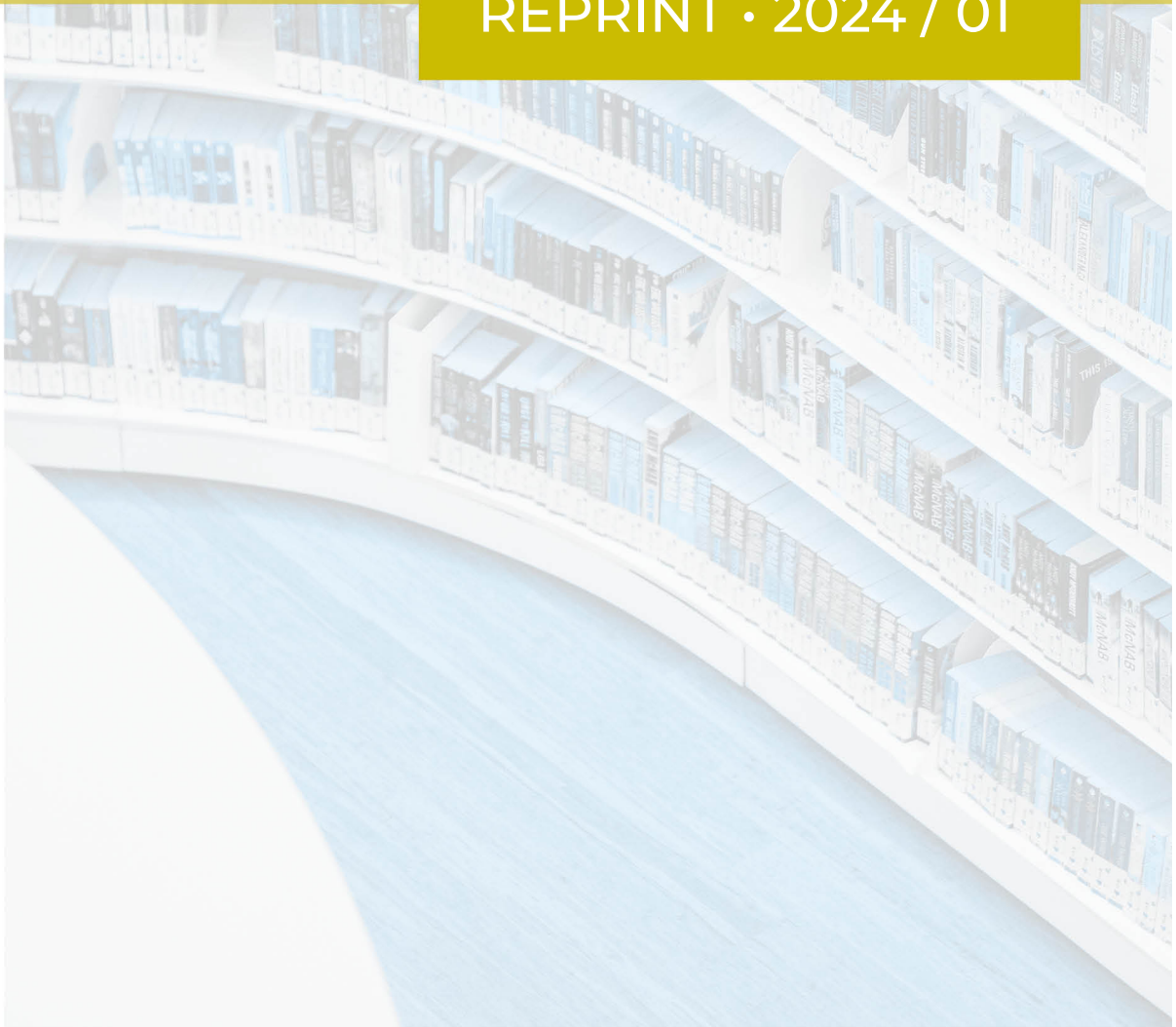


HOW DO INVESTOR'S EXPECTATIONS AND EMOTIONS DRIVE FINANCIAL ASSET PRICES IN TIMES OF CRISES AND UNCERTAINTY: THE ANALYSIS OF EXPERTS' OPINIONS

Jean-François Boulrier, Catherine D'Hondt, Fredj Jawadi, Georges Prat, Philippe Rozin, Richard Taffler

REPRINT • 2024 / 01



LFIN

Voie du Roman Pays 34, L1.03.01 B-1348 Louvain-la-Neuve

Tel (32 10) 47 43 04

Email: lidam-library@uclouvain.be

<https://uclouvain.be/en/research-institutes/lidam/lfin/publications.html>



JEAN-FRANÇOIS BOULIER
Afzi, France



CATHERINE D'HONDT
FIN/LIDAM,
UCLouvain, Belgium



FREDJ JAWADI
Univ. Lille, ULR 4999 -
LUMEN, F-59000 Lille,
Lille, France
Corresponding Author.



GEORGES PRAT
EconomiX-CNRS,
University of Paris
Nanterre, France



PHILIPPE ROZIN
Univ. Lille, ULR 4999 -
LUMEN, F-59000 Lille,
Lille, France



RICHARD TAFFLER
Warwick Business
School, UK

DEBATE ON...

HOW DO INVESTOR'S EXPECTATIONS AND EMOTIONS DRIVE FINANCIAL ASSET PRICES IN TIMES OF CRISES AND UNCERTAINTY: THE ANALYSIS OF EXPERTS' OPINIONS*

I. INTRODUCTION

Over the past two decades, financial markets have experienced various crises, shocks and disruptive events (dot.com bubble in 2000, global financial crisis in 2008-2009, COVID-19, etc.), driving high levels of volatility. This volatility is too strong to be fully justified simply by changes in fundamentals giving less credit to hypotheses concerning market efficiency and rationality as in the seminal papers of Samuelson (1965) and Fama (1965). Furthermore, the whole economy has recently shown different episodes of high inflation, uncertainty, commodity price volatilities, geopolitical instability, etc. In order to better understand the dynamics of asset prices in this context, several alternative assumptions referring to behavioral finance theory (e.g., Irrationality (Shiller, 2002), Animal Spirits (Akerlof and Shiller, 2010) and Narrative Economics Theory (Shiller, 2019) have been put forward. Interestingly, there has been an increase in this behavioral finance literature in recent years due in particular to two major factors: first, the development of financial experiments and simulations related to agent-based models among others, and second, the development of several empirical measures of investor sentiment (VIX,

Michigan University indexes, Backer and Wurgler index, etc.), investors' emotions (Taffler, 2018) and behavioral econometric modeling.

