of acceleration (Knox, 1952; Duesenberry, 1958).

The flow of internal funds or the liquidity theory of investment makes investment dependent on the internal funds available for investment, F.

$$I = f(Y, F)$$

On one side it is related to the classical theory of the expected rate of profit, but, as past profits are not a good predictor of future ones, it must be distinguished from it. On the other side it is related to the accelerator theory, as internal funds are related to income and consumption. But there is no reason why, according to the accelerator theory, investment should be limited to internal funds, basically retained profits and depreciation. Investment can be financed by internal or external funds.

Glauber and Meyer, however, have been able to relate in a creative way the accelerator and the liquidity theory. They called their theory the "accelerator-residual funds hypothesis", that analyses investment in the context of the business cycle. During the expansion phase, when perspectives of higher demand and higher profits are very positive, firms will finance their investments with internal and external funds. In the declining phase, however, they will tend to limit their investments to internal funds (1964: 120-121).

The contemporary version of this analysis, that distinguishes clearly internal from external funds, may be found in the post- Keynesian financial theory of investment. The neoclassical theory makes no such distinction. For them, including the rational expectations version of this theory, the cost of capital for each firm is the same independently of its origin. The real constraint for investments is the availability of savings, that will limit the availability of finance. For post-Keynesians, there is no "constraint on current output other than a monetary constraint, or better, a liquidity constraint" (Kregel, 1984-85: 139). Or, as puts Davidson, "ultimately, in a monetary economy, where 'money matters', that is, money is never neutral, it is the liquidity constraints and *never* an income (or savings) constraint that limit expansion before full employment" (1986: 110).

The monetary constraint to investment, however, is a highly unstable one, as financial markets are essentially uncertain. This is already in Keynes thinking, although his theory of investment, particularly in chapter 17 of the *General Theory*, pays excessive tribute to the neoclassical theory. Minsky, however, make it clear that "the deeper cause of business cycles in an economy with the financial institutions of capitalism is the instability of portfolios and of financial interrelations" (1975: 57).

The finance theory of investment becomes more clear if we consider, as Fazzari et al. do (1988), that internal and external capital are not perfect

substitutes. In this case, "firm's internal cash flow may affect investment spending because of a 'financing hierarchy' in which internal funds have a cost advantage over new debt or equity finance" (1988: 147-148). This analysis completes Meyer and Glibber "accelerator-residual funds hypothesis" (1964). Firms will only resort to external funds in the expansion phase of the cycle or when its expected rate of profit is particularly high.

The "cushion pad" between the interest and the profit rate

It is impossible to say that each one of these theories is fully wrong or fully right. All of them help us to understand investment behavior in "normal times". Their limitations, however, are also striking. The number of econometric and survey researches that refute the interest theory is enormous. I undertook one of these surveys that showed Brazilian firms paid little attention to the interest rate in their investment decisions (Bresser-Pereira, 1974). The cost of capital theory was undoubtedly an advance, but remains rather a logical theorem and a financial portfolio theory than an effective theory of investment. The accelerator theory is, on one side, obvious, on the other, rather a tool to analyze the business cycle than the decision to invest. The liquidity theory is interesting as it approaches the finance theory.

Tinbergen once said that "it is almost a tautology to say that investment is governed by profit expectations" (1938: 34). I would propose, however, that the expected rate of profit theory and the finance theory of investment are the ones that better describe investment behavior.

The expected rate of profit theory stops being a quasi-tautology if it is associated with one additional hypothesis: that in "normal times" the difference between the expected rate of profit and the market rate of interest is large enough and stable enough to allow us to say that there is a "cushion pad" between them. Firms usually do not invest up to the point where the expected profit rate is marginally equal to the cost of capital. They stop before that. The expected profit rate that well established firms require to invest is normally so much higher than the interest rate that variations in the last one have little importance in the decision process.

Theoretically the equilibrium point where investments cease to be made would be the one where the expected rate of profit and the interest rate (or the cost of capital in Modigliani and Miller sense) are equal, but this point very seldom would be reached. This is the market clearing point, the equilibrium situation assured by the interest rate.

My point is that in normal times the minimal rate of profit required by managers would be considerably higher than the market rate of interest, given the cushion pad that exists between the two rates. This cushion pad exists for several reasons. On one hand, because, in the long run, the interest rate is dependent on the general profit rate prevailing in the economy, so that the two rates tend naturally to be apart. On the other hand, because the minimum expected rate of profit that managers require to invest is usually substantially

higher than the long run interest rate. Managers have this behavior for three reasons: because uncertainty about the expected rate of profit is so high that economic agents demand a security margin for their decisions; because managers behave according to Kalecki's "principle of increasing risk"; and because managers, whose investment decisions always involve long run considerations, know that variations in the expected interest rate, that are related to the general business outlook, tend to be larger and more significant, than variations in the long run interest rate, that is viewed by them as essentially short run phenomena.

