THE WINTER OF OUR DISCONTENT
MACROECONOMICS AFTER THE CRISIS

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The article discusses three reasons for dissatisfaction with regard to the core of contemporary macroeconomics and its inability to conceive the outbreak of the Great Recession. The first comes from the excessive importance given to the demand for microeconomic foundations to the detriment of treating the problem of the aggregation and coordination of individual behaviours, an imbalance that culminates in the frequent recourse to the figure of the representative consumer. The second concerns the usurpation by this same consumer of the role of decision-maker about employment and investment at the expense of firms, simple insignificant automata on markets governed by perfect or monopolistic competition. The third involves the simplistic way in which the rational expectations hypothesis has often been applied, treating agents as observers rather than actors who create the conditions for realizing their own forecasts. These three reasons lead to arguing for a macroeconomic modelling that takes the heterogeneity of agents seriously and restores to far-from-insignificant firms a driving role in the process of making decisions about employment and investment, in a context of strategic interactions.

Keywords: microeconomic foundations, aggregation, representative consumer, entrepreneurial decision to invest, oligopolistic competition, strategic indeterminacy, endogenous fluctuations.

Macroeconomics was widely criticized for not being able to predict the crisis, to such an extent that criticism quickly extended into a diagnosis of a crisis in macroeconomics itself. In reality, the outbreak of an economic crisis does not have the same nature as the coming of an eclipse, and if there is a reproach to be directed at contemporary macroeconomics, it is not so much its incapacity to predict the

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phenomenon as its lack of preparation to conceptualize it. It is well known that in his presidential address to the American Economic Association, Robert Lucas wrote in 2003 that the central problem of macroeconomics, namely the prevention of a depression, had been solved in practice for many decades (Lucas, 2003). Between the refutation of this thesis soon thereafter by the Great Recession and the diagnosis that the discipline itself is in crisis, there is a big step that I would not like to take. Macroeconomic theory has enjoyed ongoing progress for half a century and is not doing too badly, despite the equally ongoing announcements of an impending crisis. It is, however, difficult to deny that, as Caballero (2010) has written, the current core of the discipline "has become so mesmerized with its own internal logic that it has begun to confuse the precision it has achieved about its own world with the precision that it has about the real one". By pushing things a little further, we could say that the problem is also that the world the core of contemporary macroeconomics has constructed may not be a good approximation of the real world. And this has happened not because we are still far from the target, but because we have gone astray somewhere.

The point here is not to give an overview of all the developments in the discipline since the establishment in the 1970s of the reconstruction programme undertaken under the banner of microeconomic foundations and rational expectations by trying to identify if and when possible errors in orientation were committed. I will limit myself to sketching out a few reasons for dissatisfaction with the way that macroeconomics was reconstructed, resulting in its present core. I am particularly sensitive to three reasons for dissatisfaction. The first concerns the extreme attention paid to microeconomic foundations at the expense of the bridge that must be built between these foundations and the macroeconomic outcomes that are supposed to be theorized. This bridge supposes that we proceed at the same time to the aggregation of the behaviours of a priori heterogeneous individuals and to the conceptualization of the actual modalities for their coordination. The second reason for dissatisfaction stems from the subordinate status accorded to firms, relative to consumers, in the decision-making process that leads to the determination of employment and investment. This subordinate status stems quite naturally from the negligible weight attributed to each individual producer engaged in one or the other of the two forms of competition used by the overwhelming majority of macroeconomic models: perfect compe-

tition and monopolistic competition. The third reason concerns the reductionist way in which the rational expectations hypothesis has often been used. On the one hand, the self-fulfilling power of expectations, a source of multiplicity and even indeterminacy of equilibria, has been neglected, even if self-fulfilling prophecies arose as an important theme with the emergence of the new Keynesian economics and even though the endogenous fluctuations that they can generate are still studied by an active current in macroeconomic theory. On the other hand, we have underestimated the dispersion of the (incomplete) information available to heterogeneous agents who form expectations within the framework of an essentially interactive process.