In other words, the prices of financial assets appear to be determined by various drivers in addition to fundamentals, and there is no doubt that investor emotions, market sentiment, news, and external factors such as uncertainty all play a key role. This has been clearly observed over recent years, especially during the coronavirus pandemic that has changed the common perception of the way financial markets work.

The 2nd IEAP (Investor's Emotions and Asset Price) meeting, which was organized at IAE Lille University School of Management on 1st February 2023 with the collaboration of Bank of France, aimed to discuss these highly relevant issues linked to asset pricing (traditional assets, commodities, cryptocurrencies) and behavioral finance. During this research day, several academics and professionals met to share their latest research findings related to these key topics, and this meeting has served as a valuable platform for discussing innovative and thought-provoking ideas in behavioral finance.

During this meeting a round table was organized around the following topic: "General Topic: "Expectations, Emotions & Price Formation in Times of Uncertainty and Crises". Different academics and professionals participated to this round table: M. Jean-François Boulier (Président d'Honneur de l'Afzi, France), Dr. Catherine D'Hondt (Professor, UCLouvain, Belgium), Dr. Georges Prat (Emeritus Director of Research at the CNRS, EconomiX, University of Paris Nanterre, France), Dr. Philippe Rozin (Associate Professor, IAE Lille University School of Management,

* Fredj Jawadi and Philippe Rozin would like to thank the two others coorganizers of the 2nd IEAP (Investor's Emotion and Asset Pricing): Prof. David Bourghelle and Prof. Pascal Grandin who co-organized this meeting on the 1st February 2023, as well as the administrative, research and Professorial Staff at the IAE Lille School of Management. The four organizers of the 2nd IEAP meeting acknowledge the financial support from LUMEN Research Centre and they thank Prof. Sebastian Dereeper for his support.

France), Dr. Richard Taffler (Professor, Warwick Business School, The UK). The debate, which was moderated by Dr. Fredj Jawadi (Professor, IAE Lille University School of Management) was structured around five main questions addressing the current dynamics of financial asset prices, their drivers, the role of sentiment and emotions, and providing some projections about the future dynamics of financial markets in a context of high inflation, great uncertainty and geopolitical tensions.

The rest of the paper is organized around six sections. The five next sections reconsider the questions of the round table and provide the main insights from the view of each participant.

II. QUESTION 1: WHAT DO YOU THINK ABOUT THE LEVEL OF FINANCIAL ASSET PRICES TODAY? ARE THEY PARTICULARLY VOLATILE? DO YOU THINK THEY SEEM CORRECT?

Georges Prat: The question about the value of assets in relation to the market price obviously depends on two things: the asset under consideration and the benchmark used to compare the price to an economic reference value. So, we can take several examples. If we look at exchange rates today, the exchange rate of the euro against the dollar, for example, is around one point ten dollars to one euro. We can see that all the values given by the main approaches to equilibrium exchange rates, whether it's Purchasing Power Parity (PPP), the Fundamental Equilibrium Exchange Rate (FEER), or the Behavioral Equilibrium Exchange Rate (BEER) are around this value. So, at the moment, we have the impression that the exchange rate between the euro and the dollar is unlikely to lead to an imbalance in the economy and then to a deficit, or rather to problems with the balance of payments. So, it may be sustainable.

We can take another example, which is oil. The theoretical basic price of oil would be the marginal cost of extraction and production. In this view, oil is almost always overpriced. So, is it smart to do that? I'm not sure. The cost of extraction is very low in Middle Eastern countries, for example, but it's much higher in the Arctic, maybe not very far from the market oil price. But in fact, we could say that we have also to take into account demand, etc. The problem with the demand and supply factors is that you end up with the market price, so you no longer have a benchmark, so that we go round in circles.

And what I'd just like to say in conclusion is in relation to the CAC40 index. At the moment, as you know, it's close to the January 2022 maximum, very close. We're really at the maximum. And, in relation to that, it's all the more astonishing as interest rates have gone up so much in 2022. So the explanation is what, in terms of fundamentals, this does mean? It is the value of profits first. Well, profits have been very high, and they help to compensate. Margin rates held up very well for companies in 2022. However, and this is the problem, the current high level of dividend payouts and share buybacks suggests

that this is not the time to invest and therefore not the time to finance future growth, and so the prospects for future profits may not be that good, which means we could deduce that, at the moment, since the current price is the present value of future revenues, the CAC40 index may be overvalued. Then it's business as usual. The market doesn't take into account what I've just said. So the problem... what are the answers to that? And here, I'll use an interview with Patrick Artus who says in substance (something that I believe, otherwise I wouldn't say it), what is happening – I'll pass over the short-term effects of inflation, which are decreasing a little at the moment, although very recently it has tended to be the reverse, which can have an effect effectively - but it's above all that the markets, the European markets, are, with a few months' delay, tagging onto the American market. That is his argument. So, it's not completely surprising because the Euro Stoxx 50 index, for example, is made up of multinationals. So what's going on? It's that the Fed is widely expected to stabilize interest rates. On the other hand, earnings are going to consolidate in the US. Hence, the idea that the CAC40 market will remain at this level for a while, and so, in his interview, Patrick Artus doesn't anticipate a major stock market crash in the coming year, but perhaps some movement, a slight downward movement, perhaps, that's it, perhaps...

Catherine D'Hondt: Okay, thank you. Before answering the question, I'd like to thank the organizers for the invitation. I'm very happy to be with you today and to take part in this round table. This first question is not an easy one to start with. Are current asset prices correct or not? Are they normal or abnormal? Are they extremely volatile or not? To be honest, I don't know. But what I do know is that market prices reflect prices at which investors agree to trade. Those market prices are the result of the supply and demand mechanism, and that mechanism is fed by investor expectations. So, obviously, over the recent years, investors have been facing a lot of economic ups and downs due to inflation, recession, the war, but also, more recently, rising interest rates and the falling stock market. And this is without mentioning the COVID-19 pandemic. For me, the main point is that this sequence of ups and downs has mostly increased the level of uncertainty, and today, investor expectations are mainly affected by this high level of uncertainty.