The interest rate is dependent on profit because, as Marx already noted: "Since interest is simply a part of profit, a part we have assumed the industrial capitalist has to pay to the money capitalist, the maximum interest would seem to be the profit itself..." (1894: 480). The capitalist lends its capital to the entrepreneur in exchange for a certain interest rate. This rate, according to Marx's observations, used to correspond to a small part of the profit rate (usually one fourth or one fifth according to Marx's examples (1894: 481)). This empirical observation, however, is significant because it is consistent with the logical assumption that in the long run the interest rate is a fraction of the profit rate.

But, even if we accept that the actual profit rate prevailing in the economy may near the interest rate, the minimum expected profit rate that will convince managers to invest will be substantially higher than the long run interest rate.

First, because the strong uncertainty element involved in investment and the functioning of financial markets. Given this uncertainty managers will require this cushion pad or this security gap. Autonomous investments just will not take place if the two rates are near one from the other. The firm needs a security margin for uncertainty. The market rate of interest is only partially a known variable. The firm knows the present rate of interest, not the future one. The future rate of profit is fully uncertain. The best prospective methods offer limited assurance to the investor in fixed assets.

This perspective is consistent with Keynes view of investment, as Minsky correctly interprets it: "To Keynes the subjective evaluation of prospects over a time horizon is the major proximate basis for investment and portfolio decisions, and these subjective estimates are changeable" (1975: 68) The decision to invest is a speculative decision, where the expected cash flow provided by the investment must be substantially higher than the cash flow involved in remunerating and returning external finance.

Second, it is necessary to consider Kalecki's (1937, 1952) "principle of increasing risk": the opportunity cost of an investment in fixed assets is reduced as the entrepreneur ties an increasing share of his wealth in a particular project. According to Kalecki: "Many firms will not use to full the potentialities of the capital market because of the 'increasing risk' involved in the expansion". And he adds, anticipating a behavior that is typical of Brazilian firms in the last ten years: "Indeed, some firms may even keep their investment

at a level below that of the entrepreneurial capital, a part of which may be held in securities" (1952: 92).

Third, partially returning to the first argument, if the interest rate is the part of the profit rate that entrepreneurs pay to rentiers, in the long run the interest rate is determined by the profit rate: "the interest (rate) will rise or fall with the total profit (rate)" (Marx, 1894: 481). Managers that respond for long run investments in fixed assets know that. They know not only that in the long run the interest rate will tend to be significantly smaller than the profit rate, but also that the variations in the profit rate will be determinant of the long run interest rate. They will pay little attention to short run variations in the interest rate because in the long run the interest rate is supposed to follow the general profit rate. The expected profit rate of the investment they are considering will vary in time as the general profit rate varies. Thus, in their investment decisions they will rather look to the profit rate (the expected profit rate of their projected investment and the general profit rate) than to the interest rate.

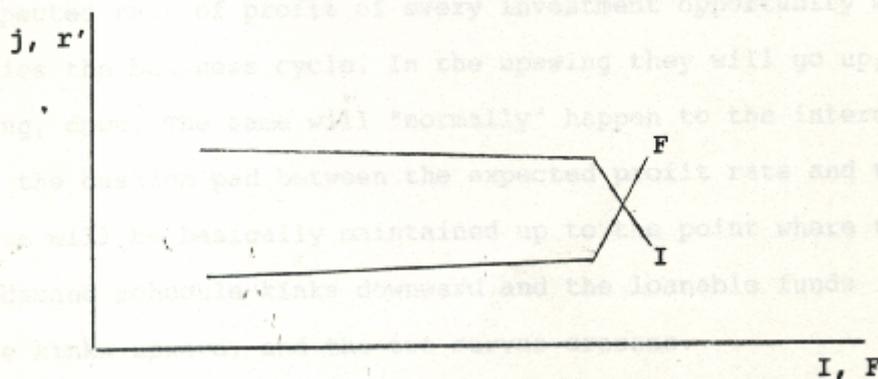
This view, that substantiates a cushion pad between the expected rate of profit and the interest rate, emphasizes the borrowers' risk. I am assuming cautious business enterprises. I am speaking rather of managers than of entrepreneurs, because the significant investment in contemporary, corporate capitalism, is decided by managers. And this cautious behavior is also typical small and medium size capitalists. Certainly there are the daring entrepreneurs, who will demand finance to investment up to the point the demand schedule of investment crosses the interest rate curve. But they will be rather the exception than the rule.

