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Focussed issue on Philosophy of Finance

Guest Editorial

The financial system, including finance—the discipline which studies financial markets—have been systematically understudied by philosophers. This is remarkable, considering that financial markets are at the very core of economic activity: here begins any entrepreneurial aspiration.

The Great Financial Crisis gave impetus to the hitherto scattered philosophical analysis of the financial system. It drew the interest of political philosophers and ethicists, who found ethical breakdown, inequality, and lack of democratic accountability as some of the features of the Crisis requiring systematic philosophical scrutiny. Today, it is possible to talk of an emerging field of the philosophy of finance which, besides ethics and political philosophy, addresses issues related to philosophy of science, epistemology, and ontology.

The selection of contributions reflects this broad spectrum of questions and seeks to kindle further interest in this fascinating and important field of enquiry. We are grateful to our contributors for their input in this effort.

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Philosophy of Finance: a brief overview

The financial systems have become not simply a central infrastructure of contemporary economies but a principle of organization of many modern advanced societies, making the global economy and society, for better or for worse, increasingly dependent on financial markets. Since finance delivers and boosts risks and benefits that are not only economic in nature, there is a pressing need to re-examine the role of finance in theory and practice. This involves considering the many epistemic, ethical, and methodological issues raised by financial systems, and philosophy can play a vital role in this regard. In effect, philosophy can help finance to achieve some of its goals, not only as a valuable external addition, but also internally.

The rich and fruitful relationship between finance and philosophy is being increasingly explored; I will highlight some lines of research in this emerging and intriguing field.

Two questions well covered by philosophy are the relation-

ships finance-to-ethics and finance-to-politics, as they offer a natural overlap between finance and philosophy where the latter can contribute actively to several issues of the former (see e.g. de Bruin, Boudewijn, Lisa Herzog, Martin O'Neill, and Joakim Sandberg, "Philosophy of Money and Finance", *SEP*, Edward N. Zalta & Uri Nodelman (eds.), https://plato.stanford.edu/archives/spr2023/entries/money-finance/).

As concerns ethics, these issues include fair financial markets (in particular, deception and fraud, conflicts of interest, and insider trading), and the social responsibility of finance (with a focus on systemic risk and financial crises, microfinance, and socially responsible investment). Philosophy investigates how to make them (more) just and deals with important ethical problems in finance such as what is fraud, what are conflicting interests, or what is fair market, and it points out that it is difficult to give an exact definition of these notions. This means that the conceptual and legal boundaries of these issues are often blurred and dynamic, and philosophy can help to clarify them. A typical example is *insider trading*, which those who saw the movie *Wall Street* probably remember. Broadly, it occurs when an agent buys or sells shares of a company (or other associated financial assets) at an advantageous time and price using her or his position within the company or privileged (non-public) information about it. It is critical for the functioning of financial markets to establish what insider trading is precisely, and when it is legal or illegal, since it can disrupt those markets and also because it contributes to one of their core functions, that is, price discovery.

As concerns politics, the philosophical focus is on financialization—i.e. the increasing influence of financial markets, incentives, institutions, and elites over the world's economic and political structure—and its effect on democracy, and on national and global justice. The philosophical treatment of these issues examines whether, how and to what extent finance helps global society and its main institutions to be (more) just.

This treatment shows how the organization and regulation of the financial markets demand careful analysis and control over the way capital is created and moved across national boundaries. This is needed to align the objectives, time horizons, and incentives between finance, which frequently favors short-term (*short-termism*), and those of a (more) just society, which typically requires mid-to-long-term projects. Some of the many issues that characterize philosophical literature on this subject are the status of Sovereign Debt, the relationship between State and Finance, bail-in *vs* bail-out, the freedom of action of democratic governments, the relationship between commercial and investment banks and the Central banks, the redistributive *vs* centralizing effect of finance. Since laws, practice, and policies are continually changing in these areas, their philosophical investigation is precious since it can contribute to better design and evaluation.