Jean-François Boulrier: Given what was said, I'm going to concentrate on the other assets. The major concern of institutions and investors is that they are clearly in an uncomfortable situation. A lot of money that's been created by central banks albeit, in a nice manner. I meant, we can't complain about the money being brought when needed, but now, what can we do about it? It seems very improbable that Central Banks will destroy that money. That money will almost surely remain in the economy and Central Bankers will be forced to slowly raise interest rates. My economic scenario is that a moderate inflation will stay for a long time because of the abundance of money and energy prices. Then, if that situation is to last, it will have consequences on rates and on equities as was already mentioned. Discounting values of future cash flows as you know depends on the level of interest rates and may drive

asset prices down. The major concern for institutions is that all asset prices are then under threat. There's also a slight other concern about real estate because real estate prices have risen, particularly in France, and in many other places in Europe, and we know that interest rate rises will be passed on credit from banks and thus will have unfavorable consequences on house prices. So, I'm rather concerned about the present situation and I feel the central banks, but also states, will have to handle the situation carefully if they don't want to create too much disturbances in the economy. However, I agree with what Georges said, prices are not so high that there is a disequilibrium, fortunately, and, especially in Europe, the stock price's movement accompanied the news flow on inflation and concern about the possible recession; now that the situation is in better shape in the US, and there are also some signs of improvement in Europe, there's not too much worry about equities. But certainly, dividend yields that were much higher than rates for a long period of time, will now be very close or below to interest rates.

Philippe Rozin: In fact, with regard to what's already been said, something has left me a little surprised and curious; it's simply the relationship between the financial markets and assets, especially in the current context of the war in Ukraine, and therefore, extremely violent exogenous shocks, which were expected on the energy markets. So, we might certainly have expected volatility in the price of energy assets, particularly gas, to be far more violent in reality than it has been. I find this really and truly surprising because for a long time we probably had relatively linear expectations, i.e., we imagined that exogenous shocks could arrive on the markets and that the market reaction would be extremely abrupt and, in line with this, to a certain extent, the reaction of investors on a certain number of contracts. Obviously, this is not really what happened. So, there was movement and volatility shocks that were extremely abrupt when threats began to emerge on energy deliveries and markets, and therefore on the hydrocarbon and gas market, markets that are also coextensive with other types of markets, such as the fertilizer market, for instance. And gradually, what seemed to happen finally is that we had a kind of return to a norm of volatility, which seemed in any case to be much more, in inverted commas, "expected". I think that this relationship between volatility, market movements and asset prices raises many questions. It makes you wonder whether, in the end - and this is perhaps an open question I'm asking - expectations about prices are not being made in parallel with expectations about market movements? So this is really something that, in my opinion, raises a certain number of questions. In the same way, I also believe that there are some issues that come into play in terms of spillover effects, contamination effects on the markets. And this is really an open question; I wonder whether these spillovers and contamination effects have an increasingly important impact on the volatility of the markets specifically. And there you have it, it's more open questions than answers, but that's what I was concerned about.

Fredj Jawadi: Thank you for the expert insight into this first question. It helps us to move forward in fact.

The next question goes a little bit in the direction of the analysis if you like ... Okay, so let's go ahead and try to understand this volatility. When we look at the literature, we can identify at least two kinds of explanations. The first is related more to fundamentals, so we could explain this volatility by the fact that the fundamentals are set to a particular time and these kinds of analyzers offer more or less rational expectations, but on the other hand, as we learnt in this meeting, behavioral factors play an important role, so my question is:

III. QUESTION 2: CHANGES IN FINANCIAL ASSET PRICES ARE ALWAYS JUSTIFIED EITHER BY FUNDAMENTALS BASED ON RATIONAL EXPECTATION'S THEORY OR BY BEHAVIORAL FACTORS. WHAT'S YOUR VIEW OF THESE TWO EXPLANATIONS? WHAT DO YOU THINK ARE THE MAIN DRIVERS OF FINANCIAL ASSET PRICE DYNAMICS TODAY?

Fredj Jawadi: Maybe I'll start with you, Richard.

Richard Taffler: Yes, it's pretty obvious that fundamentals have an underlying impact on prices, but if we then move on to think in terms of rational expectations theory or the premise that fundamentals are fundamental in driving investment behavior, then there are problems because we're not rational, we're not *homo economicus* in any way, and a whole range of other factors drive our decisions. We talk about behavioral finance, but as I've suggested in my presentation, there are problems with behavioral finance. In fact, one might even question whether the cognitive biases that behavioral finance academics label certain market behaviors to be, are actually meaningful in any sense. It's very difficult to believe behaviors found in experiments in laboratory situations with undergraduate students in very idealized and context-free situations actually transfer to large virtual dynamic groups in a market environment. Behavioral finance makes no attempt to explain; in fact it is unable to actually think about, the dynamics of groups. What are markets and what are the pricing mechanisms in markets, but the result of large group processes? And I think this is something that one finds only passing acknowledgment to in the finance literature and cannot be directly examined by behavioral finance. So, I think there's a problematic here. We're looking for answers. We want to believe we can predict so find reasons that allow us to apply cognitive bias labels but this is not very helpful in my opinion. And also, as I was talking about, and I won't say more, we're ignoring what are arguably the most powerful drivers, particularly in certain market situations such as cryptocurrencies, bubbles, and so on, and also in more normal market conditions, which are our emotions, fantasies, needs, and unconscious drives.

Fredj Jawadi: Thank you Richard. You said that people aren't rational? People don't make rational expectations. Georges, do you agree with this analysis?

Georges Prat: Yes I agree. I'd like to say, first of all, that I'm not always going to rely on others, but when others say something that I believe, and have a reputation that I don't have, I bring them up. So, two years ago in 2021, the *Review of Financial Studies* published a state of the art on asset pricing by eight very well-known authors who contributed to the paper (Brunnermeier et al., 2021). I advise everyone here to read it. And these financial economists are quite orthodox at heart, it has to be said. So what is the message they are giving, which is very much in line with my own work? The first message is that when you introduce the Hypothesis of Rational Expectations into an Asset Price Model, you can't explain the dynamics of asset prices. This is clearly and explicitly stated. What matters - and I'll come back to this, it's the second message, the two are linked - is beliefs. So it's not surprising, in my opinion, that the Hypothesis of Rational Expectations doesn't help us to represent the moments of the returns distribution, and even less the dynamics observed. I'll take a few examples. I'll go very quickly because we could discuss everything. We remember Mehra-Prescott's Equity Premium Puzzle (Mehra and Prescott, 1985), Shiller's Volatility Puzzle (Shiller, 1981), that is to say, they work in relation to a model, Robert Lucas' model, which is in General Equilibrium with Rational Expectations. This means that the risk premiums generated by this model are much too low compared to those observed, and that the market volatility is much too high compared to the one of fundamentals. The second element suggesting that the Rational Expectation Hypothesis does not correspond to reality is that there is a certain partial predictability of returns, particularly, I would say, when one is dealing with annual or multi-year data.

