Macroeconomics of Keynesian and Marxian inspirations: Toward a synthesis

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1 - Main results and outline

In the wake of World War II, Keynes' analysis contributed to the definition of the new social compromise (including its macro and welfare components). Within this favorable political context, a "Keynesian school", in the broad sense, prospered. After the establishment of neoliberalism in the 1980s, despite the overall repression of economists critical of the new social order, the Keynesian perspective is still the object of much interest among the minority of economists politically leaning to the Left. The relationship between Keynesian and Marxian economics has always been ambiguous, but there is a lot in common concerning the macroeconomics.

During the last few decades, one of the fields of our research has been the analysis of business-cycle fluctuations, theory and empirics. We understood that Marx's perspective on this issue was "macroeconomic" as expressed in the phrase "crises of general overproduction" — "general" being here the term to be emphasized as opposed to "disproportions" among industries. On such grounds, the encounter with Keynes was unescapable. This is one of the numerous interests we share, we believe, with Duncan Foley to which this volume is dedicated.

The object of the present study is the investigation of these common Marxian-Keynesian grounds. The "Keynesian inspiration" refers to a broad set of approaches, major figures of the past such as Michal Kalecki, Joan Robinson, or Hyman Minsky, and the contemporary postKeynesian school. Conversely, by a "Marxian inspiration", we only mean here our own understanding of Marx's analysis, to be later specified, not the entire set of readings of Marx's crisis theory by contemporary Marxist economists or in the past. The final ambition is factual analysis: business-cycle fluctuations within sophisticated capitalist economies after the establishment of central banks and the conduct of macro policies. (This later feature, obviously, creates some distance with Marx's original approach.)

The purpose of section 2 is the introduction of the overall framework of analysis, but abstracting from money and finance. A broad typology of "theoretical fields" is established depending on time frames and the choice of a multi-industry or macro perspective. Monetary and financial mechanisms open a second field in section 3. We introduce the framework of "co-determination", in which the behaviors

of nonfinancial and financial agents concerning money and credit are jointly considered within single functions. The contrast is sharp between the postKeynesian view of "accommodative money" and this new perspective in which the action of central monetary authorities plays a crucial role in the taming of an otherwise unstable macroeconomy. Section 5 harks back to the perspective of a multi-industry economy. The section introduces the important thesis that capitalism is rather efficient in the allocation of capital among industries — and, correspondingly, the production of goods or services in proportions conform to the pattern of demand — but always on the verge of macro instability (departure toward overheating or recession). These distinct properties provide the theoretical foundations for the adoption of a macro viewpoint in the modeling of business-cycle fluctuations. The perspective in section 6 is historical. A link is, first, established between profit rates and macro stability. Then, our thesis concerning the "tendential instability" in capitalism is introduced. Last, section 7 discusses the components of such fluctuations in various time frames in the U.S. manufacturing sector.

Due to space limitation, two sections of an earlier version of this study are located in appendices. Appendix A is devoted to the modeling of a monetary macroeconomy in the short and long terms[1]. Appendix B discusses Minsky's "financial instability".[2]

2 - Common and distinct grounds

We first recall our framework of "disequilibrium microeconomics" and "general disequilibrium models". A typology of alternative theoretical fields is, then, introduced and a link established with the Marxian and (post)Keynesian perspectives.

2.1 Disequilibrium microeconomics

Heterodox economists reject mainstream economics on account of their methodology and politics. Optimality properties are used

1. http://www.jourdan.ens.fr/levy/dle2011ga.pdf.
2. http://www.jourdan.ens.fr/levy/dle2011gb.pdf.

by the mainstream as an alleged justification of "market economies", another name for capitalism. The problem is not, however, the fact of accounting for individual behaviors, but what we call "equilibrium microeconomics", that is, maximizing under the assumption of ex ante equilibrium. To the contrary, we believe decisions are made in situations of disequilibrium and "radical uncertainty" (as opposed to objective probabilities with known distributions). For example, enterprises are not sure of selling the goods produced and do not know the probability distribution of demand. They *adapt* to the observation of disequilibrium, as in the accumulation of inventories of unsold commodities:

$$\cdots \to \begin{pmatrix} \text{Evidence of} \\ \text{disequilibrium} \end{pmatrix} \to \begin{pmatrix} \text{Modification of} \\ \text{behavior} \end{pmatrix} \to \cdots$$

This reaction contributes to a correction of the disequilibrium observed, but it does not result in the immediate return to equilibrium. This outcome can only be achieved progressively as a result of a gradual and conditional process of adjustment. Smith's metaphor of the "invisible hand" points to the gradual collective outcomes of such individual behaviors not to each movement. This approach to decision making must be extended to all aspects of economic activity — outputs, prices, investments — but also decisions to borrow and lend, including the action of lending institutions and the central bank.

These processes must be studied within dynamic models. As in other disciplines, such as physics, an equilibrium is the possible outcome of an actual dynamic process, it is the fixed point of such a process. Conversely, within mainstream economics, equilibria are defined independently of any dynamic process. Disequilibrium dynamics are, at best, viewed as inessential developments. When equilibrium is approached as the fixed point of a dynamic process, the issue of (in)stability comes to the fore. An equilibrium can be stable or unstable; stability is always conditional. In our opinion, the consideration of an equilibrium locally unstable can be economically relevant, and the stability conditions are susceptible of economic interpretation.

An institutional framework must be defined in which a list of agents is established as well as the types of mechanisms through which they interact. Such models can be called *general disequilibrium models*, though the ambition must be limited if an analytical treatment is sought. A common simplifying assumption is the consideration of a single commodity, as in a macro model. Another option, also typical

of Keynesian models, is to assume that enterprises produce exactly what is demanded. Such assumptions are very helpful, but their consequences must be carefully assessed, and the investigation of more complex models remains necessary.

