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Keynesian theories of investment: neo-, post-, and new

Teorias keynesianas de investimento: neo-, pós-, e novo

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RESUMO: O artigo tem como objetivo geral analisar as formulações desenvolvidas por três vertentes interpretativas da teoria do investimento de Keynes, especificamente no que tange às inter-relações entre variáveis reais e monetário-financeiras. Após destacar o caráter inovador da formulação de Keynes sobre a questão, o autor percorre as abordagens dos neokeynesianos (síntese neoclássica), pós-keynesianos e novos keynesianos, tendo em vista focalizar a questão central do artigo, qual seja, avaliar a existência ou não de possíveis relações entre os novos keynesianos e as duas outras vertentes no que diz respeito aos vínculos entre finanças e investimento. Em particular, o autor objetiva avaliar se as formulações dos novos keynesianos representam ou não uma convergência entre as visões neo e pós.
PALAVRAS-CHAVE: Investimento; keynesianismo.

ABSTRACT: The general objective of this piece is to analyze the formulations developed by three interpretative strands of Keynes' investment theory, specifically with regard to the interrelationships between real and monetary-financial variables. After highlighting the innovative character of Keynes' formulation on the issue, the author goes through the approaches of neo-Keynesians (neoclassical synthesis), post-Keynesians, and New Keynesians, in an attempt to focus on the central question of the article, that is, to assess the existence or not of possible relationships between the new Keynesians and the two other approaches with regard to the links between finance and investment. In particular, the author aims to assess whether or not the formulations of the new Keynesians represent a convergence between neo and post visions.
KEYWORDS: Investment; Keynesianism.
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INTRODUCTION: A BRIEF INTELLECTUAL HISTORY OF THE RELATIONSHIP BETWEEN INVESTMENT AND FINANCE

In the *General Theory*, John Maynard Keynes emphasized the central role of investment in the theory of aggregate output and employment. His ideas differed from traditional views in two fundamental ways. First, the importance of investment did not result only from its long run effect on capital stock growth. Keynes focused on investment as the driving force of aggregate demand and short-run fluctuations in economic activity. Seccondly, Keynes rejected the microfoundations of investment that were based exclusively on technological conditions of capital productivity by stressing uncertainty, finance, and monetar factors as fundamental determinants of investment.

One of Keynes's fundamental contributions was to develop conditions under which "money," broadly conceived, mattered for the real performance of the macroeconomy. This general approach is evident in the theory of investment, in which financial and monetary conditions affect firms' capital spending. These insights spawned a rich theoretical and empirical literature, in the decades following the publication of the *General Theory*.[1] These authors found some support for financial influences on investment through significant effects of liquidity or profits in a variety of empirical investment functions.

These ideas, however, have been much debated. In particular, economists working primarily in the neoclassical tradition have questioned whether purely financial factors can have an impact on a "real" phenomenon like investment. Such a result seems to contradict the optimizing foundations for microeconomic decision-making that characterizes the neoclassical perspective. The most prominent work on this approach is associated with Dale Jorgenson and his collaborators.[2] It roots desired capital accumulation, and hence optimal investment, in the fundamental preferences and technology that characterize the economy. Purely financial conditions do not affect investment. Indeed, Jorgenson bases his results on the Miller-Modigliani theorem that shows the independence of real and financial decisions under some conditions. Jorgenson's work also dismisses the financial effects found in other empirical research as the result of correlations between financial variables and neoclassical determinants of investment.[3]

These results also had important implications for the emerging "neoclassical synthesis" of Keynesian results with neoclassical microfoundations. For if stable tastes and technology ultimately determined investment, one could dismiss much

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[1] See, in particular, the work of Meyer and Kuh, Gurley and Shaw (1955), Davidson (1972), Minsky (1975) and Eisner (1978).

[2] Well known papers include Jorgenson (1963), Hall and Jorgenson (1967), and the survey in Jorgenson (1971).

[3] There are a number of reasons why the assumptions of the Miller-Modigliani theorem would be violated in realistic economic circumstances, non-neutral taxation for example. But these problems did not seem, at the time, to support Keynesian volatility of investment.

of the volatility of aggregate demand predicted by Keynes. Under these circumstances, the remaining fluctuations in aggregate output were predictable and could be offset by enlightened stabilization policy.