Another aspect is the term structure of risk premiums. If there is Rational Expectations, there is a single risk premium whatever the horizon. What we're observing is exactly the opposite. It was John Cochrane who put his finger on it. Moreover, in opinion polls, experts are asked what they think about future values of share prices, exchange rates, interest rates, oil prices, and so on. They'll answer whatever you want, except rationality. In other words, they make extremely important mistakes that are not white noise at all. And then there is also the idea of heterogeneous behavior. This is not very compatible, I'd say, with Rational Expectations. In principle, if agents have Rational Expectations, we shouldn't have heterogeneity of expectations. And what we also have, I would add, is that the attempts that have been made in learning processes towards rationality - that is to say, we make mistakes, but we correct them little by little, etc. it doesn't work. There are famous models of heterogeneity, which distinguish between fundamentalist behavior and chartist behavior, and studies show that one can identify them rather well. There are regime changes between these two type of behaviors, aren't there, Fredj? In reality, the market price is a combination of both behaviors, at any given moment. Why all these results say no for Rational Expectations? For very simple reasons - and I'm not going to give a lesson

here - it's that there are information costs and cognitive biases, that's all. Because of the cost of collecting and processing information, it can be quite rational not to anticipate rationally.

So, what is surprising, what surprises me a little, is that we've left to one side the Theory of Economically Rational Expectations, which basically says: additional information will be used if its marginal cost is less than the increase in utility that it will provide in terms of reducing forecasting errors. So it's like a consumer equilibrium analysis, it's the forecaster's equilibrium. And I believe in that it means that it can be perfectly rational to be extrapolative. I would add that transaction costs are an answer to the problem of the Grossman-Stiglitz paradox (Grossman and Stiglitz, 1980).

The second (and I'll be very brief) message in the RFS paper, which is related, is that financial assets reflect investors' beliefs about the future. So, these beliefs - and this is emphasized by the authors - about both the payoffs of assets and the discount factors, well, we need to work on that. You have indeed to be aware of what you're doing because you're moving from a Lucas-style General Equilibrium Paradigm to a Temporary Equilibrium Paradigm. In fact, one can't really work on a financial asset pricing model in the General Equilibrium paradigm if expectations are not rational. This is very important, and it's also underscored.

The big problem is about beliefs; what are they? How to measure them? etc. So, this is the Pandora's box that has been opened. We can mention two lines that are currently being studied. The first is to use the derivative markets prices, which allow exhibiting the future distributions of the underlying assets prices. There's a stream of literature about this, in particular, a large body of literature on the term structure of equity risk premiums based on the use of options markets. And obviously, the second stream is the use of expert-related opinion surveys. So, it's developed a lot, there's a lot of new data out there for researchers.

So, what's interesting with that is that researchers have become completely agnostic on how expectations are formed. They have fewer and fewer prerequisites because they try to understand empirically how expectations are formed. So, how? There's a paper I'd like to cite, Greenwood and Shleifer in 2014, again in the *Review of Financial Studies*, which concludes, after the authors have analyzed expectations of stock prices provided by six different surveys that: "measures of expectations from investor surveys are not meaningless noise, but rather a reflection of widely held beliefs about future market returns." So, when we analyze the processes themselves, we find fairly traditional processes, such as the psycho-sensory adaptive, extrapolative, mean reverting, etc. And so now, many researchers are looking at the results of these surveys. And from now on, many researchers think that, in order to validate a model, you have to introduce beliefs into asset price models, and I quote again, from a 2017 paper by Adam et al (2017). in the *American Economic Review*, which clearly says "for a stock price model, when I introduce anticipated capital gains from surveys, it works; when I introduce Rational Expectations into the model, it doesn't work." So, this really confirms the review in the RFS article that I cited at the beginning.

Last remark, I'm not saying that we should use surveys; not at all. There are two things to keep in mind. The first is that surveys, just because a respondent declares a belief, it doesn't necessarily mean that he or she will behave in the market in accordance with that belief. This is a point to keep in mind. And secondly, even if that's the case, there's a problem, which is that there are still transaction costs, and I would say arbitrage risk because the fundamental value that one may have in mind is uncertain. So if one makes an arbitrage of price versus value, he/she takes a risk. So all this means that, even if the opinion is really correct, she/he won't necessarily intervene in the market. This means that there are areas where transaction costs and the risk of arbitrage are very high, but if they're below the expected gains, there can be an adjustment of the market price to the fundamental value.

Fredj Jawadi: Thanks a lot Georges for this analysis. So, with regard to these factors, Georges talks about this disruption based on the theory of rational expectations to introduce beliefs into asset pricing models. So, are these valid factors and why are behavioral factors important? Can we consider that they really drive prices?

Catherine D'Hondt: Yes, in my view, both fundamentals and behavioral factors are important drivers of financial asset prices. And let me maybe start with fundamentals. I have some slides to help me. I see fundamentals as the necessary food for building a Rational Expectation, and obviously to build rational expectations, we need specific skills and we know that, if we take the typical average investor, he or she has cognitive limitations and very low financial literacy. Hence, I would say that Rational Expectations concern only some specific investors like institutional investors and maybe some highly financially literate retail investors. Now let's move on to behavioral factors. These factors have the particularity to concern all investors. I mean institutional investors, but also retail investors, are affected by behavioral factors, and of course we know from past research that investors with a low level of financial literacy will be more affected by behavioral factors. So what are behavioral factors?

In my view, behavioral factors have two components: the first one is made of cognitive factors and, as Richard explained in his presentation, a cognitive factor refers to how the human brain functions. Obviously, we have cognitive limitations, and those limitations explain why we tend to use heuristics to make a decision. The problem with using heuristics is that those heuristics can lead to systematic biases that are called "behavioral biases". Put differently, cognitive factors can drive us away from rationality.