I will discuss successively these three reasons for discontent with the world created at the heart of contemporary macroeconomics. It will be seen that all three concern, to varying degrees, the driving role wrongly attributed to the consumer by a vision of the economy rooted in Walrasian theory. It is also noteworthy that all three reasons signal points where contemporary macroeconomics diverges from its Keynesian source. Indeed, the General Theory gives a non-negligible role to the aggregation of goods and individual actions, places the entrepreneurs at the centre of the process of decision-making about employment and investment and confers a decisive role in equilibrium determination to the interplay between the expectations of entrepreneurs and speculators. I have already had an opportunity to address this historical aspect of the question (Dos Santos Ferreira, 2014), which I will not dwell on in the remarks that follow.

1. Microeconomic Foundations and Aggregation

My generation was born into macroeconomics under the newly proclaimed imperative of microeconomic foundations. Macroeconomic relations were no longer to be posed ad hoc but instead constructed by aggregating individual behaviours validated by rational choice theory. In principle, this programme consisted of two components: first the formulation of individual behaviours, and then their aggregation. In practice, the second component was usually trivialized by the use of composite goods and representative agents. The article by Kydland and Prescott (1982), which founded the now dominant theory of real business cycles and especially the dynamic stochastic general equilibrium (DSGE) modelling, provides an excellent example. The economy considered in this article is reduced to a representative

consumer whose intertemporal choices maximize, under technological and informational constraints, a utility function which, of course, is also a social welfare function. These choices are therefore, trivially, Pareto-optimal and, in the absence of externalities, constitute a competitive equilibrium. As a consequence, the macroeconomic equilibrium pertains entirely in this case to individual decision theory.

This fact is not in itself a criticism of a major contribution. The idea must be accepted that we cannot tackle all the difficulties at the same time and that taking intertemporal choices seriously, particularly in a context where preferences are not time-separable and where the production of capital is not instantaneous, is already such a heavy task that we must content ourselves with simplifying assumptions. And one would have hoped that, by proceeding by successive approximations, a more complex world of heterogeneous agents is subsequently found. However, the initial choice of bracketing aggregation issues is not without danger.

The first danger comes from the well-known Sonnenschein-Mantel-Debreu result according to which aggregation can destroy the essential properties of demand deduced from rational choice theory. Why then bother to establish the microeconomic foundations of macroeconomic relations if the implications of these foundations are lost at the global level? And, since aggregation can construct, as much as destroy, would it not have been wiser to focus on the second part of the programme for reconstructing macroeconomic theory – aggregation – rather than the first part? One could hope to use aggregation to obtain the deficient structure of global demand by exploiting the properties of the distributions of heterogeneous agents' characteristics. Indeed, the monotonicity of the aggregate demand function is for instance ensured when the frequency of individual incomes decreases with their amount, even if the individual demand functions are not themselves monotonic, as was shown by Hildenbrand (1983) in a pioneering article introducing a research programme that has largely been ignored by macroeconomists. This programme is in a way a return to Cournot (1838, §22), who used the variety of consumers' needs and fortunes to justify the assumption of continuity of the aggregate demand function, without worrying about its microeconomic foundations, which the economists of the next generation, Jevons, Menger and Walras, were on the contrary to put in the foreground.

But the main danger of the systematic use of the representative agent lies rather in the erasing of the interactions between agents and

therefore in the dismissal of the possible unintended consequences of these interactions. In an economy reduced to a representative agent, individual rationality and collective optimality are conflated. No room is left for suboptimal equilibria, which, it is true, are also absent from perfectly competitive economies, even peopled with heterogeneous agents, provided these economies are endowed with complete markets and deprived of externalities of any kind. Popular themes of the old Keynesian macroeconomics, such as the paradox of thrift and, more generally, anything related to the fallacy of composition, are excluded.

Even more serious is the exclusion of any coordination problem, which is undoubtedly the dominant theme of the General Theory. For instance, the downward rigidity of money wages, attributable to trade unions' defence of relative wages, is the consequence of a difficulty in coordination, which would disappear if the labour market were reduced to a bargain between a single firm and a single union, just as it would disappear "in a socialised community where wage policy is settled by decree", whereas in the real world there is "no means of securing uniform wage reductions for every class of labour" (Keynes 1936, 267). And, more fundamentally, the existence of what Keynes calls involuntary unemployment is the result of coordination failures across all markets, especially the financial markets, unable to effectively coordinate the plans of two categories of agents, investors and savers, largely because of the presence of a third category, speculators. It might be objected, in this instance, that the question of coordination is not completely put aside so long as there are at least two classes of agents, firms and households, even if each of them is reduced to a representative agent. However, the traditional modelling of the firm will in any case deprive it of an active role in such a configuration.