2.2 Toward the distinction between theoretical fields

Due to the complexity of the mechanisms under investigation, economic analysis is conducted within distinct theoretical fields — sets of notions and mechanisms — defined by implicit or explicit abstraction. It is assumed that the quantitative relationships between a number of variables are weak and can be neglected. Implicitly or explicitly, two basic distinctions play a central role within economic theory:

1. *Proportions and dimension.* In our terminology, "proportions" refer the relative values of variables among industries or enterprises, for example, the relative stocks of capital or prices. "Dimension" refers to the general or average values of the variables, for example, total output as in a macro model.[3]

2. *Time frames.* The distinction between various time frames is based on the hypothesis that one set of variables is involved within movements faster than another set of variables. For example, production may be considered a fast variable, and the stock of fixed capital, a slow variable. In a similar manner, a given variable can be broken down into a short-term component (accounting for its fluctuations) and a long-term component (that is, a trend, around which the fluctuations are observed).

In the investigation of properties related to a *long term*, one can assume that the short-term dynamics have converged, that is, assume that short-term equilibrium prevails. This is the method of *temporary equilibrium*. Long-term dynamics are approached as the succession of temporary short-term equilibria. Thus, the dynamic properties of the model can be investigated in two successive steps:

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3. Keynes is very conscious of this distinction and criticizes the almost exclusive emphasis on proportions in what he calls "classical economics": "Most treatises on the theory of Value and Production are primarily concerned with the distribution of a *given* volume of employed resources between various uses and with the conditions which, assuming the employment of this quantity of resources, determine their relative rewards and the relative values of their products." (J.M. Keynes, *The General Theory of Employment, Interest and Money*, London: Macmillan (1936), p. 4).

(1) short-term equilibrium and its stability; and (2) long-term equilibrium and its stability.

We call "historical term" (or "term of historical tendencies") a further time horizon in which the historical trends of distribution and technology, as well as the historical transformation of institutions, are considered.

2.3 A taxonomy: Knitting Marxian and Keynesian perspectives

The distinctions between, on the one hand, proportions and dimension, and, on the other hand, short, long, and historical terms allow for a taxonomy of economic theories.

	Short term (production)	Long term (growth)	Historical term (historical dynamics)
Dimension (macro)	[1]	[3]	[5]
Proportions (relative values)	[2]	[4]	

Five basic configurations are discussed here:

- Configuration [1] in the table defines dimension in the short term. The economy is considered globally, and the stock of capital is constant. Thus, abstraction is made of accumulation and growth. Proportions are set aside. This is the field of Keynesian macroeconomics and the short-term equilibrium can, consequently, be called a "Keynesian equilibrium".
- Configuration [2] refers to proportions in the short term. It can be understood as the extension to various industries of configuration [1]. A given pattern of relative inter-industry capacity utilization rates allows for the equality between outputs and demands.
- Configuration [3], dimension in the long term, is the field of postKeynesian economics. In a postKeynesian trajectory (or "traverse")[4], a sequence of Keynesian short-term equilibria con-

4. M. Lavoie, P. Ramirez-Gaston, Traverse in a Two-Sector Kaleckian Model of Growth with Target Return Pricing, University of Ottawa, Ottawa (1993); A. Dutt, "Convergence and Equilibrium in Two-Sector Models of Growth, Distribution and Prices", *Zeitschrift für Nationalökonomie, Journal of Economics*, 48 (1988), p. 135-158.

verges toward a steady state in which resources are not fully used.

- Configuration [4], proportions in the long term, defines the Classical-Marxian field of the formation of production prices within competition. Considering the average values of the variables, one can also define a Classical-Marxian long term macro configuration, as in [3], evocative of the postKeynesian long-term equilibrium, with the important difference that the Classical economists and Marx assume that capacity utilization rates converge to "normal" (or "target") values. (More rigorously, they "abstract" from business-cycle fluctuations.)
- In the third column, only problems of dimension [5] remain, as proportions have been determined within shorter terms. In this context, dimension refers to the historical tendencies of the growth rate and the profit rate, and the trajectory of technical change (notably, the ratios between inputs such as the capital-labor ratio, or ratios between outputs and inputs such as productivities).

A given school may refer one particular or various configurations. The field of Marx's analysis of competition is [4]. Involved are only the relative values of prices, capital stocks, outputs. The problem of dimension — the mechanisms by which the rate at which productive capacities are used converge to "normal" values — is assumed away, and the business cycle is not discussed. Marx's analysis of the business cycle and crisis of general overproduction is clearly "macro" as in [1], that is, abstracting from proportions. Although Marx refers to "partial crises" within specific industries[5] , he strongly rejects analyses of capitalist crises in terms of *disproportions*. Marx's study of historical tendencies belongs to [5]. Keynesian economists do not distinguish between the long term and the historical term, and abstraction is made of proportions. Thus, only cases [1] and [3] are considered. Keynes' work belongs to [1], dimension in the short term. The field of postKeynesian economists combines [1] and [3]. Temporary equilibria are defined in [1] and the sequence of such equilibria in the long term belongs to [3].

A priori, each configuration in the table can be considered from the viewpoints of equilibrium and disequilibrium dynamics (including stability conditions). Keynes' analysis in [1] focuses on equilibrium,

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5. K. Marx, *Theories of Surplus Value*, Moscow: Progress Publisher (1862), p. 620-621.

while Kalecki's analysis belongs to [1] and [3], with an emphasis on dynamics. Concerning postKeynesian economists, only equilibrium is considered in the short term, as in [1], while both equilibrium and disequilibrium dynamics are considered in the long term, as in [3].