Alongside cognitive factors, there are emotional factors and, for me, emotional factors refer to the impact of emotions, mood and sentiment on a decision, and these emotional factors tend to bolster behavioral biases. They exacerbate biases. And in all that, there is a key role for uncertainty. When uncertainty is high, rational expectations (based on fundamentals) are harder to build, and behavioral factors might have greater influence on decision-making. It is why irrationality might be more likely when uncertainty is high.

I'm not an expert in emotions as Richard is, but I can give you some insights. If I had to define emotions, I would refer to the American Psychology Association (APA). The APA defines emotions as a complex reaction pattern involving experiential, behavioral, and physiological elements. I think the interesting point is that emotional experiences have three components. The first one is a subjective experience; this means that any emotion starts with a subjective experience that is called a stimulus. It's what triggers the emotion. The second component is the physiological response. It's the body's reaction to the subjective experience. And finally, we have the behavioral response as the third element. That is what we see from the emotion; it is the actual expression of emotion. According to the APA, emotions are often confused with feelings or mood. Feelings arise from an emotional experience, but feelings can be defined as the result of an emotion and may be influenced by other factors like memories or beliefs. As for mood, mood is defined as any short-lived emotional state, usually of low intensity. Mood will differ from emotions because it lacks the subjective experience; it lacks the stimulus and has no clear starting point.

I can now move to something that was said before. There are lots of theories in the literature, but all those theories agree that emotions shape decisions, as Richard mentioned and demonstrated in his paper. Emotions are really important. They can actually motivate engagement and/or the decisions of people.

Emotion also differs from investor sentiment. Emotion is a broad concept, while investor sentiment, market sentiment is a narrower concept. We can refer to the formal definition proposed by the seminal paper of Baker and Wurgler (2007) about investor sentiment. These authors define investor sentiment as a belief about future cash flows and investment risks that is not justified by the facts at the end (i.e., not justified by fundamentals). In their paper, the authors use a top-down approach to explain that sentiment can be aggregated at the market level and aggregate sentiment can affect market returns and individual stocks. They also show that some assets are going to be more affected by market sentiment, especially stocks that are hard to arbitrage or stocks that are more difficult to value. To finish on that point, I can get back to the key role of uncertainty, because uncertainty is important when it comes to fundamentals and to behavioral factors. Why? Because when uncertainty is high, behavioral biases are more pronounced, and at the same time, firms' fundamentals are harder to predict and are more subject to speculation. That's why, at the end of the day, we can expect a higher impact of investor sentiment on asset prices when uncertainty is high.

Fredj Jawadi: Okay, thanks a lot, Catherine. Well, I'd like to move on to question three. So okay, now we understood the difference between investor emotion and investor sentiment, and my question is whether you think that, and why these two concepts could help us, for example, to understand speculative bubbles, to understand bear or bull markets, or financial crises, and how these concepts give insights into bubbles, for example. So, my next question is:

IV. QUESTION 3. INVESTOR EMOTIONS AND INVESTOR SENTIMENT ARE AMONG THE BEHAVIORAL FACTORS USED TO JUSTIFY CHANGES IN ASSET PRICES. TO WHAT EXTENT DO THESE CONCEPTS HELP US TO UNDERSTAND SPECULATIVE BUBBLES, BEAR OR BULL MARKETS, FINANCIAL CRISES, ETC.?

Philippe Rozin: I'd like to pick up on the earlier discussion before I try to answer the question about bubbles, because I think we can look at these questions from a somewhat different angle. I'd like to make it a bit more complex, if possible - well, if it lacks complexity. For me, a triptych already exists; there are emotions, feelings, but also passions, and I believe that the factor that makes these three elements converge is judgement. So, in fact, the basic question we can ask in relation to financial markets is "what conditions can govern judgements on values?" And here I think we have this famous trilogy: passions, emotions, and feelings. It undoubtedly plays a fairly important role. So, in effect, I think that market sentiment - as it is currently theorized - is in full swing. In fact, in this literature - it is more specifically locked into representations of consensus for example. In any case, movements that are, in a way collective, will also converge on market values. So, we often have the feeling that passions are linked to private criteria, in fact. There was an interesting discussion by Wittgenstein who wondered if passions were reducible to private factors and, if we had passions, to factors that weren't private. For example: why shouldn't we speak of collective passion? Wittgenstein challenged the idea that we can talk about collective passions because he said that when someone is moved by supposedly irrational behavior, we are obliged to presume that he is affected by private passions, something that affects him. But you don't assume that a society will go mad in that way, at least not like that. And then, between the two, literally between these two force fields, we have the contexts, in fact the emotions, which compared to the other two, have a context of passivity. In other words, when we feel, when we speak of emotions, we speak more of resentment, of something that we tend to feel. I find the debate interesting on this point because it's the whole debate of the passage between the privative factors and the collective factors, and I simply wonder if the somewhat weak point of this argument is to presume that the aggregation of private passions, finally, is going to lead to "collective" movements, in inverted commas. That we could easily identify with privative criteria simply by isomorphism, by introducing concepts such as hubris, which is less fashionable nowadays, the concept of runaway, and from there, effectively, this tendency to treat collective movements, speculative bubbles for example, in a way that certainly oversimplifies. And at the same time, in relation to this, I feel that the distinction

between everything that comes under these passionate, emotional or sentimental contexts and rationality appears perhaps a little naive. So there is a whole - I won't cite too much, and I apologize for citing things that have already been written by more illustrious people than me, but there are studies by the American philosopher Peirce, which are very interesting I believe on this subject, who said that reason - well, the argument is long and a bit tedious, as is often the case with Peirce - he simply said that reason is already passionate, that reason as such is already a system in perpetual reconstruction of impulsive elements, of passions, and a phenomenon in fact. Peirce had this expression that I find interesting, that reason is a phenomenon of normalization of passions, a factor of normalization, of norms of conduct of passionate factors. So there you have it, I found his work absolutely fascinating, and how emotions (it's the general label) are taken into account. On the other hand, I'm a bit reluctant... I find it naive, if I dare say it, to treat passions as factors that will necessarily have behaviors behind them, in other words...

Fredj Jawadi: Thanks Philip. Richard, if I can ask you, what do you think about that?