Of course, a lot remains to be done for philosophy, especially on other equally valuable issues that overlap finance and philosophy of science (see Ippoliti, E.: 2022. "Why Finance Needs Philosophy (and Vice Versa): Some Epistemic and Methodological Issues". *Foundations of Science* 27: 957–974, https://doi.org/10.1007/s10699-021-09804-2). In effect, issues concerning traditional subjects in the philosophy of science such as prediction, the nature and role of models, and the effect of algorithms are prominent in finance and raise far-reaching ontological, epistemological and methodological issues that philosophy of science can help to deal with.

For instance, the prediction of financial systems, which puzzles not only researchers but also public opinion, requires developing at least (i) a theory of prediction of social systems, (ii) specific financial theories (such as the efficient market hypothesis, the reflexive market hypothesis, the financial instability hypothesis, etc.) and (iii) an account for dynamics that characterize finance in a paradigmatic way like performativity and *reality-bending models*.

Just to offer a glimpse of the philosophical complexity and richness of these issues, let us look in more detail at the third point. A model can 'perform' a market, i.e. it aligns the behavior of the market to the predictions of the models employed to describe it (see MacKenzie, D. (2006). *An engine, not a camera*. Boston, MIT press), and this fact generates both practical and philosophical challenges since traditional notions like prediction, description, and control can enter into a circular relationship. In fact, if a model intended to describe (a portion of) a financial market can modify the behavior of that market as a consequence of its employment by the financial actors, then it can be used as a way of predicting the market and, in turn, this knowledge can provide the basis for controlling markets, at least in some circumstances (see e.g. Ippoliti, E.: (2020. "Mathematics and Finance. Some philosophical remarks", *Topoi,* https://doi.org/10.1007/s11245-020-09706-1). This has a significant impact on how we approach and control important issues like market design and market manipulation, which open space for the toolkit that philosophy of science has developed to explain how data (prices) and hypotheses (models and investment decisions) are connected. In fact, if prices can be the result of models rather than just reflecting the actual supply/demand ratio, they can deceive financial actors in several ways, making it simpler to create critical events like bubbles or crashes.

This may be concerning, but that is exactly the point—we should not forget that finance is a human *construct* that can be improved. By throwing light on how financial systems are, as well as how they may and ought to be, philosophy can help us understand, create, and manage them more effectively.

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Sustainable Finance as a Moral Obligation

Sustainable finance is basically about activities undertaken by financial agents, such as banks or investment funds, to support the transition of society towards greater social and environmental sustainability. This has recently become a major topic of interest among private market participants and public policy makers. One could say that there is a growing consensus around the idea that finance and investment have an important role to play in the sustainability transition. However, there is still widespread disagreement and debate about exactly how to characterize that role and, especially, about the extent to which it differs from "business as usual" in the contemporary

financial market. It is my contention here that academic philosophy can be very helpful in clarifying and making progress in this debate on the most suitable format of sustainable finance.

An important question that looms in the background is how we should conceive of the main purpose or agency of finance. According to a popular view in economics, the purpose of financial markets is to funnel financial resources (such as loans and investments) to their most efficient use. This is typically taken to imply that the purpose of each financial agent should be to seek out the companies or transactions that he or she expects to yield the highest financial return adjusted for the associated financial risk. Expected return is taken to be the best measure of what a given company or transaction adds to society: e.g., how much consumers are willing to pay more for the company's products than for the labour and materials that go into them (this is the company's profit which also determines the investor's returns). When all financial agents do their best to maximize their own returns, then, the collective outcome is that financial resources are funnelled to the projects that contribute the most to society.

On this view, finance indeed has an important role to play in the sustainability transition, namely, to funnel financial resources towards "green" companies and projects. However, it is important to note that financial agents themselves do not play a very active role in carving out this new path for society. The assistance of finance ultimately hinges upon the expected profitability (and hence financial returns) of the "green" versus "brown" projects that are available on the market. To be more precise, it seems that finance can only move if and when certain corresponding changes take place in other sectors of society: either consumers must change their preferences and be ready to pay more for "green" than "brown" products (which would make the former more profitable than the latter), or governments need to change their regulations so that "brown" companies are penalized and/or "green" companies are subsidized. In either case, financial markets can only ever play a reactive role and never a proactive one.