2. Firms and Markets

In the world of Cournot, all the action went to the producers, facing an aggregate demand issued from non-modelled individual behaviours. In the world of Keynes, the bulk of the action was still incumbent on the entrepreneurs, who were simultaneously producers – thus job-creators – and investors – thus creators of demand, multiplied by means of a propensity to consume that was in the main captured at the aggregate level. In the world of modern macroeconomics, the action is on the contrary monopolized by consumers who, through trading-off between consumption and leisure or between consumption and

saving, are both the employment and investment deciders. Perfect competition, which governs the markets imagined by neoclassical theory, transforms the firm into a simple automaton that keeps the economy right at the efficient frontier of the production set. The theory can in fact easily dispense with the firm by assuming – as did Kydland and Prescott (1982) – that the household directly integrates the technological constraint into its optimization programme.

If we want to be precise, we must keep in mind that it is not the consumers who are in the game but the representative consumer (or, what amounts to the same thing, a set of identical consumers), which immediately eliminates any consequence of wealth inequalities. In this regard, Caballero (2010) questions what happened to the specific role played in the supply of capital by Chinese bureaucrats or Gulf autocrats. As it is generally assumed that the stock of installed capital is directly held by households (Smets and Wouters, 2003; Christiano *et al.*, 2005), one might also wonder what has become of the role played by Amazon, Google and Microsoft in the formation of capital. We owe to Walras (1874, §184) the notion of an enterprise purchasing from the capitalist household, in a competitive market, the services of capital that the latter holds and accumulates, a conception that deprives the former of any active role in what is one of its main functions: to invest. Since the firm at all times is buying the services of a capital that is already constituted, it can content itself with a short-sighted calculation, leaving the responsibility for any intertemporal calculation to the saving household.

This marginalization of the firm's role is found in the new Keynesian economics, even though the latter, which has taken with Blanchard and Kiyotaki (1987) the path opened by Dixit and Stiglitz (1977), has broken with the hypothesis of perfect competition on the product markets, at least in a sector ruled by monopolistic competition. In monopolistic competition, producers of differentiated goods now have market power, but they still operate on a negligible scale relative to the size of the sector. The assumptions of symmetry and constant elasticity of substitution between differentiated goods (by the CES specification of the utility function of the representative consumer) lead in this context to a uniform and constant profit markup on the marginal cost, which itself is assumed uniform and constant. That this markup must be strictly positive is the only difference introduced by monopolistic competition compared to perfect competition. It is true that this differ-

ence, however minimal, is not insignificant, in that it makes it possible to accept the sub-optimality of the equilibrium and also to take into account the existence of price adjustment costs, which are fixed by the producers whenever they respond to exogenous shocks. This difference thus opens the door to a "Keynesian" differentiation of the theory compared with the new classical economics, while ultimately leading to a new neoclassical synthesis.

In this way one arrives at an extremely satisfying result, since the deep unity of the theory is preserved in the end. This result tends, however, to obscure the gap between the theory and the real world where we often encounter firms that are far from insignificant in relation to the size of the markets in which they operate – a real world where the average consumer (not the representative consumer) has a negligible influence on employment and investment decisions. Should we not therefore begin to explore more systematically than in the past what macroeconomic models with large firms, making strategic decisions about employment, production, prices and investment, could offer?

The option of importing oligopoly models directly from the theory of industrial organization may be discouraging, due to the extreme variety of these models, with none of them able to really impose itself. Nor are references to the few attempts to integrate imperfect competition into general equilibrium theory very reassuring, given the difficulty of obtaining sufficiently general conditions for the existence of an equilibrium. However, progress can be made if we stick to a fairly simple general equilibrium model, along the lines of those commonly used in macroeconomics.