Richard Taffler: Yes... I'm not quite sure really what the differences are between emotions and sentiment. I think much more helpful is how the psychologists talk about fundamental emotion. They distinguish between integral or fundamental emotions and incidental emotions, and to my mind, sentiment is really referring to incidental emotions, as I talked about in my paper. Technically, sentiment is a term used in behavioral finance in those studies which measure tone, derived typically using the Loughran and McDonald or Henry positivity/negativity word lists. So, in that sense, sentiment, or tone, which measures positive minus negative words in a text over positive plus negative words, might be some formal definition that's conventionally used. But I'm struck by the way in which the term sentiment is used quite loosely without appropriate definition.

Jean-François Boulier: I'm going to make three points: one that has already been made. There's a large heterogeneity of interest in the marketplace. So, combining all that into a single measure creates fuzziness. Second, when it comes to professional investors, like institutional investors or asset managers, it's impossible to say that these people will not explain to their clients what they've done. Explanations to their clients are the key element and they must be of course objective. Nevertheless, I think many professional managers accept the idea that an active manager will put forward some beliefs or some additional information, or specific treatment of information in his decisions. Often, they think a professional investor is paid because he trusts that his way of thinking is efficient and he then expects excess performance will come from that. When it comes to the institutional investors themselves, as I said this morning, about one-third on average of their portfolios is actually managed directly by their institutions and two third delegated to asset managers. One can understand well that for the large diversity of asset classes you need to hire experts. These experts need to report and explain their decisions to the institutional investor.

When a decision is taken at the level of the institutional investor, the body that matters is the board. Of course, the chief investment officer of the institution and his team have some freedom to invest in their ways every day; they will report to a committee that may be monthly, but nevertheless most of the important decisions remain taken by the board of the institution. This is required by regulations, and this is a good governance, to make sure that it's not a single view that is taken into account. There must be a discussion about what's important and what's not. Beliefs are very important, so the discussion between people here is key. We go back to financial literacy. If the board doesn't have a sufficient level of financial knowledge, the decision will be blocked; for example because some people may be afraid to share risk if they don't feel sufficiently comfortable with the decision. As a consequence, for example, in Switzerland pension fund board members must have some form of education: it's one day a year at a minimum, and, when a new board member is appointed, it's one week of education. So you see, it's a meaningful amount of time and efforts. I think the complexity cannot be managed by just one person, because this is too dangerous. It doesn't mean that people are not cautious enough, but it's dangerous because no one knows everything.

I now come to what was previously said about groups. I think groups have a great influence on market, and understanding how to aggregate beliefs, how to aggregate views, how to aggregate maybe emotions as well, is quite important, because again, a decision is not taken by a single individual, but by some sort of panels.

The last point I want to make is that, nowadays, when we think of rational information, we should take also the extra-financial information into account; this is quite critical; if you read a paper like the one by Zerbib on sustainable asset pricing (Zerbib, 2022), you'll see that the premium on extra financial measures is like a third of the classical risk premium. This empirical result is based on recent US data. So, the amount of the premium may be even larger in Europe. It's not negligible at all; thus, if you are equally set on risk or on expected performance, but not on carbon or other extra financial aspects, you're probably not making the right decision. I think when we speak about behavior; we need now to be more comprehensive because there are several factors at stake. We have to understand the strength of these factors and how they combine together.

Fredj Jawadi: Thank you so much. So now I'm going on to question number four, and going back to Georges who said that people's expectations are not rational, and we look at the situation today, so the specific context characterized by high inflation, high uncertainty, geopolitical tensions, the war in Ukraine and the eco-climate of anxiety, this context intensifies the emotional phenomena. So, my next question is:

V. QUESTION 4. DOES THE CURRENT CONTEXT OF HIGH UNCERTAINTY, HIGH INFLATION, GEO-POLITICAL TENSION, AND ECO-CLIMATE ANXIETY INTENSIFY THE EMOTIONAL PHENOMENA OF OVER-REACTION AND UPSET THE MECHANISMS INVOLVED IN THE DEVELOPMENT OF EXPECTATIONS?

Georges Prat: Yes, if an issue exogenous to the financial markets is felt with great intensity, sufficient intensity, it will lead to changes in the expectations formation processes. Well, it's very intuitive to say that. So what can we say from a rational point of view? First of all, when we analyze the expectation formation processes based on opinion surveys of different asset prices, exchange rates, stock market prices, etc., what do we see? Well, we identify processes, which are not bad by the way, but they're unstable over time. So, there are several ways of interpreting this instability, but in particular we observe disruption when major events take place. For example, the financial crisis of 2008 created disruption, and so did quantitative easing. So processes changes - we can see it statistically, with switching regime models; there are disruptions in the processes.

The second point, which is a bit more theoretical, is to consider that a market price is a sort of weighted average of investors' opinions about the fundamentals and the collective opinion that an investor perceives through the market sessions as André Orléan said. And when there is great uncertainty about the future evolution of the fundamentals - which are very costly to use - what do people do? Well, behavior tends to focus more and more on the market's opinion, which is not costly. So, the price becomes increasingly self-referential and what does this type of reasoning mean? It means that the share of fundamentals in forecasts is likely to vary considerably over time and can go as far as fainting.

Fredj Jawadi: Jean-François, do you agree with that?

Jean-François Boulrier: Broadly speaking, yes. But I'm not sure that we're in a state of considerable uncertainty. It's true that there have been many turning points like the war in Ukraine, which was mentioned, energy, which was mentioned, and interest rate levels, as I said earlier. But nonetheless, up to me, we're not in crisis state. The levels of volatility are not huge, neither for liquid assets, nor for the variations in non-traded asset prices. There's no great issue. Of course, there are changes that have been perceived by many actors - my successor Hubert Rodarie mentioned this in the nineteen measures that Af2i suggest in reaction to these changes - but today we have not facing any real trauma. The accidents in financial markets we've had in recent years were often exacerbated by liquidity issues: too many players buying the same asset or trying to sell the same asset. I'm not particularly surprised by today's levels of volatility and even if there is certainly a

tendency to overreact, I don't think today's conditions will increase volatilities that much.

Fredj Jawadi: Thank you. Now, let's move to my last question:

VI. QUESTION 5. WHAT LINES OF RESEARCH SEEM MOST PROMISING TO YOU TO UNDERSTAND AND INCLUDE EXPECTATIONS AND UNCERTAINTY IN ASSET PRICING MODELS?