Therefore, in the 1960s and 1970s, views about links between finance and investment bifurcated into distinct schools of thought. The "post-Keynesians" maintained that the original insights of Keynes remained valid: instability in financial relations could cause volatility in investment and the macroeconomy. The more formal "neo-Keynesian" approach rested on optimizing models derived from neoclassical "first principles" that did not allow important links between finances and investment.[4] During this period, there was little common ground between the two schools of thought.

In the 1980s, however, a new and distinct macro research program emerged. It has become known, somewhat unfortunately, as the "new Keynesian" economics. The roots of this work lie at least partially in both the success and failure of the new classical macroeconomics of the seventies. The new classical approach places special emphasis on building models from first principles, in ways consistent to the greatest possible degree with neoclassical optimization. This characteristic has been retained in most of the new Keynesian work. On the other hand, the implications of the new classical theories did not fare well empirically, leading some economists to look more closely at the Keynesian ideas that other economists thought should be abandoned for good at the height of the rational expectations revolution.

The new Keynesian approach changes the environment in which microeconomic agents optimize. The models explicitly recognize features of decentralized market activity that prevent the system from attaining the efficient general equilibrium results that characterize most of the new classical macro models. The analysis goes beyond the sticky nominal wages or systematically biased expectations that underlie much of the neo-Keynesian view to examine more fundamental problems of market economies.[5] Many of the problems center on asymmetric information between buyers and sellers in markets that prevents the kind of efficient exchanges that would occur in equilibrium if all agents were fully informed.[6]

One of the most fruitful applications of these ideas has been to the study of credit markets. When agents have asymmetric information, many non-traditional

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[4] Further developments in macro theory pushed this conclusion even further. In the "new classical" macroeconomics, the nominal rigidities that gave rise to short-run Keynesian results disappeared through the combined assumptions of market clearing and model-consistent (rational) expectations. Of course, these models maintained the tastes and technology approach already evident in Jorgenson's work. Therefore, investment was understood as a real phenomenon, independent from financial influences.

[5] These problems are sometimes referred to as "market imperfections." To the extent that this term connotes a secondary importance, a priori, of the problems addressed in the new Keynesian economics, it can be misleading. One can only judge the significance of these issues after they have been subjected to serious theoretical and empirical scrutiny.

[6] Akerlof (1970) is a seminal paper in this literature, although these ideas were not applied to macro issues until later.

results arise even though all agents are essentially neoclassical optimizers. For example, credit may be rationed so that interest rates do not equate the supply and demand for loans, and agents' access to funds may depend on their financial circumstances. More specifically, the ability of a firm to undertake an investment project may depend not just on the fundamentals of the project under consideration, but also on the firm's financial condition. Projects that firms would invest in it they had sufficient internal funds might not be undertaken if the firm must raise external funds to finance the project.[7] These ideas provide a new foundation for links between financial structure and real activity. This research program has also recently led to new empirical work that re-examines the importance of finance for investment.[8]

This approach seems to have resurrected, to some extent, the original Keynesian view of investment and finance that disappeared from mainstream neo-Keynesian research. The central issue addressed in this brief paper concems the relationship between this new Keynesian research on the finance-investment link and the traditional post- and neo-Keynesian schools. In particular, do these developments represent a convergence in any meaningful sense between post-Keynesian views and the intellectual progeny of the neoclassical synthesis? Have the developments in new Keynesian economics advanced the post-Keynesian approach? We shall also speculate on what is yet to be learned from the various schools that may advance their respective research programs.

ASPECTS OF THE KEYNESIAN THEORY OF INVESTMENT

The theory of investment, regardless of one's perspective, is a rich and diverse subject. Therefore, to keep the topic manageable, this section focuses on only two major aspects of theory of investment often emphasized in post-Keynesian research: tender' risk and borrowers' risk. In the analysis of these aspects, we shall consider the way in which they have been addressed in the new Keynesian research. This will facilitate the assessment of the degree of convergence between the theories, and it will suggest the direction of further developments.

A) Lenders' risk

Keynes claimed that as investment spending rises, "lenders" become more and more reluctant to finance marginal projects. In Minsky (1975) this risk is characterized as an increase in the marginal supply price of investment facing firms. That is,

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[7] Representative papers include Stiglitz and Weiss (1981), Myers and Majluf (1984), Blinder and Stiglitz (1983), and Bernanke and Gertler (1987). A more detailed survey of these ideas that develops their particular relevance for investment can be found in Fazzari, Hubbard and Petersen (1988).

