

Project: An International Network on Expectational coordination.

1. Introduction.

In spite of an intense academic activity over previous decades, the current crisis suggests that economic theory has failed to provide an appropriate global understanding of the recent events. Two key assumptions underlying most existing theories have been rightly questioned:

One group of critics has proposed that agents in financial markets are less rational than has been assumed in most economists' models. Departures from the standard paradigm of rationality constitute the substance of what has come to be known as *behavioural economics*. Integrating behavioural economics into finance¹ is clearly a promising avenue for research.

A second group of critics questions *the "rationality of expectations"*. The Rational Expectations Hypothesis (REH) assumes that economic agents have an unbiased, statistically correct, view of the future. REH is not a consequence of the classic Rationality Hypothesis, nor is the standard Rationality Hypothesis a necessary ingredient of models fitting REH (Non-expected utility maximizers may be given rational expectations). Hence this second axis is conceptually distinct and broadly independent of the first one.

The project presented here focuses on the *critique of REH, a critique which applies to many areas of analysis, notably the study of financial markets and the study of macroeconomics*. Indeed, most theories in finance, as well as in macroeconomics, have tended to adopt REH axiomatically. We believe that REH, in its standard version, is a key ingredient of the excessive optimism that economic theory currently conveys regarding the working of the financial system. This excessive optimism has fuelled the excessive confidence in the self regulating capabilities of the system, which, as is now argued by many, is at the heart of its recent failures.

2. The driving intellectual direction of the project.

a) A critical assessment of REH

REH is a universal tool for describing the coordination of expectations within a system of interacting agents: it has long been the dominant *intellectual tool of economic modelling*. Expectational coordination, viewed through the lens of REH is successful, i.e it leads agents to formulate a view of the future which is essentially not flawed. The critical assessment of REH, that forms the intellectual basis of the present proposal follows, broadly speaking, three lines of thinking.

- The first line of critical assessment may be viewed as "internal": the main assumption is maintained, but either its consequences are questioned or departures from the standard practice are advocated.

- Under the first heading come studies which focus attention on *multiplicity*. Different beliefs regarding what will happen can trigger different equilibria, which confirm these beliefs: in other words, there may be several self-fulfilling theories. Explaining non *ad hoc* coordination on one of the (several) equilibria may result in the loss of the intellectual discipline that the REH was supposed to provide. The multiplicity issue is heavily present in infinite horizon settings, where indeterminacy and sunspot equilibria have been a subject of intensive research in the eighties and nineties (see Guesnerie-Woodford (1992), Benhabib-Farmer(1994), Hens (2001), Guesnerie (2001)).

- Another type of "internal" research emphasizes the fragility of the entire equilibrium process. The relative timing of the diffusion of information and of the taking of decisions may lead rational agents who learn from each other to herd or more generally may generate inefficiencies or failures of *social learning* (which often have a multiplicity dimension - see Chamley (2002)).

¹ A move along the lines of P. Krugman's advice in his chronicles.

- A third “internal” critique stresses *imperfect awareness of the state* of the economy by agents. Such imperfect information may occur even when all information is publicly available and agents have limited attention. Either the rate of information acquisition is taken as given, or is itself endogenous, a case investigated in the rational inattention theory, (see Sims (2011), Reis (2006) Woodford (2009)).

- The second broad line of investigation reassesses, often from a game-theoretical background, the presupposition of the REH.

- The incorporation of *incomplete information* enriches the treatment of beliefs and expectations in applied economic models. The global game literature, relying heavily on the work of Morris-Shin, (see Morris-Shin (1998), and Morris-Shin (2003)), illustrates the scope and power of the method.

- One may question whether the *common knowledge of rationality and of the model* (i.e. that agents are rational, understand the strategic situation in which they act, understand that the others are rational and also understand the situation, and so on ...) are sufficient to trigger Common Knowledge (from now CK) of equilibria. In cases where it does, the link provides support for the Rational Expectations Equilibrium² (from now REE), which becomes “eductively” stable in the sense of Guesnerie (2002), (2005)). In the bad case, the justification of REE has to rely on local arguments³.

- REH assumes, often explicitly, in some cases implicitly, that the “exogenous” stochastic processes are Common Knowledge. However, the existence of a *common prior* may be dubious⁴. Also, and particularly in the case of “intrinsic” shocks involving a regime switch, the observation of regularities by agents is *not sufficient to ensure CK of the intrinsic uncertainty*. Such a fact is the basis of the work of Kurz (1994) and his co-authors (see Kurz-Motolese (2011)).