Jean-François Boulier. Let me briefly recall what we do at Af2i and indicate the three areas where we would like to read more relevant research. We have quite an active academic research committee at Af2i: we try to find good research projects from young researcher, to recognize excellent published research and to contribute to the debate on outcomes and practical implications. We've financed for example Pierre Fay, who is a PhD Student at the IAE Lille under the supervision of Fredj Jawadi and David Bourghelle, who was awarded a grant for this work on cryptocurrencies. We also gave last year Af2i Academic Prize to the paper by Campbell and al. on inflation and its impact on asset classes, a paper that we found outstanding and well timed. We also want to discuss with researchers to try to influence the topics they address and also to test their ideas.

In a nutshell, there are three domains where we feel there's a need for more research. First, all the utility functions used in investment theory focus too much on valuation and insufficiently on holdings, which is inappropriate because the turnover of portfolios of institutional investors are quite low and asset allocations are often set for a very long time. For example, as for bond portfolios, probably roughly 80 to 90% of issues are bought on the primary market and held to maturity. Therefore what is important is not the spread variation of a bond on the market but if it will be reimbursed at maturity. Similarly for all ESG factors, what is important is to support firms in their transition. It's not to drop the ones that are, you know, not efficient today. Investors need to help firms to transform their processes, their business, so that they become more suitable to climate, social needs, and governance.

Second, how to incorporate ESG factors in financial decisions: what's the proper balance? Is there only one way to address this question or should each institution decide for itself? What's the balance and how to integrate the two views? This is a question that's really important to many institutional investors, in Europe and elsewhere. The use of ESG scores has shown its limits notably because the empirical studies show that there is little commonalities in ESG scores coming from various providers. Moreover investors need information useful for the future.

Third, one should analyze the long-term risk and not only the short-term risk. And for example, at Af2i we are very concerned about Solvency and the measurement of risk that is considered in this European regulation for insurances. It's a one-year horizon whereas most liabilities

are for many years. I've been managing a French life contract (named Afer) for example in the last few years. On average, the portfolio is held by clients for more than 20 years. So, we need to come back to what matters, not the short-term risks but the long-term risks. Of course, this may be difficult, since we don't necessarily have the right information and measures, but it's preferable to work on this information rather than to try to use short-term measures to cope with longer term needs.

Fredj Jawadi: Catherine, would you like to carry on?

Catherine D'Hondt: Yes. For this last question, my answer will be biased because I'm active in behavioral finance and decision-making and so for me, future research lies in improving our understanding of how investors behave and how they make their decisions. In that perspective, I think that there's room for further research focusing on specific behavioral biases, because today we know a lot of things about some biases. However, since the environment is changing, I think that new aspects should be taken into account. As an example, I could talk briefly about herding. Herding is a behavioral bias that is well known. We can simply define it as our own natural tendency to imitate others' behavior, and most of the time, we do that because we see what others are doing as the thing to do. It's the norm, in fact. I think, in that perspective, today with social media, there are new contextual factors that could be interesting to further investigate. Why? Because first of all, we've seen in the recent past that social media can very easily create new norms. We can take the FIRE movement in the U.S. during the Covid-19 pandemic as an example. FIRE is the acronym for Financial Independence Retire Early, and that norm pushed people to take huge risks to accumulate quick gains and to stop working at an early stage. Another example is the crazy attractiveness of the "meme stocks". Actually, social media is a ground where new norms can easily emerge. Another point about social media is that it can increase the illusion of knowledge of people, because when they are active on social media, most of the time, they join groups and some of those groups can self-report as expert. If you join a group that is self-declared as expert, you will tend to think that you are an expert. Such an illusion of knowledge is important because it can bolster overconfidence. Another aspect with social media is confirmation bias. We know from past research that on social media, people mainly tend to look for information, opinions, and beliefs that confirm their own beliefs and opinions. Finally, we also know that more and more social media material is used to assess investor sentiment, investor emotions maybe tomorrow, and sometimes algorithms are used to exploit that information at the expense of investors. For all those reasons, I think that it's really important to keep on working on behavioral biases like herding, because herding might increase or reinforce temporary (irrational) price trends.

Fredj Jawadi: Thank you Catherine. What do you think Georges?

Georges Prat : Yes, I'd just like to talk very briefly about three points. I think that one important thing with regard to the discussions we've had is to distinguish between two types of rationality: instrumental rationality, which allows investors to establish, for example, a situation where there

is no arbitrage; allows them to create efficient portfolios; and allows them to make coherent inter-temporal choices. You can make coherent inter-temporal choices with false expectations, that's what you have to understand. The second type of rationality, that is cognitive rationality, which implies rational expectations, is much stronger, much more restrictive. I mean, when we say that we assume that the agent is rational in a model, we really need to know what we're talking about. This distinction is not necessarily a line of research, but, yes, it can be.

The second point that I have the feeling concerns in particular the dynamics of risk premia on financial markets. It seems to me that there's not enough of a distinction - insofar as it's made conceptually, of course - between the part that goes into the price of risk and the part that goes into expected volatility for explaining premia. Both the price and the quantity of risk can obviously vary. So, I'll give an example: the ARCH (Autoregressive Conditional Heteroscedasticity) models work on conditional volatility. What do they give as a result to explain the risk premiums? The part of variance that's explained is very low. When you get to 8%, you're happy, that's it. Why? Because it's implicitly assumed that the price of risk is constant, I mean that we clearly need to see that the price of risk is variable - it's in the literature, I'm not breaking any new ground - but to clearly distinguish what the share is when we apply a model, at each moment and according to the horizons, it's very different, it can be very different. That's the second thing.

The third point, which fascinates me the most, is the following: in terms of research program, how can we make the lessons from Prospect Theory - issued from Kahneman and Tversky's experimental psychology work at the end of the 1970s (Kahneman and Tversky, 1979) - operational in asset-pricing models. I believe it's a key challenge. One excellent author who's thought a lot about this question, Nicolas Barberis, well he turns round and round in circles (Barberis *et al.*, 1998). He points to the difficulties, from time to time, it looks like he's going to give a solution, then it's not quite that, etc. This is very important for me. Why? And what exactly did Kahneman and Tversky say, what did they find? It's very simple. They found, from questionnaires and so on, that when individuals are presented with the perspective of winning, 84% are risk averse. On the other hand, when they are faced with the prospect of losing, 69% of individuals are risk seeking; in other words, they have a risk preference... It's enormous. This result is huge. If we could introduce this into models of expected utility, etc., it would be fantastic....