The interest for the disequilibrium dynamics around short-term equilibrium defines an important difference between our approach and the traditional (post)Keynesian perspective. This difficulty harks back to a basic ambiguity within the Keynesian paradigm, beginning with Keynes himself. It is not clear whether Keynesian equilibria are supposed to explain durable shifts or sudden collapses in the general level of activity (the 1920s in England or the Great Depression in the U.S., for example). The core Keynesian analytical device seems to account for durable shifts, whereas Keynes' analysis of the business cycle[6] emphasizes the extreme volatility of the marginal efficiency of capital, which determines investment and the level of output.

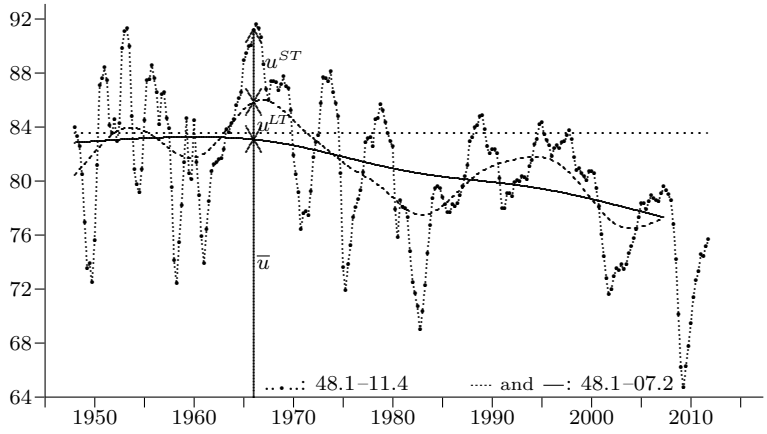
2.4 The components of the general level of activity

The framework in the previous sections has important implications concerning the analysis of the fluctuations of the general level of activity. Various time frames must be distinguished. This is illustrated in Figure 1. The variable is the capacity utilization rate within the U.S. Manufacturing sector, broken down into three components, u^{HT}, u^{LT}, and u^{CT}, which sum up to u:

- The segment from zero to the continuous line (——) defines a first component, u^{HT}, with a slow downward trend since the 1960s. Its interpretation is difficult (section 7). For brevity, it can be denoted as the "historical component", but something else than "historical tendencies" in Marx's sense is implied, maybe a mere figment of the data.
- The *the long-term* component, u^{LT}, is the difference between the "long-term fluctuation" (- - - - -) of u and the above first component (——). It reveals broad fluctuations during significant periods of time, about 10 years long. It can be approached as a sequence of temporary equilibria.
- A *short-term* component is manifest in the distance between u (·····) and the long-term fluctuation (- - - - -). The sharp departures typical of this component are the expression of the (in)stability of short-term equilibrium.

6. J.M. Keynes, *The General Theory, op. cit.* note 3, ch. 22.

Figure 1 The capacity utilization rate in the U.S. Manufacturing sector



u $(= \overline{u} + u^{LT} + u^{ST})$: (····•····)
Sequence of short term equilibria $(= \overline{u} + u^{LT})$: (-----)
Sequence of long-term equilibria $(= \overline{u})$: (——)
Average value of u before 1970: (·····)

In 2009, Manufacturing industries only accounted for 10 percent of total U.S. income. The fluctuations of the manufacturing capacity utilization rate, u, are, however, tightly correlated to those of the value added of the Nonfinancial corporate sector. The purpose of the figure is merely illustrative. The two lines (——and -----) have been determined using Whittaker filter. Both have been calculated to the second quarter of 2007, that is, prior to the current crisis. More time will be necessary to determine new tendencies.

In this paper, we denote as "business-cycle fluctuations" the two latter categories of fluctuations above, the short-term and long-term components. Interpretations are suggested in section 7.

3 - Money and credit in the macroeconomy

The present section is devoted *monetary and credit mechanisms*, of which abstraction is made in the previous section. "Financial mechanisms" proper, in a broader sense, are treated in appendix B.

3.1 The credit demand channel

Monetary mechanisms are approached here in a simple framework, in which "banks" make loans to the nonfinancial agents — households, the government, and enterprises — from which demand emanates, assuming the traditional confrontation between the lender and the borrower (households and enterprises), as in the past, still typical of procedures in many countries. (Money and credit must be treated jointly, as the two facets of a same coin, since money is issued when loans are granted, and destroyed when loans are paid back.) An important assumption is that demand is financed out of previously garnered income and borrowing:

$$\begin{pmatrix}\text{Demand}\\ \text{in period } t+1\end{pmatrix} = \begin{pmatrix}\text{Income}\\ \text{in period } t\end{pmatrix} + \begin{pmatrix}\text{Borrowing}\\ \text{in period } t+1\end{pmatrix}$$

Other monetary actions are also involved with equivalent impacts on demand. They must be jointly considered with borrowing in the determination of financing:

Borrowing (1)	Depositing on bank accounts (3)
Paying back loans (2)	Using these deposits for demand (4)

A household, for example, can finance more than its income by drawing on its bank account; it can also use the money deposited at the bank to pay back loans. And the converse will happen if demand is inferior to income. The outcome of such monetary-credit flows is the *variation of the net debt* ("borrowing" for short).

From the viewpoint of "real" flows, the variation of the net debt of an economic agent is the difference between its total spendings (consumption and investment) and its income. Equivalently, the opposite of the variation of the net debt is equal to "financial savings", as opposed to "savings", the difference between income and spendings.