[8] See Fazzari and Athey (1987), Fazzari, Hubbard and Petersen (1988), and Kashyap, Hoshi and Scharfstein (1988).

the effective cost of investment includes not only the purchase price of capital goods but also incorporates the present value of the debt service commitments set up to finance the investment project. As the cost of external finance rises, the supply price rises.[9] Minsky argues that this kind of risk actually "shows up in contracts" as higher interest rates when borrowing increases or as collateral requirements or other restrictive covenants in debt contracts.

On the surface, this kind of phenomenon looks like risk averse behavior on the part of providers of external funds. But, from a neoclassical perspective, this problem could be overcome by diversification. Individual firms should face an infinitely elastic supply of external finance at an interest rate determined in centralized securities markets. Then, they should undertake any positive net present value investment project, regardless of the mix of internal and external funds required to finance it. Financial conditions and investment become independent.

This kind of result has received closer scrutiny in recent literature, however. The financial irrelevance result rests fundamentally on the assumption that both borrowers and lenders have full information concerning the quality of the project and the character of the borrower. Suppose on the contrary, that information is asymmetric, and the quality of projects and borrowers is variable. If the same general equilibrium interest rate that cleared the market for external finance in the full information case were to prevail with asymmetric information, borrowers with poor-quality projects could behave opportunistically. They could obtain loans that they would not have been able to get if the lenders could determine the true probability of default. Lenders recognize this incentive, and therefore they will charge a higher rate of interest to borrowers of all qualities when information is asymmetric.[10]

These circumstances explain a link between a firm's financial structure and its investment. Firms with good investment projects face a higher cost of external capital than their opportunity cost of using internal funds because the cost of external funds includes a premium to compensate lenders for the risk of inadvertently funding bad projects. This creates a preference for internal funds, and firms may refuse projects that require borrowing or new equity issues even though they would undertake them if they had sufficient internal cash flow.

This result is fundamentally different from predictions of the neoclassical theory predicated on the essential independence of real and financial decisions. One cannot understand real investment as ultimately determined by exogenous tastes and technology alone. It is possible that two firms with access to identical investment opportunities, from a technological standpoint, will reach different decisions

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[9] Also see the discussion in Fazzari and Mott (1986).

[10] This kind of environment is similar to the conditions that can result in "credit rationing" in the model of Stiglitz and Weiss (1981). The particular approach described here is drawn from the formal presentation in Myers and Majluf (1984). The ideas are extended, and many additional references are provided in Fazzari, Hubbard and Petersen (1988).

about whether to invest in the projects depending on the firm's financial structure.[11] Nevertheless, in spite of the non-neoclassical characteristics of the results, the models developed in this literature retain the first principles optimizing approach that has been associated with neoclassical research.

Are these results Keynesian? Can they add to the generally more discursive research of the investment-finance link in the post-Keynesian tradition? The answer is not obvious. But while many of the rich insights associated whit ·the idea of "lenders' risk" may not be captured by these new models, I believe the problem of asymmetric information in markets for external capital provides an essential element in the story. Furthermore, this problem is not an arbitrary "imperfection" tacked on to an otherwise standard model. Rather, it represents a fundamental characteristic of decentralized market economies.

Lenders' risk, unless it is an empirically trivial concept, involves an unwillingness of lenders to finance investments that a firm would otherwise undertake. To assume, therefore, that such a risk arises when both borrowers and lenders have identical information about the profitability of investment implies that either the borrower wants to go ahead whit a money-losing deal or the lender systematically foregoes what it knows are money-making opportunities.[12] Neither alternative seems to capture post-Keynesian ideas. Rather, an interesting theory needs to explain why it is fully rational for a firm to seek finance for investment, but for the providers of finance to refuse the request or charge a premium over their market cost of funds. A theory based on asymmetric information has this characteristic.

A legitimate criticism, however, of most existing models of credit markets under asymmetric information is that they do not adequately explain the sources of information problems. But it is clear that these problems are likely to be empirically significant in market economies. The inherent characteristics of decentralized markets include the separation of agents and the lack of institutional structures that consciously coordinate the diverse activity of isolated individuals. Agents specialize in a wide variety of economic activities and their informational advantages are specific to their particular circumstances. Indeed, neoclassical economists argue most strongly that the lack detailed information across agents with different specialties provides great advantages to market organization as compared with other forms of

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[11] The relevant aspects of "financial structure" probably go well beyond the availability of internal funds, Bernanke and Gertler (1987) emphasize the importance of "internal net worth" or "collateral" as theoretical determinants of a firm's access to investment finance. Various problems with debt finance and restrictive debt covenants are discussed by Fazzari, Hubbard and Petersen (1988) who also show the empirical importance for investment of firms' stock of liquid assets. Fazzari and Mott (1986) and Fazzari and Athey (1987) examine the empirical importance of interest expense.