- The third line of critical reassessment features the learning studies that have a long history particularly in macroeconomics, and the more recent experimental research.

- In standard *learning studies*, subjective beliefs on the future are derived from observation of the past. Learning is then sequential (“evolutive”) rather than introspective (“eductive”). It takes place in real, (rather than virtual) time. It relies on boundedly rational schemes that are however more or less sophisticated (going from statistically sophisticated – Bayesian learning, least square learning- to more naïve, adaptive learning). A standard reference on classical schemes is Evans-Honkappohja (2001)⁵. See also Marimon (1997).

- Finally laboratory *experiments* with human subjects have been used to investigate the formation of expectations in artificial but well controlled situations: see Hommes (2011).

Although we cannot claim to be comprehensive, the above quick review provides a broad list of the theoretical directions of current critical assessments of the REH. Two remarks are in order.

First, the just evoked studies have different implicit or explicit objectives. Some aim at providing a better foundation to the equilibrium concept (either from the consideration of incomplete information or from CK arguments). Others may be viewed as providing a robustness test to the REE

² The mental process may fail to locate exactly the equilibrium (finite depth of reasoning as in Evans-Ramey (1998), or in Keynes’ beauty contest !)

³ The interpretation of which may not require any longer CK or even knowledge of the model.

⁴ The consequences are analysed in the work of Bolton-Scheinkman-Xiong (2011). Their work provides an interesting connection between the present project and the behavioural economics literature evoked above.

⁵ In recent literature, agents evaluate the ongoing relative performance of different, heterogeneous learning models and switch from one to the other during the learning period (see Brock-Hommes-Wagener (2009)).

under scrutiny⁶. Others aim at providing alternatives to the REH⁷. However, the studies should be viewed as complementary and they have sometimes unexpectedly strong connections⁸.

Second, as the just sketched and later bibliographic indications suggest (and as a more complete bibliography would eloquently demonstrate), most of the scholars who have agreed to join this international network project have in the past pursued research under one or the other of the above headings. As we argue later, such diversity is one strength of the project.

b) New approaches to finance, macroeconomics and other subjects.

The tools proposed here permit us to revisit from a new perspective many of the questions that have been raised by the recent crisis both in finance and macroeconomics.

We will concentrate first on the way in which our reassessment of the quality of expectational coordination *affects different subjects in finance*: the efficiency of the market, the multiplication of structured products, the logic and dynamics of bubbles, etc. Below is a sample of examples, small and by no means exhaustive.

The standard *“efficient market” hypothesis* relies on the assumption that the problem of expectational coordination is resolved through REH. Earlier studies, which feature a critical assessment of the hypothesis, have already raised questions about a number of popular propositions in the field of finance. For example, under rational expectations, opening new markets is most often broadly beneficial, and, more generally, speculation, in the sense of Friedman, is “stabilizing”. But both of these propositions lose their presumption of validity if expectations are not rational. Opening new markets and/or increasing speculation may affect negatively the plausibility of “satisfactory” expectational coordination, and therefore the plausibility of the (RE) Equilibrium. *In this sense, speculation can be “destabilizing”* (Guesnerie-Rochet (1993), Brock-Hommes-Wagener (2009)).

In a similar vein, even the most critical analyses of the quality of information transmission (such as Grossman-Stiglitz (1980)) may still be overly optimistic. When the market is supposed to transmit large amounts of information, the equilibrium on which agents are coordinating ceases being plausible. In those conditions, the most reasonable conclusion is that *the market cannot transmit excessive amounts of information* (see Desgranges-Heinemann (2003) and Ben Porath-Heifetz (2006) for a related analysis). In a different setting, attention has been focused on the *interaction between public and private information*. Public information is a better guide for predicting the actions of others, but it may not be welfare improving (see Morris-Shin (2002)).

The fact that major phenomena, like *bubbles*, are not understood in depth also reflects the limitations of the hypothesis of full coordination for the understanding of forward looking dynamical systems. More generally, the question of the *dynamics of the stock market* is on the agenda of a number of network members. Existing data on the beliefs of the agents suggest that the standard REH story fails to explain the evolution of the price dividend ratios, when plausible learning stories provide better accounts (see Adam-Marcet (2010) (2011)). Failures of REH contribute to a better understanding of the “diversity of beliefs” (see Kurz (2009), and Wu and Guo (2004)), as well as of the standard “equity” or “volatility” (Shiller (2000)) “puzzles”.