With the notation D for demand, Y for income, and N for the net debt, one has:

$$D_{t+1} = Y_t + \Delta N_{t+1} \tag{1}$$

This approach to credit mechanisms can be used to account for the formation of the demand of specific agents within models in which several goods are considered, as well as within a macro model in which a single nonfinancial agent is at the origin of demand. We consider this equation the cornerstone of the modeling of a monetary economy.

A first remark must be made concerning the aggregate net debt. If *nonfinancial and financial agents* are simultaneously considered, the variation of the aggregate net debt is null since the loans of financial agents are identically equal to the borrowing of nonfinancial agents, and the deposits of nonfinancial agents are held by financial agents. Conversely, considering *only nonfinancial agents*, the variation of their aggregate net debt is a priori different from zero.

A second remark concerns the distinction between various nonfinancial agents. Borrowing (the variation of the net debt) may affect to different degrees the demands of distinct agents. For example, the demand of capitalist investors could be larger than their income, while wage-earners would consume less than their income. We call "credit macro demand channel" the *overall* impact of credit mechanisms on aggregate demand independently of its distribution among agents.

3.2 Built-in instability in a credit economy

The financing of demand *via* the credit channel opens a field of analysis of major import. Like Marx and Kalecki, we believe that the propensity to borrow of economic agents in a capitalist economy is procyclical. When the economy is booming, economic agents are prone to borrow more, and conversely when the economy is depressed.

If the aggregate net borrowing of nonfinancial agents is procyclical, short-term equilibrium is *necessarily* unstable, with cumulative movements upward or downward. Notably, the tendency on the part of enterprises to borrow when the economy is growing comparatively fast in order to expand their investment has destabilizing effects. The same is true of households borrowing for residential investment.[7] The converse is true in a recession, with cumulative movements downward. Thus, the unrefrained propensity to borrow (or the unchecked propensity to diminish expenses and pay back debts) would result in a "built-in instability" inherent in capitalism.[8]

This built-in instability renders necessary the stabilizing countercyclical action of a segment of financial institutions beyond the narrow profit motive. Private or government central institutions are

7. Consumption might increase less than output, with stabilizing effects. Empirical investigation is required here.
8. G. Duménil, D. Lévy, "Modeling monetary macroeconomics: Kalecki reconsidered", *Metroeconomica*, 63 (2012), p. 170-199.

involved in such practices. In the United States, under the National banking system, such functions were performed by the large banks of New York in the context of the gold standard.[9] Since the creation of the Federal Reserve in 1913, and its more active action after World War II, this management of the macroeconomy is the object of monetary policy, supplemented by fiscal policy.

3.3 Co-determination

A central aspect of the postKeynesian analysis is the "endogenous" or "accommodative" character of the issuance of money. Lenders ("commercial banks" for short) and central banks could only accommodate the demands for loans. Symmetrically, the opposite assumption concerning the "exogenous" character of money, in which monetary authorities determine the amount of credit and money, is harshly criticized. We reject this dilemma. Money is neither endogenous nor exogenous, but is co-determined — *a third viewpoint*.

We call "co-determination" the general twofold principle stating that: (1) in the analysis of the formation of demand, real and monetary variables must be simultaneously determined; and, (2) less trivially, the actions of nonfinancial and financial agents are jointly involved. The behavior of households responds to their eagerness to buy, the level of their income, their monetary holdings, and the cost at which funds can be borrowed. Lenders typically assess risks; they can set an upper limit to the amounts borrowed or straightforwardly deny lending; they also take account of their own capability to lend and obtain refinancing on the interbank market, given the policies of the central bank and the opportunity to refinance opened by the securitization of loans; they are constrained by existing regulations; but the profit motive stimulates their propensity to lend. The central bank has multiple objectives such as managing the macroeconomy, in particular taming inflationary pressures, ensuring the smooth functioning of financial institutions, and limiting the degrees of indebtedness and the risks of financial crisis. One lever in the conduct of such policies is the modification of the interest rate at which banks are refinanced, but various balance-sheet ratios and regulations are also involved. The variations of net debts are the outcomes of such mechanisms.

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9. G. Duménil, D. Lévy, *Capital Resurgent. Roots of the Neoliberal Revolution*, Harvard: Harvard University Press (2004), Box 18.1.

The determination of the flows of new loans is traditionally approached as the confrontation of two functions, a (potentially vertical) supply curve for loans and a demand curve for borrowing. Conversely, we model the variation of the net debt as in equations 1 or 3 by a single function accounting for all aspects of monetary and credit mechanisms, the "co-determined monetary function", $\Delta N = F$. A simple expression for F is, for example:

$$F_{t+1} = \alpha + \beta Y_t - \gamma N_t - \delta j_t \tag{2}$$

Besides the constant α, the term βY simultaneously accounts for the determination of borrowers, given their income and the tendency of commercial banks to accommodate this demand when the economy is booming (and symmetrically within opposite situations). The term $-\gamma N$ accounts for the concerns vis-à-vis the levels of indebtedness on the part of both borrowers and lenders. The last term, $-\delta j$, describes the aversion of the central bank for inflation and the consequences of its policy concerning the refinancing of banks. A similar function can be written making explicit the role of the interest rate, in turn manipulated by the central bank.

To the countercyclical action of central monetary authorities, one must add fiscal policy on the part of the government. As any other agent, the government may borrow to spend more than its revenue (and symmetrically, may pay back its debt if its revenue is larger than its spending). Contrary to other agents, however, this behavior can be countercyclical, as part of a deliberate action to stabilize the macroeconomy or due to the stickiness of expenses (as in built-in stabilizers).