Fredj Jawadi: Thanks Georges. Richard, would you like to have the last word?

Richard Taffler: I feel embarrassed, I've said enough already, You've been very kind listening to me. Where can we take research forward? Well, obviously, some of the areas I've been talking about need to be developed further if we're going to answer some of the more fundamental questions we currently cannot. I want to pick up on first of all on what Catherine was saying when she was talking before about uncertainty as well as some of the other areas she was discussing in her to-do list. Firstly,

when we talk about uncertainty, what we're really talking about is anxiety because uncertainty is very stressful as it means we can't predict. It's not like risk where we've got some probability distribution, which interestingly is why in investment markets people always talk about risk rather than uncertainty which, by definition, is unpredictable. So, certainly, we need to think about better ways of how we deal with uncertainty thereby alleviating the associated anxiety. Also, I think in behavioral finance, ultimately, all we can talk about are cognitive biases at an individual decision level, which I've talked about before, and is very limiting. The description herding is only a label not an actual explanation. The problem is that markets are large groups where people interact in different ways instantaneously, and markets take on their own lives. It's not a question of herding. It's actually the psychodynamic processes of large virtual groups which are at work. This is something I think where we need to do a lot more work in understanding. In emotional finance theory we have two types of groups. We have work groups, which are exactly what Jean-Francois was talking about, where people come together to a common end and work constructively to achieve this, and of course working well as a work group you can achieve a lot more than you can individually. But markets sometimes, such as in bubbles, which we didn't really talk about, become what's known as a basic assumption group, where the whole purpose of the group is to make its members, you can think about investors in financial markets, feel good, and they do this by shutting off or pushing away reality, and everyone colludes in denial. This is what goes on in bubbles, and also in non-bubble markets at times. We talked about social media and group processes which Catherine again raised. So, these are all areas where I think actually recognizing the key role the unconscious plays both at an individual level, and most importantly, in terms of a group-wide social level, is where we're going to get a lot more potential understanding of market behavior and help resolve some of the outstanding issues that Fredj was asking about in his questions.

Philippe Rozin: I think what's really interesting, potentially, is just to provide some studies regarding the decoupling effects, especially in fact when we consider the main differences between the involvement in green asset management, involvement in theory for sustainable development in fact and the reality of the market, and we receive a lot of reports regarding the poor performance of alternative funds. And so I think it's quite hard to understand how we can carry on like that, explaining that the main values of investments are just more focused on green assets, and then just keep working with investment funds when communication is about a kind of ethical involvement, and such poor, absolutely poor results in terms of returns, as well as in terms of investment. And I think this is really interesting in terms of behavioral biases, this is common behavioral bias in fact. We're still working with such kinds of hypocrisy, so I think this is a point. I think it's interesting to keep working on this kind of research by the way.

Fredj Jawadi: Thank you all for this very interesting debate and exchange.

References

- ADAM K., A. AND J. BEUTEL (2017), "Stock Price Booms and Expected Capital Gains", *American Economic Review*, 107, (8), 2352-408.
- AKERLOF, G. AND SHILLER, R. J. (2010), *Animal Spirits - How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism*, Princeton University Press, 256 pages.
- BAKER, M. AND WUGLER, J. (2007), "Investor Sentiment in the Stock Market", *Journal of Economic Perspectives*, 21, 2, 129-152.
- BARBERIS, N., SHLEIFER, A., AND VISHNY, R. (1998), "A Model of Investor Sentiment." *Journal of Financial Economics*, 49, 3, 307-343.
- BOULIER JEAN-FRANCOIS, (2017) *Long Term Savings Performances: The 40 Year Track Record of Afer Funds*, Bankers Markets and Investors, 146
- BRUNNERMEIER M., E. FARHI, R.S.J. KOIJEN, A. KRISHNAMURTHY, S. C. LUDVIGSON, H. LUSTIG, S. NAGEL AND M. PIAZZESI (2021), "Perspective on the Future of Asset Pricing", *Review of Financial Studies*, 34(4), 2126-60.
- ELROY DIMSON, PAUL MARSH AND MICHAEL STAUNTON (2018) *Divergent ESG ratings*, *The Journal of Portfolio Management*, 47, (1), 75-8
- FAMA, E. (1965), "The behavior of stock market prices", *Journal of Business*. Vol 38, Issue 1: 34-105.
- GREENWOOD R. AND A. SHLEIFER (2014), "Expectations of Returns and Expected Returns", *Review of Financial Studies*, 27 (3), 714-46.
- GROSSMAN, S., J. AND STIGLITZ, J., E. (1980) "On the Impossibility of Informationally Efficient Markets", *American Economic Review*, 70, 3, June, 393-408.
- KAHNEMAN, D. AND TVERSKY, A. (1979), "Prospect Theory: An Analysis of Decision under Risk", *Econometrica*, 47, 2, 263-292.
- LUCAS, R. (1972), "Expectations and the neutrality of money", *Journal of Economic Theory*, 4, 2, April, 103-124.
- MEHRA, R. AND PRESCOTT, E., C. (1985), "The Equity Premium: A Puzzle", *Journal of Monetary Economics*, 15, 2, 145-161.
- SAMUELSON, P. (1965), "Proof That Properly Anticipated Prices Fluctuate Randomly". *Industrial Management Review*, 6, 41-49.
- SHILLER, R., J. (2019), *Narrative Economics: How Stories Go Viral & Drive Major Economic Events*, Princeton University Press, 400 pages.
- SHILLER, R., J. (2002), "The irrationality of markets", *The Journal of Psychology and Financial Markets*, 3(2), 87-93.
- SHILLER, R.J. (1981), "Do Stock Prices Move Too Much To Be Justified by Subsequent Changes in Dividends? ", *The American Economic Review*, 71, June, 3, 421-435.
- TAFFLER, R. (2018), *Emotional finance: investment and the unconscious*, *The European Journal of Finance*, Volume 24, 2018 - Issue 7-8.
- ZERBIB, O., D. (2022), *Sustainable Capital Asset Pricing Model (S-CAPM): Evidence from Environmental Intégration and Sin Stock Selection*. *Review of Finance*, Volume 26, (Issue 6), 1345-1388.