The most natural choice is to stick to the structure of the economy conceived by Dixit and Stiglitz (1977) and taken up by the new Keynesian economics, with a production system consisting of two sectors, one – imperfectly competitive – producing differentiated goods, and the other – perfectly competitive – producing a homogeneous good. The difference with almost all existing models lies in the nature of imperfect competition: oligopolistic rather than monopolistic. In other words, firms producing differentiated goods are no longer considered insignificant in relation to the sector's size. Under very general assumptions about demand, an oligopolistic equilibrium can be obtained characterized by profit markups on the marginal cost whose expression remains simple and covers as a limit case the usual

markup prevailing in monopolistic competition (d'Aspremont and Dos Santos Ferreira, 2017).

The equilibrium markup of each firm in the oligopolistic sector appears as the inverse of the weighted arithmetic mean of the intra- and intersectoral elasticities of substitution of the good that it produces. The relative weight attributed to the intersectoral elasticity – which expresses a general equilibrium effect – increases with the market share of the firm and decreases with its aggressiveness towards competitors within the sector, that is to say, with the importance that it attaches to obtaining an increase in market share as opposed to an increase in market size. The equilibrium markup thus depends not only on structure – the market share – but also on conduct – the level of aggressiveness or, conversely, of collusiveness.

If the market share is negligible – the case of monopolistic competition – all the weight is put on the intra-sectoral elasticity, so that the general equilibrium effect vanishes, with the macroeconomic model degenerating into a sectoral model. We wind up with the same result if the aggressiveness towards competitors within the sector is maximal, a manifestation of the "Bertrand paradox": the existence of two very aggressive firms with no ability to cooperate is sufficient to ensure the competitive outcome (here that of monopolistic competition, given the differentiation of products). Thus, what will allow the model to regain a true general equilibrium structure is the presence of large firms whose conduct involves a certain degree of collusion (for example, that which is implicit in Cournot competition, where firms accommodate the quantitative targets of their rivals).

Thanks to the general equilibrium effects expressed through the intersectoral elasticity of substitution, the model makes it possible to exhibit markups that are neither necessarily uniform nor necessarily constant, even if the CES specification is maintained, with a constant intrasectoral elasticity of substitution. Since the relative weight given to this elasticity tends to vary over the business cycle – market share tends to decrease during expansions, due to the entry of new firms into the market, while the aptitude to collude weakens – profit markups tend to exhibit counter-cyclical behaviour, so long as the products of the oligopolistic sector are more substitutable with each other than with the competitive product, as Dixit and Stiglitz (1977) presume. We thus find the result of Rotemberg and Saloner (1986), which is obtained in a model of tacit collusion that echoes several contributions from the late

1930s that aimed at accounting for the pro-cyclical character of real wages. This was inexplicable under the "the first fundamental postulate of classical economics", which was taken up by Keynes in the General Theory (Rotemberg and Woodford, 1991; d'Aspremont *et al.*, 2011).

This is a first achievement of the switch from monopolistic to oligopolistic competition: to account for the cyclical properties of profit markups and real wages by drawing on the cyclical variability of structure (through the creation-destruction of firms) and conduct (more or less collusive). A second achievement lies in the weakening of the conditions for the emergence of endogenous fluctuations that such variability provides (Dos Santos Ferreira and Lloyd-Braga, 2005). I will come back in more detail to this second point, in particular to the role of the fundamental indeterminacy of the oligopolistic equilibrium, which hides in particular behind the arbitrary choice by the model maker of a particular form of competition (for example, in prices or in quantities) and which in itself is an important potential source of endogenous fluctuations.

3. Anticipations, Conjectures and Endogenous Fluctuations

The rational expectations hypothesis extends to the process of expectation formation the condition of coherence that is common to all reasoning in terms of equilibrium. It fits into Marshall's equilibrium approach and is found implicitly in the General Theory as regards short-term expectations and their role in a short period equilibrium. Like microeconomic foundations, this does not lead to any break with the Keynesian conception of macroeconomics, except as a call for greater analytical precision. So in what way is there a divergence? The divergence stems from the fact that the new classical economics tends to restrict the source of uncertainty to random shocks on the sole exogenous variables. To resort to the rational expectations hypothesis would then amount to excluding systematic errors on the part of agents with the status of observers. But the agents are also actors, whose actions, dependent on their expectations about the endogenous variables, contribute to the determination of the equilibrium value of these same variables. The rational expectations hypothesis is thus integrated into a concept of equilibrium, the multiplicity of which is not excluded, leading to additional uncertainty and a problem of coordination. This source of uncertainty is present even in the absence

of shocks on the exogenous variables and can therefore lead to purely endogenous fluctuations.