Does the cushion pad hypothesis mean that demand for investment curve does not cross the supply of loanable funds given by the rate of interest? Not necessarily if we assumed a sharply downward kinked demand curve for investments. The demand curve for investments will be quite above the supply curve of loanable funds till a certain point. After this point - the point where the stock of projects of investments of the normally cautious managers and capitalists is exhausted - the demand schedule will fall sharply. This fall will not be vertical to allow for the entrepreneurs, the risk takers, who will invest even if the expected rate of interest is quite near the cost of capital.

Under a certain point of view, the finance theory presents an opposite view, as it assumes entrepreneurs eager to invest and conservative banks that will increase the rate of interest as their risk increases. Fazzari assumes "asymmetric information" between lenders and borrowers, as a factor that circumvents the market to be cleared: "lenders' risk, unless it is an empirically trivial concept, involves an unwillingness of lenders to finance investment that a firm would otherwise undertake" (Fazzari, 1989: 106). This is probably right for daring entrepreneurs, but it is not the usual behavior for well established business enterprises, particularly for the large corporations that dominate contemporary capitalism.

It is possible, however, to consider the finance theory as complementary to the expected rate of profit with a cushion pad hypothesis, if we assume that lenders and borrowers are both cautious. Thus, the two theories are consistent. And we assume also an upward kinked supply curve of loanable funds. After the point that the stock of "good" borrowers is exhausted - a point that will correspond to the exhaustion of projects of these borrowers - the supply curve of loanable funds as a function of the rate of interest will rise sharply. In this way we have a market clearing point, but it is a quite particular one, quite far away from the one assumed in the neoclassical and the neo-Keynesian-neoclassical synthesis.

Figure 1. The kinked investment demand schedule and the kinked supply curve of loanable funds



According to this hypothesis of investment behavior variations in the interest rate will have small influence in investment. The decisive variable is the expected rate of profit for each project, that will according to the phases of the business cycle, or, according to the positive or negative outlook of managers and capitalists as to the future behavior of demand and of the general profit rate. The expected rate or profit varies with the business cycle. Each variation in the level of optimism in relation to the future behavior of economy will shift the investment demand schedule upward or downward. In the upswing investors will be optimists, their general business outlook will be positive, their general (for the whole economy) and particular (to their firm) profit prospects, high. Thus, the investment schedule will shift upward, the expected rate of profit for new investments will also be high. They will invest. In the downswing they will be pessimist, they will foresee lower sales and smaller profits, the investment schedule will shift downward, and they will limit their investments to the strictly required ones.

The expected rate of profit of every investment opportunity will vary as varies the business cycle. In the upswing they will go up, in the downswing, down. The same will "normally" happen to the interest rate. Thus, the cushion pad between the expected profit rate and the interest rate will be basically maintained up to the point where the investment demand schedule kinks

downward and the loanable funds supply curve kinks upward, and the two curves crosses.

Investment in "exceptional times"

This analysis is valid for normal times. In "exceptional times", as the ones that Latin America, including Brazil, experiences since early 1980s, the cushion pad between the expected profit rate and the long run interest rate disappears, as the profit rate goes down, the interest rate goes up, and entrepreneurs and managers start paying much more attention to the interest rate.

By "exceptional times" I mean times of deep structural crisis, as the present Brazilian crisis. A crisis that cannot be mixed with the business cycle crisis. In the last case, after a period of over-investment, when profits and investments increase more rapidly than wages and salaries, and also of over-consumption, because wages and salaries anyway increase in real terms and employment increases still more, the economy tends to over-capacity, the expected rate of profit decreases, investments programs are reduced and the downswing takes places. Thus the business cycle crisis is a strictly market phenomenon. Structural crisis are different. They are synonymous of exceptional times. Often they are the result of wars, or of high public indebtedness. Usually they imply a deep fiscal crisis of the state.

The Brazilian and more broadly the Latin American cases is quite clear in this sense. Hostage of an enormous and increasing public debt and a resistant public deficit, the state crowds out private investment pressing up the interest rate as it competes for loanable funds. On the other hand, as public savings tend to become negative, the financing of public investment means necessarily additional public deficit. In consequence public investment is reduced, and private investment is discouraged. Savings are further reduced. The economy stagnates. On the other hand, as the state is recognized bankrupt by economic agents and loses credit, it also loses the capacity to back up the national money. The consequence is that inflation tends to hyperinflation. Meanwhile, governments, usually trying to follow Washington authorities' advice, try to pay the debt and to adjust gradually, conventionally, an economy that requires radical changes. The failure of these attempts is an indication of the perverse macroeconomics of a fiscal crisis: gradual and conventional policies only further harm an economic system already deteriorated (Bresser-Pereira, 1989, 1990).