Our frontal assault on the credibility of expectational coordination may also have far reaching implications for the understanding of macroeconomics and other issues. Indeed, most of the scholars in this network have analysed both financial markets and macro economics. *The assessment of the effects of government policies and of their announcement on the evolution of the economy* is an old question, which is particularly acute in the field of *monetary policy* (see Woodford (2011)). A critical reassessment of REH suggests a number of new lines of inquiry in this regard. If REH provides a reasonable reference, emphasis on robustness of a given REE provides insights on desirable policies

⁶ The convergence in learning studies, when it occurs, suggests that agents will ultimately, although sooner or later, believe in the equilibrium; similarly, local “eductive stability” is a robustness criterion.

⁷ It is the case for Kurz’ equilibria with diverse beliefs, for rational inattention – see the concept of “near rational expectations”, of Woodford (2010), or for the “rationalizable” equilibria associated with the “eductive” viewpoint, or even for “evolutive” studies stressing different possible outcomes of the learning process.

⁸ See, for example, the connections between “evolutive” and “eductive” learning : Evans-Guesnerie (2005), Hommes-Wagener (2010)

and announcements (they can help avoid the occurrence of sunspot (Woodford) or “eductive” (Guesnerie) or “evolutive” (Benhabib- Evans-Honkappohja (2011) instability). When it is not the case, the part to be explained of what the market believes in the future is a source of additional volatility. In such circumstances, both the understanding of future evolution and the determination of policies (they may have to be robust to different possible pattern of expectations) are affected. Many other possibilities are a priori open, for example the alternation of quiet times with turbulent times. Finally, the REH has a long history in many additional subjects going from, to quote two domains in which members of the network have been involved, *corporate finance to general equilibrium with incomplete markets*.

Bibliography : Appendix 1.

3. Network design: organization and activities, intellectual logic.

a) The objectives of the team, and its expected activities:

Let us discuss now more the objectives and activities of the network.

- The first objective of the network is to be a vector of dissemination of knowledge and a *forum* for discussions. The means for achieving this ends are, firstly, conferences, workshops, and exchange of visitors.

- The second objective which is at least as important is to attract younger colleagues. This objective governs the design of the project. The current balkanisation of research reflects both the existence of a multitude of fronts -- a good point -- and a certain perversity to the logic of intellectual investment: entrenchment of subjects increases the fixed costs of switching, which increase entrenchment, such that increased balkanisation is an equilibrium phenomenon. In the present state of the international production of knowledge, younger scholars are encouraged to make conservative choices of subjects, and to maintain their initial choices longer than in the past. We strongly believe that the line of research advocated here has higher expected returns, but it is clearly riskier than research pursued by the mainstream networks. The fact that more risky subjects, such as the ones set forth here, are given visibility and credibility by the presence of established senior scholars is extremely important. A lot of resources are expected to be devoted to promoting the visibility of the ideas that the research team is developing. We think naturally of summer schools, research subsidies, post-docs. We also aim at more experimental forms of transmission of knowledge. Resources permitting, time and effort will be devoted to the production of videos of 10-12 hours, providing summaries of the ongoing discussion in the network. The purpose of the videos would be to make this discussion freely available and easily accessible to PhD students around the world (some videos would be based on teaching sessions at network summer schools).

b) Present organisation and future development:

The project's headquarters will be in Paris, at the *Paris School of Economics and at the College de France*, with some office space, and hopefully a core of semi-permanent, (part time) staff, but the network is organized around nodes, led by a node leader (nodes are normally geographic, although some people may be tied intellectually rather than geographically to the node).

The node leaders are the *governing body* of the network. The present nodes are all over the world, in North America, (*Columbia, New York University, Oregon, Princeton, Stanford*), South America (*Santiago de Chile*), Asia (*Beijing, Tokyo*), the Middle East, (*Jerusalem*), Europe (*Amsterdam, Barcelona, Paris, Zurich*). Here is the list of the nodes and nodes leaders.

Amsterdam node, Leader C. Hommes, - Barcelona node, Leader R. Marimon, Chinese node, Leader, HM. Wu, Columbia node, Leader, M. Woodford, Israeli node, Leader E. Ben Porath, - NYU node, Leader J. Benhabib. Oregon node, Leader G. Evans, Paris node, Leader, R. Guesnerie, plus a *social science* (economic history + sociology) sub-node, *P.C Hautcoeur*. Princeton node, leader, S. Morris, Santiago node, leader, A. Jofre, Stanford node, leader, M. Kurz, Zurich node, leader, T. Hens, Tokyo node, leader D. Oyama,

Appendix 2 describes the present composition of the nodes, their previous and present research related to the theme

Besides nodes, independent researchers have agreed to join in the network individually. They will be called *Associate Fellows*. The provisional list of 14 associate fellows is given in Appendix 2 (expected number 30). The list includes A. Araujo, W. Brock, H. Calvo, S. Ghosal, S. Honkappohja, F. LeRoy, W. Maldonado, G. Plantin, K. Mitra, G. Seccia, R. de Vilder, J. Weibull. .