[12] Two qualifications to this statement are in order. First transaction costs might give rise to some preference for internal versus external sources of finance, but this is not the kind of problem that either the post-Keynesian or new Keynesian schools have in mind. Second, one might explain credit limitations on the basis of systematic differences in risk preferences between borrowers and lenders. But, as mentioned above, it is hard to understand why diversification would not solve this problem, at least when transaction costs are low.

economic coordination. ln a market system, we do not need to know the details of how wheat or cars or toasters are produced. We only need to know the market prices of these goods and the relation of these "use values" to our preferences.

Consider, however, the implications of this kind of specialization and information isolation for the functioning of financial markets. Entrepreneurs have informational advantages in developing new technologies and marketing new goods and services. Bankers and financiers specialize in financial intermediation. If an entrepreneur seeks funds from an intermediary to finance an investment project, the natural starting assumption to make is that the entrepreneur has more information about the project's prospects than the banker. The banker may be able to obtain some information from independent sources, but this activity is costly.[13] To become fully informed would require that the banker become an entrepreneur, a condition that would undo the specialization that is fundamental to the productivity of the system.

The upshot of these ideas is that financiers will only be able to get full information about the projects they are financing if the investor voluntarily reveals it. But it is impossible for this to happen because borrowers have an incentive to present their situation in the best possible light. This incentive is well understood by the lenders, and it leads to a rational skepticism that results in a wide variety of institutional features designed to safeguard the lenders' interests. These may take the form of equity participation arrangements, collateral requirements, restrictive covenants, or simply a premium charged for funds that increases the cost to investors of external finance as compared to the opportunity cost of internal cash flow.[14] ln any case, Keynesian "borrowers' risk" is evident as a result of asymmetric information. These asymmetries are not just minor wrinkles in an otherwise smoothly functioning system. They represent an inherent characteristic of de-centralized market production.

B) Borrowers' risk

Lenders' risk may be the most obvious manifestation of the intrusion of financial effects on real decision-making. As Minsky argues, lenders' risk can be directly observed in the characteristics of real world financial arrangements. But the Keynesian and post-Keynesian view of the investment-finance link also encom-

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[13] The fact that intermediaries evaluate creditworthiness at all is evidence of asymmetric information by specializing in these activities, intermediaries can reduce the extent of information problems between the primary borrowers and lenders, but at a cost, and there is no reason to believe that the information gap can be eliminated. See Bernanke (1983) and Calomiris, Hubbard and Stock (1986) for related discussion.

[14] Although these problems may be most evident in debt contracts, they may be even more severe in the market for new equity, a fact that would explain the relatively small amount of new equity finance that occurs. See Myers and Majluf (1984), Greenwald, Stiglitz and Weiss (1984) and Fazzari, Hubbard and Petersen (1988).

passes a different and more subjective channel through which financial conditions have an impact on real decisions: borrowers' risk. Minsky describes this risk as "doubts in the mind of the entrepreneur" and argues that this is the only relevant financial factor if "a man ventures his own money" (1975, chapter 5). Similar ideas have entered the post-Keynesian literature through Michal Kalecki's (1937) "principle of increasing risk". This idea explains an increase in the marginal opportunity cost of investment, or, equivalently a reduction in the marginal demand price for investment goods, "because the more of one's wealth tied up in a particular fixed investment, the more dangerous one was exposed to in the event of failure [or] ... in case of a sudden need for liquidity" (Mott 1985, p. 7).

Again while these ideas are intuitive and they seem to characterize real-world phenomena, their significance is apparently reduced in a neoclassical environment. If borrowers' risk arises from entrepreneurs' risk aversion, then diversification seems to provide the obvious solution. Systemic, undiversifiable risk may affect economic performance, but this effect is ultimately rooted in exogenous preferences and therefore does not change the tastes and technology view of neoclassical thought.

But again, the insights of the new Keynesian approach led to different conclusions regarding borrowers' risk. We can demonstrate that the original Keynesian insight can be sustained in an optimizing framework without arbitrarily assuming the agents simply ignore opportunities to diversify their risks. The lack of diversification emerges as itself an optimal response to a realistic economic environment.