Concerning the capability of central monetary institutions and the government to influence money, credit, and spendings, two aspects must be combined: (1) These institutions strongly impact the macroeconomy and, in the absence of this action, the macroeconomy would be unstable; (2) The efficacy of these actions is conditional, not always and unambiguously ensured. Government demand policy is specifically important when the channels of monetary policy become inefficient (for example, in a credit crunch during a crisis of financial institutions).

3.4 Modeling a monetary macroeconomy

Appendix A introduces a number of models of a monetary macroeconomy, built along the lines introduced in the previous sections. The main results are as follows:

- Concerning short-term equilibria, we believe that their stability is always subject to conditions and that these conditions are susceptible of economic interpretation. As no decentralized mechanisms account for the stability of the macroeconomy, otherwise autonomously unstable, the action of the central bank is crucial. But this action is also subject to significant limitations. Notably, perturbations on financial markets may recurrently destabilize the macroeconomy. Overheatings and recessions are always around the corner. Overall, the stabilizing action of the central bank confines the deviations of the general levels of activity within certain limits. More than *constantly maintained*, stability is *recurrently restored*.
- Concerning long-term equilibria, assuming the preservation of the stability of short-term equilibria, long-term equilibria remain attractors around which the rather hectic short-term oscillations are observed. The problem concerning long-term equilibrium is the management of its level. It is a slow process, in which institutional transformations are implied. Thus the gravitation of short-term equilibria around a normal value of the capacity utilization rate is constantly "shifted", as the macroeconomy is involved in slow long-term fluctuations.

4 - PostKeynesian views concerning money and credit

A first section briefly recalls Kalecki's emphasis on the use of borrowing to finance investment to which we devoted a specific study.[10] The two other sections compare our views to the postKeynesian approach of money as "endogenous".

4.1 The financing of investment in Kalecki's framework

The financing of spending by borrowing, as introduced in section 3.1, is reminiscent of Kalecki statements concerning financing. The

10. G. Duménil, D. Lévy, "Modeling monetary macroeconomics", *op. cit.* note 8.

view that the expansion of loans ("credit inflation") can be used to finance investment is repeatedly stated by Kalecki. Loans are made to capitalists and finance their investment beyond their savings[11]:

> How can capitalists invest more than remains from their current profits after spending part of them for personal consumption? This is made possible by the banking system in various forms of credit inflation.[12]

Thus, within Kalecki's perspective, our equation 1 translates into:

$$I_{t+1} = \text{Savings}_t + \Delta N_{t+1} \tag{3}$$

4.2 Exogenous money, endogenous money, and co-determination

To the eyes of most postKeynesian economists, money is endogenously determined, meaning that the financial system always provides the loans demanded by nonfinancial agents. Thus, the absence of monetary variables within models is, sometimes, presented as a deliberate option. In the words of Basil Moore: "The financial system has no choice but to accommodate[13]". Moore bases his assessment on the observation that commercial banks are enterprises, similar to other enterprises, responding to the demand of their customers. They are "price setters" and "quantity takers".[14] By lack of capability or willingness, central banks accommodate the demands for refinancing.

A few postKeynesian economists contend that, as in our approach of co-determination, the power is shared between nonfinancial and financial agents. In Mark Lavoie's formulation: "Other post Keynesians[15] prefer to recognize that the stock of money has endogenous

11. The quotation is made by Malcom Sawyer (M. Sawyer, "Kalecki and Finance", *European Journal of the History of Economic Thought*, 8 (2001), p. 487-508).
12. M. Kalecki, *Capitalism: Business Cycles and Full Employment, Collected Works of Michal Kalecki, Vol. I* (Edited by J. Osiatynski), Oxford: Clarendon Press (1990), p. 148.
13. B.J. Moore, "The Endogenous Money Stock", *Journal of Post Keynesian Economics*, 2 (1979), p. 49-70, p. 58.
14. B.J. Moore, "The Endogenous Money Supply", *Journal of Post Keynesian Economics*, X (1988), p. 372-385, p. 381.
15. With reference to S. Weintraub, *Capitalism's Inflation and Unemployment Crisis*, Reading: Addison-Wesley (1978) and P. Davidson, "The Dual-Faceted Keynesian Revolution", *Journal of Post Keynesian Economics*, 2 (1980), p. 291-307.

as well as exogenous aspects".[16]

Money endogeneity can also be questioned in reference to a Keynesian "liquidity constraint". Foley emphasizes this mechanism in relation to the interconnectedness of transactions inherent in market economies, described in terms of "externalities":

> Keynes insisted by contrast that in real-world monetary economies many households and firms are 'liquidity-constrained', that is, unable to finance spending beyond their immediate cash inflows by borrowing. In this more realistic world, spending itself has an important externality. Each household or firm that spends money not only accomplishes its own ends (consumption or production), but also relieves the liquidity constraint of other spending units.[17]

4.3 Financing channels within postKeynesian models

The treatment of financing channels is complex, as stocks and flows must be carefully articulated within accounting frameworks. This is manifest in the works of Marxist economists concerning Marx's analysis of the circulation of capital in Volume II of *Capital*.[18] A number of postKeynesian economists use "transactions flow matrices" and "Balance sheet matrices".[19]

The approach of postKeynesian economists is quite distinct from ours (as introduced in the previous sections):

1. *Consumption and investment functions.* Within postKeynesian models, traditional consumption and investment functions are defined prior to the consideration of financing.