Finally, the network should develop from its present size, about 60 members in the nodes plus 25-30 associates to a larger size of around 100. At present, the group is composed of a majority of theorists. Although a number of its members are familiar with empirical methods and are involved in empirical analysis, it is desirable to attract in the future more econometricians. Also, we are already working with historians, (Hautcoeur PC (2007)) and sociologists, to pave the way for fruitful exchange. But it is our intention to develop interactions between our theoretical insights and two peripheral domains. The first is the *economic history of financial markets*. The second is the *understanding* of financial markets which *practitioners particularly have*. The dialogue between theorists, on the one hand, and economic historians, practitioners, and econometricians, on the other hand, may not always be smooth, but we are confident that it will develop as the project progresses. The network may also consider launching a journal, possibly electronic, dedicated to new and critical thinking about expectations and the stability of equilibrium. It should accommodate a mixture of theory, history and statistical testing, as described above, and be open to more speculative papers. It should be less risk averse in its selection process than the usual scholarly journals.

c) The expected value-added of the network:

As made clear in the description of the nodes and projects in Appendix 2, the members of the network consist of scholars with a *broad variety of intellectual histories*. Some have a game-theoretical background, some come to the subject of expectational coordination from their understanding of specific fields (finance, macroeconomics, general equilibrium, etc.). Four reasons suggest that in these circumstances, networking has very high intellectual expected returns.

First, the recent events make more and more clear that the subject of expectational coordination is a blind point of our understanding of economics in general, of financial markets and macroeconomics in particular. From their previous involvement in the subject, the network members may be viewed as an “*avant garde*”, which has shown to be receptive to criticism of the mainstream view. They have now realized that they embarked on a broadly similar intellectual project.

Second, the members are enough similar to be able to communicate efficiently: indeed, as shown in Appendix 2, there are many examples of existing cooperation between members and between nodes: the objective is to transform the existing bilateral or multilateral exchange into a collective exchange, transforming partial knowledge into Common Knowledge.

Third, the members are enough different to make intellectual exchange challenging, and potentially extraordinarily rich. The diversity of intellectual backgrounds co-exist, and is sometimes correlated, with a diversity of perceptions of the precise nature of the problem. Although all may not agree on the path to follow, the network members do “agree to disagree” and they see the project as triggering fruitful interactions between possibly competing views. Their diversity –of which they are well aware – is one strength of the project.

Fourth, the existence of this network, with its emphasis on a key question, would be a strong signal for the rest of the profession. One may expect that it will convey the message that ignoring difficult problems may not be the right way to deal with them. As argued above, increasing visibility on the theme will be a key factor for removing the academic risk and improving the incentives of young scholars to join the project,

Indeed, we expect that the International Network will progress beyond existing literature by promoting avenues of research and analysis among members in new and innovating directions. Here are some key questions behind the project, on which one may expect to bring answers significantly improving on the previous ones

Is the failure to coordinate expectations a universal phenomenon in a market economy or is it temporary and restricted only to isolated instances? What is the social cost of the failure to coordinate expectations should society respond to problems arising from failure to coordinate expectations? What are the principles or criteria society should use with which to justify the use of stabilization policy and to define the role of central banks?

d) Conclusion:

That fact that economists are reluctant to give up REH has deep reasons. With RE, the world is, up to some point, “predictable”: it is random, but its randomness reflects “intrinsic uncertainty” and may reflect “extrinsic”, strategic uncertainty only to a limited extent (multiplicity). Outside a world of rational expectations, the predictability of the system may be (much?) more dubious (see Frydman-Goldberg (2011), Taleb (2007) for broader arguments echoing this assertion) and the status of the economist is closer to the more modest role advocated by other social scientists for their field (see Passeron (1998)). Hence the reluctance of the mainstream segment of the profession (its “physics envy” to use Soros’ term (2010)) is understandable. As well as there is a “wilderness of bounded rationality”, (Sims (2000)) there is a “wilderness of non REH coordination”. Exploring this dark continent is one of the main challenge facing students of markets and society to-day.

APPENDIX 1- Short Bibliography.

This is not a comprehensive bibliography, but rather a sample of papers illustrating and supporting the argument developed in the text. References are given in the order in which they appear in the text.

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