Much of the groundwork for this analysis has been laid in the previous section. The key insight again springs from asymmetric information between borrowers and lenders. As discussed above, this circumstance prevents external funds from perfectly substituting for internal funds. External finance will be more costly if it is available at all. Therefore, to undertake a profitable investment project a firm's insiders may have to commit more of their own capital either as a direct means to finance the project or as collateral to obtain outside funds. This requirement forces entrepreneurs to forego diversification opportunities if they want to invest. The more committed they become to particular fixed capital, the greater their exposure and the greater their risk. This problem leads directly to "borrowers' risk" or Kalecki's "increasing risk" as a limitation on the expansion of investment. The limitation is not technological, but inherently financial. It can be overcome by increases in liquidity, independently of changes in the technological characteristics of the project.

CONCLUSION: AN OPPORTUNITY FOR CONVERGENCE OR A HOPELESS MESS

Are the new Keynesian models just another entry in a line of "imperfection" theories that attempt to reduce Keynesian macroeconomics to a special case of neoclassical general equilibrium theories? The answer to this question is not clear. There is no doubt that the new Keynesian models share methodological features

with mainstream neoclassical research. On the face of things, this fact may not seem to further the influence of the Keynesian school as some branches of the mainstream paradigm have treated the adjective "Keynesian" as synonymous with George Bush's use of the "L-word" in the recent election![15]

But the similarities between the new Keynesian approach and anti-Keynesian models in the tradition of the new classical macro have more to do with form than substance. The new Keynesian theoretical models attempt to ground macroeconomic results in formal optimizing models. But Keynes and his more prominent followers never denied that agents optimize. The debate has focused, correctly in my view, on the environment in which optimization occurs.

At this level, the new Keynesian models, I believe, are much more sympathetic to the views of post-Keynesians than anything that has come along in mainstream macro for decades. Whether one labels the information asymmetries that generate Keynesian results imperfections or not seems purely a matter of semantics. The important points are that these problems are pervasive in decentralized market economies and that they give rise to fundamentally Keynesian results: nominal financial relations matter for real economic activity.

The view of investment that emerges from these new models is unmistakably Keynesian in its empirical implications. Information asymmetries lead to a preference for internal funds over external finance. The most important determinant of fluctuations in internal cash flow and liquidity is undoubtedly the aggregate business cycle. Therefore, these models immediately suggest a link between investment and the cycle, unlike anything that comes out of the tastes and technology microfoundations of the neo-Keynesian synthesis. These insights may lead to more rigorous foundations for the much-maligned, but maybe the most empirically successful investment model: the accelerator. Of course, this kind of model returns the multiplier concept to the mainstream and opens the door to the possible need for stabilization policy. On a more theoretical level, these models explain the business cycle as an inherent aspect of market economies that is not tied to their *technological* characteristics (as in the new "real business cycle" theory). Fluctuations result from the *economic* structure of production.

Is there then some possibility for "convergence" between the bifurcated schools of thought? There are still important aspects of the post-Keynesian approach that have yet to find their way into the mainstream thinking represented by the new Keynesian macroeconomics. For example, the fundamental role for uncertainty in the determination of investment is just beginning to appear in the mainstream literature, and the ideas still remain somewhat removed from the view of chapter 12 of the *General Theory.*[16] Therefore, I would not claim that the new models incor-

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[15] Of course, post-Keynesians often have an equivalent degree of respect for mainstream views.

[16] Bernanke (1983) and Jones and Ostroy (1984) present models in which uncertainty about economic structure has real effects. Also see Ferderer (1988). A recent paper by Scharfstein and Stein (1988) models the "herd behavior" Keynes discussed in a formal optimizing model.

porate the whole Keynesian story; much is yet to be re-discovered in the mainstream. On the other hand, I believe the post-Keynesian approach can gain insights from these new developments. The central role of information structure, for example, is implicitly in Keynes and much post-Keynesian research. The new models emphasize and explore this issue and in so doing, motivate new empirical research. The result has been a more convincing case for the proposition that financial influences on investment are of central importance. This cannot help but bolster a Keynesian world view.

These observations make the case that there is a basis for discussion between at least two of the three species of Keynesians: the "new" and the "post". There is reason to hope that the intersection of post-Keynesian interests, problems, and real-world empirical insights with the analytical and empirical tools developed primarily in mainstream neoclassical analysis can lead to important new insights into how the macroeconomy behaves. Both schools of thought have much to gain by taking the work of each other seriously.

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