2. *Intermediation, and credit and deposits as residuals.* Concerning enterprises or the government, a first set of external channels is the

16. M. Lavoie, "The Endogenous Flow of Credit and the Post Keynesian Theory of Money", *Journal of Economic Issues*, 18 (1984), p. 771-797, p. 776.
17. D. Foley, The Anatomy of Financial and Economic Crisis, New School University, New York (2009), p. 15.
18. G. Duménil, *Marx et Keynes face à la crise*, Paris: Économica (1977), ch. II, L'élaboration des schémas: Flux et stocks, and ch. III, L'élaboration des schémas: Les mécanismes du crédit; D. Foley, *Understanding Capital, Marx's Economic Theory*, Cambridge: Harvard University Press (1986), ch. 5, The reproduction of capital.
19. W. Godley, M. Lavoie, *Monetary Economics. An Integrated Approach to Credit, Money, Income, Production and Wealth*, London: Palgrave (2007).

collect of funds by the issuance of securities such as stock shares, bonds, and the like. (For example, a given percentage of investment by an enterprise is financed by the issuance of shares.) These channels share the common property of being mechanisms of *intermediation* in which existing purchasing powers are transferred, as opposed to the *issuance of money* as in bank loans in which purchasing power is created. As in portfolio theory, households determine the proportions of their monetary and financial holdings. (For example, a given percentage of their financial assets is held as stock shares.) The equilibrium on financial markets is ensured by the prevalence of prices that clear each of these markets. Loans and deposits are treated as residual variables allowing for the consistency of spending plans (otherwise determined) with the financing made available by the above channels of intermediation. Since the credit system accommodates the demands of borrowers, and since no decisions are made concerning deposits, this consistency is guaranteed by construction.

3. *The prices of financial assets.* Correspondingly, the focus of postKeynesian frameworks is more on the price of financial assets rather than the amount of loans. For example, the price of fixed capital is compared to the price of stock shares, as in Tobin's q. This is also an important aspect of Minsky's analysis of business cycles.[20]

Note that we do not question the importance of financing procedures distinct from the credit channel. Their potential destabilizing impact is obvious. Within sophisticated monetary and financial economies, the multiplicity of financing channels renders the action of the central bank even more difficult.

5 - Articulating theoretical fields— Vindicating macroeconomics

The present section focuses on *general disequilibrium models*, in which several industries are considered and other assumptions lifted. Only general principles are introduced, and the emphasis is on the main results. The objective is to show how the four first theoretical

20. H. Minsky, "Financial Instability Hypothesis", *in* P. Arestis, M. Sawyer (eds.), *The Elgar companion to radical political economy*, Aldershot: Edward Elgar (1994), p. 153-157, p. 143.

fields in the table of configurations in section 2.3 (short and long terms, and proportions and dimension) can be articulated within a unique coherent framework. Important conclusions follow, notably capitalist economies are *stable in proportions, and at the limit of (in)stability in dimension*, a thesis to be made explicit in section 5.2. The third section briefly opens the broad field of the relationship between the historical term (the term of tendencies) and the business cycle.

5.1 Production and investment

This section introduces the main mechanisms typical of a general disequilibrium model:

1. *The decision to produce.* Production is decided and realized within enterprises, and this is also where investments are made. Production is decided before demand is known, and supplies and demands are confronted on markets. Inventories of unsold commodities may exist (or rationings). These inventories, S_t, are transferred to the next market as part of supply, $S_t + Y_t$[21]:

$$S_{t+1} = S_t + Y_t - D_t$$

2. *Accumulation and growth.* Capital invested during one period becomes part of the stock of capital, K, in the following period. Instead of variables such as I, Y, or S, it is more convenient to use ratios to the stock of fixed capital, K (or to productive capacities, Y^{Max}), such as $\rho = I/K$, $u = Y/Y^{\text{Max}}$, or $s = S/Y^{\text{Max}}$. We define $\overline{u}$ and $\overline{s}$, the values of such ratios, as targeted by enterprises.

3. *Main behaviors.* We use adjustment to disequilibrium as in section 2.1. For simplicity, in the equations below, abstraction is made of the superscript i indicating that one particular agent is considered. When inventories are smaller than targeted by enterprises ($s < \overline{s}$), they increase their capacity utilization rate. To a smaller extent, they also raise prices. When capacity utilization rates are large ($u > \overline{u}$), enterprises slowly increase their prices. They also tend to invest more (that is, $\rho = I/K$ rises). When the profit rate in one enterprise or industry is larger than the average, the difference stimulates investment in this enterprise or industry. Since enterprises increase their

21. The case of services requires a specific treatment from which we abstract here.

investment when capacity utilization rates are large, they simultaneously initiate a return toward the normal use of productive capacities. (This twofold behavior aims at the adjustment of productive capacities in line with demand.) For example, the decision to produce (the determination of the capacity utilization rate) can be modeled as the adjustment of u_t in reaction to two disequilibria:

$$u_{t+1} = u_t - \varepsilon(s_t - \overline{s}) - \sigma(u_t - \overline{u}) \tag{4}$$

Other behaviors must be modeled in a similar manner.

To obtain a full-fledged general disequilibrium model, the consumption and investment functions must be expressed, in conformity with the principle of co-determination also accounting for the central role of monetary and credit mechanisms.

5.2 Stability in proportions—instability in dimension

We presented general disequilibrium models in various earlier works.[22] For each enterprise or industry, four variables must be considered: u, s, K, and p. To this first set of variables, one must add money stocks (deposits) and debts for all agents.