All this is quite well known and has been widely treated in the literature on endogenous fluctuations, which has continuously loosened the conditions for the emergence of these fluctuations, especially in the neighbourhood of a dynamically indeterminate steady state (Lloyd-Braga *et al.*, 2014; Dufourt *et al.*, 2017). These conditions essentially concern the utility function of the representative consumer, production externalities and market imperfections. They reach a reasonable level of empirical likelihood, even while their restrictive character cannot be ignored. In this situation, it is important to take into account the strategic behaviour of large firms. The essential indeterminacy of oligopolistic equilibria mentioned above in fact constitutes an additional source of uncertainty facilitating the emergence of fluctuations.

To take just one example, in a DSGE model without intrinsic uncertainty, where the dynamic indeterminacy of a steady state is excluded, and even by imposing a priori Cournot competition (and thus freezing firms' aggressiveness), the simple strategic indeterminacy that arises from the existence of potential entrants in each sector is sufficient to ensure the existence of endogenous fluctuations reproducing relatively well the properties of the American economy (Dos Santos Ferreira and Dufourt, 2006).

More generally, the shift from monopolistic competition to oligopolistic competition introduces a strategic uncertainty leading to a plurality of equilibria associated with the different configurations of conjectures that firms hold about the behaviour of their competitors. Naturally, these conjectures have a self-fulfilling power and are not rejected at equilibrium. This power is conferred on them by various forms of coordination, notably by referring to extrinsic public signals, conveying no relevant information about the fundamentals, i.e. sunspots. Referring to the image popularized by Keynes, we can also say that the entrepreneurial actions are dictated by "animal spirits", which push entrepreneurs "to action rather than inaction" and, more specifically, to more or less aggressive action.

In addition, if we restore to entrepreneurs their role as decision makers in the accumulation of capital, a role that was confiscated by Walrasian consumers, we can bring about a significant change in the dynamics of investment that is potentially favourable, once again, to the emergence of endogenous fluctuations. We have, for example,

been able to show such a result in a deterministic model with overlapping generations where the firms, living like the consumers for two periods, invest strategically in the first period and produce in the second, engaging in Cournot competition (d'Aspremont *et al.*, 2015). This result is achieved through the interplay of two opposing effects: on the one hand, investment boosts productivity and stimulates business creation, and on the other hand, business creation reduces profit margins and discourages investment. The latter is a Schumpeterian effect combining conjectures and expectations: it arises from the competition between entrepreneurs as producers, as this is anticipated by these same entrepreneurs acting as investors. It disappears when the market share of each company becomes negligible.

Finally, another source of uncertainty that can lead to endogenous fluctuations, even in a context of equilibrium uniqueness and determinacy, and this time independently of any imperfection in competition, is the heterogeneity of the information that is available to the agents engaged in the process of forming anticipations. This heterogeneity raises a problem of coordination, which can be analysed using as a framework the model of a beauty contest, with reference to the parable put in place by Keynes to account for the working of financial markets (Angeletos and Lian, 2016, s. 7-8). The basic idea is that the agents act under two motives when they form their expectations about an asset's value: a fundamental motive and a motive for coordination with each other. These motives converge in a situation of perfect information (or more generally information homogeneity), since the shared expectation of the fundamental value is a source of coordination. On the other hand, if the information is dispersed, with each agent receiving for example a private signal, a conflict between the two motives appears, and it can become optimal to coordinate using a public signal containing little or no information about the fundamental value (a sunspot), to the disregard of more precise, but purely private information, which is therefore irrelevant for the anticipation of the market value (Boun My *et al.*, 2017). The abandonment of the fundamental motive in favour of the coordination motive clearly reflects the prevalence of speculation over enterprise, as shown by Keynes.