Having this fact in mind I decided to repeat in 1990 a survey I undertook in 1970 about the decision to invest among the largest industrial firms in Brazil.²

² - This survey, as the previous one, had as universe the 100 largest industrial enterprises in the State of São Paulo, divided in 10 industries. We obtained 63 questionnaires filled up; in 1970, 67. I made a partial report of the first survey (1974). The full reports of both surveys will be made by Cristina Pinto de Mello, that will write her Master dissertation for Getúlio Vargas Foundation, São Paulo, on the subject.

In this survey, after asking the chief executive officer of the business enterprise if some significant investment had been undertaken in the last five years, the following question was made: "Which of the following factors could influence you in not realizing such investment?" The first factor, "excessively high real interest rate", that would inhibit only 24.6 percent of respondents in 1970, inhibited 53.2 percent in 1990, whereas "a low expected rate of profit", that would inhibit the investment in 75.4 percent of the cases in 1970 changed only to 79.0 percent in 1990 (Table 1).

Table 1: Factors that could influence the chief executive officer in not undertaking the investment

	1970	1990
High interest rate	24.6	53.2
Low expected rate of profit	75.4	79.0
Unsatisfactory profit in previous year	15.9	37.1
Negative economic outlook	53.6	74.2
Absence of government incentives	10.1	19.3
Absence of long term government financing	20.3	9.7

Note: Question allows multiple answers.

What do these changes between the two surveys mean? Essentially, why the concern with the interest rate, that was very small in 1970, more than doubled in 1990? On the other hand, why the concern with a negative economic outlook increased from 53.3 percent in 1970 to 74.2 percent in 1990?

The answer to the first question is straightforward: in 1970, when the economy was prosperous and "normal" (GDP increased 8.3 percent) and fixed capital formation was high (21.7 per cent), the real interest rate was low (around 10 per cent a year) and the expected profit rate on new projects very high (the average rate of profit in 1970 was around 20 percent). Thus a sizeable cushion pad existed between the two rates - a cushion that prevented the market to be cleared as neoclassical economics proposes, but that did not prevent investment from being undertaken.

In 1990 the situation was entirely different. The economy was (and still is) in deep crisis. A crisis that began in the end of the 1970s. GDP decreased by 4.3 percent. Fixed capital formation was probably very low (around 16 per cent of GDP in constant prices). The real interest rate, pushed by a very hard monetary policy, was around 30 percent a year after Collor Plan I, during the second semester of the year.³ The expected rate of profit, very low. So low that probably autonomous investment was near zero in that year. These are figures of "exceptional times". They translate a structural crisis, where the cushion pad disappeared. Worse than that, it became negative.

The increase in concern about the general prospects of the economy reveal the pessimism of managers in relation to the expected rate of profit. This variable remains firmly the essential criterion of investment (75.4 percent in 1970, 79.0 in 1990). But, as the chief executive officers were in 1990 much more concerned with the economy's future outlook than they were before for the simple reason that in 1990 this outlook was objectively worse.

These two surveys put together are a striking indication that macroeconomics rather than a system of theorems or logical models about the aggregate economic behavior of rational agents that empirical test would confirm, is a system of models with a logical, an empirical *and* a historical content. Rationality does not exist outside history. Economic agents are essentially rational, but their rationality changes historically, as the general economic conditions change. They are fully rational when, in normal times, they pay little attention to the interest rate in their investment decisions. They are again entirely rational when, in exceptional times, they give much more importance to the interest rate. In the first case a cushion pad existed between the interest rate and the expected profit rate of their projected investments, in the second, this cushion pad disappeared. It is not only the historical or factual conditions that change, the reasoning remaining the same. The reasoning also changes. If we limit reasoning only to a very high level of abstraction, reasoning is unchanged. But if we take reasoning not as a purely abstract phenomenon, but as a phenomenon that is part of the total reality men and women are part of, reasoning changes, as these two surveys clearly show.

I would add that economic agents also change their rational behavior when political conditions change. This paper did not deal directly with this problem, but it should be considered that the Brazilian present structural crisis is a fiscal crisis. Thus it is a crisis of the state, a crisis that by definition has not only an economic but also a political aspect. It would be interesting to complement this study with a political analysis of the decision to invest. This analysis probably will strength the role of profit in investment, and the role of the state in assuring high and stable profit rates for investors.

³ - Source: *Comments on the Brazilian Economy*, (23)91, February 6, 1991. São Paulo: Banco BBA-Creditanstalt.

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