Usually, the determination of equilibria is rather easy, while the study of the stability of equilibrium is difficult. The distinction between various theoretical fields as in section 2.2 points, however, to two possible ways out that may render the treatment of stability manageable. First, under the assumption that it is possible to sort out variables whose variations are judged rapid, and others, slow, the distinction between time frames, short and long terms, suggests the use of the methodology of temporary equilibria. Second, the distinction between proportions and dimension allows for a factorisation of the model. New "centered" or relative variables are defined. For example, to profit rates in each enterprise or industry, one can substitute the differences between these rates and an average profit rate; the same can be done for capacity utilization rates and prices (distinguishing between the "general level of prices" and "relative prices"). The average profit rate, the average capacity utilization rate, and the

22. G. Duménil, D. Lévy, *The Economics of the Profit Rate: Competition, Crises, and Historical Tendencies in Capitalism*, Aldershot: Edward Elgar (1993); *La dynamique du capital. Un siècle d'économie américaine*, Paris: Presses Universitaires de France (1996).

general level of prices account for *dimension*, and the centered (and relative) variables, for *proportions*. The main results are as follows:

1. A *Keynesian equilibrium* prevails in the short term (with the equality between production and demand in each enterprise or industry), and a *Classical-Marxian equilibrium* in the long term (with a normal use of productive capacities and prices of production).

2. Within rather simple models, the characteristic polynomial of the Jacobian matrix used in the study of stability conditions can be factorized into four factors corresponding to proportions and dimension, respectively, in the short and in the long terms. Within more complex models, the factorization is not rigorously possible, only "quasi factorization" (given the low values of a number of parameters).

3. An important result is that, in the short term as well as in the long term, the conditions for stability in proportions appear to be easily met, while the conditions for stability in dimension can be easily violated. This result points to the basic property of capitalist economies, which we denote as "stability in proportions and instability in dimension":

- "Stable in proportions" refers to the capability of capitalist markets to allocate capital in the long term, and determine outputs in the short term, in various industries, in line with demand patterns. Potential buyers generally find what they seek on markets.
- "Instability in dimension" or, more rigorously, "at the limit of stability in dimension", points to a twofold propensity of capitalist macroeconomies to deviate from normal levels. This is, first, manifest in the recurrence of overheatings and recessions (the expression of the instability of short-term equilibrium). Second, for more lasting periods of time, the average levels of output around which short-term fluctuations are observed may stray at a distance from normal levels (as defined by the historical trend).

4. General disequilibrium models allow for the interpretation of these properties. The *same mechanisms* simultaneously account for stability in proportions and instability in dimension in the short term. Involved is the swift capability of enterprises to react to the signals manifesting a divergence between supply and demand (parameter ε in equation 4). This prompt adjustment ensures the availability of output or the limitation of the growth of inventories of unsold commodities, with favorable effects concerning proportions. But the vigor of the same adjustment may entail cumulative movements of output, upward or downward, the expression of instability in dimension.

These findings straightforwardly echo Marx's analysis in *Capital*. In the theory of competition in Volume III, Marx accounts for the mechanisms leading to the allocation of capitals among industries and the prevalence of prices ensuring in each industry an equalized average profit rate, with corresponding prices and outputs. (Involved is, actually, a gravitation process because of recurrent shocks of variegated nature.) Marx believed this mechanism is efficient in capitalism (that is, stability in proportions). Conversely, the general level of output follows the characteristic pattern of the cycle of industry (the business cycle), with recurrent departures into overheatings and recessions (instability in dimension).

6 - A historical perspective

This section is devoted to the analysis of the historical transformations of stability conditions. A first aspect is the impact of declining profit rates. A second aspect is the effect of the progress of management and the development of monetary mechanims on macro stability.

6.1 Profit rates and stability conditions

An interesting hypothesis proper to Marx's analysis is the view that profit rates — their values and trends — impact macroeconomic stability. Recurrent fluctuations downward of profit rates may cause recessions. For example, in the short term, as in Marx's analysis of overaccumulation, the growth of employment during a phase of expansion may push wages upward and temporarily diminish profits, and provoke a recession.[23]

This impact may be felt in the longer term, and this suggests an interesting link between the historical and short terms. If the profit rate declines and remains low for more durable periods of time, a "structural" propensity to instability prevails with more frequent and deeper recessions, as during the 1970s.

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23. K. Marx, *Capital, Volume III*, New York: First Vintage Book Edition (1894), ch. 15.

One mechanism accounting for the impacts of profit rates is their potential influence on parameter ε in equation 4 (accounting for the decision by enterprises to increase or diminish production depending on the levels of inventories). As stated in the previous section, if the response to excessive or deficient inventories is too strong, this mechanism may trigger cumulative movements of output, downward or upward. Profit rates command cashflows and liquidities and, thus, affect ε. (The continuation of production at given levels depletes liquidities if sales are diminished.)

6.2 The tendential instability thesis

It is a well-known stylized fact that the emergence of the modern pattern of business-cycle fluctuations echoed the development of money and finance in capitalism. The built-in instability began to manifest itself when monetary-financial mechanisms reached a sufficient degree of development, as during the first half of the 19th century in Europe. In combination with the progress of the management of enterprises, notably since the end of the 19th century, the gradual expansion of financial mechanisms fostered a tendency toward increasing macro instability, a "tendential instability".

To account for such trends, the potential impact of the variations of reaction parameters in the modeling of behaviors can be considered in a historical perspective. The financial system became gradually more inclined to accommodate the demand for loans, a rise of parameter β in equation 2, a tendency in which financial innovation played a prominent role. The progress of the management of enterprises induced a rise in parameters such as ε in equation 4. These historical drifts in the value of parameters rendered the satisfaction of stability conditions more difficult.