We see that there are answers to the dissatisfaction about the core of contemporary macroeconomics already appearing in the periphery of the discipline, with no need to await a revolution. It can be hoped that they are harbingers of the end of a long winter of discontent.

References

Angeletos G.-M. and C. Lian, 2016, "Incomplete information in macroeconomics: Accomodating frictions in coordination", *In Handbook of Macroeconomics*, J. B. Taylor and H. Uhlig (eds), Elsevier, 2(14): 1065-1240.

Aspremont C. d' and R. Dos Santos Ferreira, 2017, "The Dixit-Stiglitz economy with a 'small group' of firms: A simple and robust equilibrium markup formula", *Research in Economics*, 71: 729-739.

Aspremont C. d', R. Dos Santos Ferreira and L.-A. Gérard-Varet, 2011, "Imperfect competition and the trade cycle: Aborted guidelines from the late 1930s", *History of Political Economy*, 43: 513-536.

————, 2015, "Investissement stratégique et fluctuations endogènes", *Revue Economique*, 66: 351-368.

Blanchard O. J. and N. Kiyotaki, 1987, "Monopolistic competition and the effects of aggregate demand", *American Economic Review*, 77 : 647-666.

Boun My K., C. Cornand and R. Dos Santos Ferreira, 2017, "Speculation rather than enterprise? Keynes' beauty contest revisited in theory and experiment", *GATE WP* 1712.

Caballero R. J., 2010, "Macroeconomics after the crisis: Time to deal with the pretense-of-knowledge syndrome", *Journal of Economic Perspectives*, 24: 85-102.

Christiano L. J., M. Eichenbaum and C. L. Evans, 2005, "Nominal rigidities and the dynamic effects of a shock to monetary policy", *Journal of Political Economy*, 113: 1-45.

Cournot A., 1838, *Recherches sur principes mathématiques de la théorie des richesses*, Hachette, Paris.

Dixit A. K. and J. E. Stiglitz, 1977, "Monopolistic competition and optimum product diversity", *American Economic Review*, 67: 297-308.

Dos Santos Ferreira R., 2014, "Mr. Keynes, the Classics and the new Keynesians: A suggested formalisation", *European Journal of the History of Economic Thought*, 21: 801-838.

Dos Santos Ferreira R. and F. Dufourt, 2006, "Free entry and business cycles under the influence of animal spirits", *Journal of Monetary Economics*, 53: 311-328.

Dos Santos Ferreira R. and T. Lloyd-Braga, 2005, "Non-linear endogenous fluctuations with free entry and variable markups", *Journal of Economic Dynamics and Control*, 29: 847-871.

Dufourt F., K. Nishimura, C. Nourry and A. Venditti, 2017, "Sunspot fluctuations in two-sector models with variable income effects", *in Sunspots and Non-Linear Dynamics*, K. Nishimura, A. Venditti and N. Yannelis (eds), Springer, 71-96.

Hildenbrand W., 1983, "On the law of demand", *Econometrica*, 5: 997-1019.

Keynes J. M., 1936, *The General Theory of Employment, Interest and Money*, Macmillan, London.

Kydland F. E. and E. C. Prescott, 1982, "Time to Build and Aggregate Fluctuations", *Econometrica*, 50: 1345-1370.

Lloyd-Braga T., L. Modesto and T. Seegmuller, 2014, "Market distortions and local indeterminacy: A general approach", *Journal of Economic Theory*, 151: 216-247.

Lucas R. E., 2003, "Macroeconomic Priorities", *American Economic Review*, 93: 1-14.

Rotemberg J. J. and G. Saloner, 1986, "A super game-theoretic model of price wars during booms", *American Economic Review*, 76: 390–407.

Rotemberg J. J. et M. Woodford, 1991, "Markups and the business cycle", *NBER Macroeconomics Annual*, MIT Press, 6: 63-129.

Smets F. and R. Wouters, 2003, "An estimated dynamic stochastic general equilibrium model of the euro area", *Journal of the European Economic Association*, 1: 1123-1175.

Walras L., 1874, *Éléments d'économie politique pure*, Corbaz, Lausanne.