The second facet of the tendential instability thesis is, however, that this movement toward increased instability was checked by the historical progress of countercyclical central mechanisms, thus becoming gradually more necessary. The Federal Reserve, created in 1913, was substituted for the National banking system, although the movement toward a genuine management of the macroeconomy was only gradual. The corresponding stabilizing mechanisms only reached matured forms after the New Deal and World War II, in the context of the Keynesian revolution. Neoliberalism did not destroy the domestic framework in which monetary policy is conducted, rather the

contrary, but altered its objectives.[24] The new conditions created by financial globalization during the 2000s finally unsettled the foundations of the policies conducted by the Federal Reserve.[25]

Thus, the tendential instability thesis points to an historical process in which resistances and set-backs are recurrently observed. But the pressure of events, as in recurrent crises, finally has the edge, though the costs may be huge as in structural crises.

7 - Business-cycle fluctuations

This section provides intepretations of the fluctuations of the capacity utilization rate as in Figure 1, in line with the analytical framework introduced in the present study. The notion of "fluctuation" implies the reference to a given center around which the macroeconomy oscillates, abstraction being made of growth. In our models, this center of gravitation is denoted as $\overline{u}$ and assumed constant over time. The examination of the series of capacity utilization rates over the more than seventy years in Figure 1 suggests fluctuations around a constant value to 1970 (83.1% for the average 1948-1970) and, in the subsequent decades, around a slowly declining trend. Thus, between 2003 and 2007, the figure estimates u^{HT} at 77.7%. We do not believe enterprises went on building capacities during several decades, while they were not able to reach their target utilization rates. Thus, in the downward trend of u^{HT}, we see a decline of $\overline{u}$ not a growing negative gap between such a target and the rates actually achieved.[26]

The following interpretations can be given of the observed patterns of fluctuations:

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24. As in the Deregulation and Monetary Control Act of 1980. See G. Duménil, D. Lévy, *Crise et sortie de crise. Ordre et désordres néolibéraux*, Paris: Presses Universitaires de France (2000), box 18.5.

25. G. Duménil, D. Lévy, *The Crisis of Neoliberalism*, Cambridge: Harvard University Press (2011), ch. 14.

26. The difficult assessment of capacity utilization rates over such long periods of time is clearly expressed in the definition of the variable itself: "The Federal Reserve Board's capacity indexes attempt to capture the concept of sustainable maximum output — the greatest level of output a plant can maintain within the framework of a realistic work schedule, after factoring in normal downtime and assuming sufficient availability of inputs to operate the capital in place" (Capacity Utilization Explanatory Notes, Federal Reserve, http://www.federalreserve.gov/releases/g17/CapNotes.htm).

1. *The long-term component.* The broad fluctuations in u^{LT} (-----) reveal the weakness of the centripetal forces generated by the action of the central bank, intending to confine output in a "vicinity" of levels considered "normal" or appropriate. To this end, the institutional setting and the rules in which monetary policy is conducted were recurrently modified:

- The awareness of the partial recovery of output in the recession of the late 1950s induced the bold fiscal policy of the 1960s on the part of President Kennedy's advisers, aiming at the stimulation of the macroeconomy. In combination with the financing of the Vietnam war, this policy contributed to the rise of output to unusual levels.
- Then, the decline of profit rates altered the basic conditions underlying the trade-off between the fight against inflation and the preservation of growth in the direction of increased inflation. In the context of the rather accommodative policy of the central bank after 1973[27], an upward trend of prices was observed, paralleling the decline of the long-term component in what has been called "stagflation".
- The shift of the long-term component to lower levels during the structural crisis of the 1970s was prolonged into the early 1980s, when the sudden rise of interest rates, the 1979 coup, further bent the long-term component (and caused the recession of the early 1980s, whose analysis belongs to the short-term component).
- During the 1980s and 1990s, the preservation of "decent" levels became gradually more problematic in the context of the growing deficits of foreign trade and globalization.[28] The severe character of the situation was temporarily hidden by the boom of information technologies during the 1990s, with a significant stimulation of investment. When this unexpected bonanza came to an end around 2000, a new decline in the long-term component occurred, whose severity was only partially checked by the upward trends in residential investment.

In these movements the recurrent actions of the central bank and government are manifest, in particular in the upward movement from

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27. The fact that the theory of accommodative money was developed during those years is certainly not coincidental.
28. See G. Duménil, D. Lévy, *The Crisis of Neoliberalism, op. cit.* note 25.

the late 1950s to the 1960s, the fight against inflation culminating in the early 1980s, and the attempt to boost the U.S. macro trajectory by a bold mortgage policy (and deregulation) prior to the current crisis.

2. *The short-term component.* The sudden deviations of u^{CT} around the long-term fluctuation suggest quite specific patterns of variations:

- The 1950s and 1960s manifest the typical pattern of the "stop and go", in the context of still immature stabilizing procedures.
- One can, then, observe the occurrence of sharp departures upward and downward, with rapid — a few quarters long — transitions (for example, the dramatic two-quarter fall in 1974.)
- A closer examination reveals clusters of observations, when the capacity utilization rate stabilizes (gravitates in a vicinity of given positions): (1) close to the long-term component (as in 1963, 1984, and during the long boom); (2) for comparatively higher positions, as in overheatings (as in 1979); and (3) for comparatively lower positions as in the lasting recession of 2001-2002.
- The three broad cycles during the 1970s and early 1980s (the period of declining profitability) are spectacular.

3. *The circumstances (deregulation and the relaxation of lending practices) that led to the subprime crisis in the United States.* Concerning these latter years, the circumstances created by the duration of the current structural crisis have a considerable impact on macro mechanisms and disturb usual patterns. More time will be necessary to provide reliable assessments. After the plateau of the capacity utilization rate above the long-term component during the second half of the 2000s prior to the recession, a new sharp plunge occurred, followed by a still quite limited recovery.

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