An alternative view in the philosophical literature holds that financial agents and markets have their own agency and therefore their own moral obligations. In our contemporary system of financial capitalism, it is very difficult to get anything done without access to finance and investment. But with great social power also comes great social responsibility. Therefore, one could argue that financial agents have a moral obligation to (at least sometimes) put their money towards companies and projects that address very pressing societal challenges, irrespective of their expected financial returns. And in our current situation with challenges such as climate change, biodiversity loss, and global poverty, it does not seem unreasonable to require that financial markets should act irrespective of – or precisely *because of* – the slow changes in consumer preferences and government regulations. That is, financial agents have a moral obligation to (at least sometimes) be proactive and not only reactive.

While this alternative view may seem intuitive enough, it is not without its problems – and here it is likely to benefit from further philosophical thought. First, it is hardly reasonable or realistic to insist that all for-profit financial activities should be reformed into philanthropy. As long as we believe in the basic legitimacy and utility of financial capitalism, we perhaps should agree that the main role of financial markets is to funnel financial resources to their most efficient use. This could be taken to mean that financial agents *typically* should seek to maximize their own financial returns, but with certain salient *exceptions*. According to one suggestion, the exceptions pertain to so-called market failures, i.e., situations in which for-profit behaviour fails to secure efficient outcomes due to problems such as information asymmetry (that one party to a transaction knows more than the other) or externalities (that some transactions have significant effects on third parties). Alternatively, as we have seen here, another type of exception is when other sectors of society have failed in *their* moral obligations: e.g., when consumer preferences and government regulations have not (yet) changed enough. Further philosophical research is needed to calibrate and evaluate these ideas of exception-based obligations.

Second, we should not expect financial agents to able to change the world on their own. While financial capitalism gives much power to financiers as a collective, there is no individual agent with full control over the financial flows. Say, for example, that a significant group of fund managers were to read philosophy and decide to sell all their fossil fuel shares. Somewhat counterintuitively, that would have no direct effect on the fossil fuel industry if the shares are sold on the ordinary stock market (which is a secondary market, i.e., the transactions are with other investors rather than the underlying companies). The stunt may even leave the stock prices of the fossil fuel companies unaffected, as long as there are enough other investors that only seek to maximize profits (since these would have increased incentives to buy the shunned shares). Thus, perhaps the most significant effect in this case would be the *signal* that the stunt sends to other sectors of society, e.g., to consumers and regulators. It could have a more direct impact if the money was redirected to newly launched companies in the renewable energy sector that really need funding. Further philosophical research is needed to discuss the most suitable coordination of the moral obligations of investors, consumers, and regulators in this situation.

I hope to have shown here that sustainable finance is a fascinating topic, and that academic philosophy can be helpful in determining its most suitable and effective format for the future.

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Social Ontology: Money is No Object?

People typically use money without giving it much thought. Yet, it raises intricate questions. One concerns its value. Why would anyone attach value to basically worthless pieces of paper? The popular answer is: trust – perhaps, in particular, trust in central banks or states. Another concerns its ontology. What is it, most fundamentally? This question used to have an easy answer: money is a concrete object. Throughout history people have used furs, shells and even large limestones as money, as well as coins and pieces of paper. These are all concrete objects. Yet, social and technological innovations, such as credit and electronic money, are counterexamples. They are not concrete objects.

By way of alternative, it has been argued that money is a concrete object in some cases and an abstract object in others. I would like to highlight a third possibility here. *If money is not a concrete object, it is a property of an agent*, the amount of purchasing power that the agent has. To motivate this view, I start by discussing the relation between money, property rights, freedom and power. The upshot is that money is not always an object.

THE POWER ARGUMENT Money can be seen as an entry ticket that opens many doors. Jerry Cohen observes that, without a ticket, people are not allowed to travel by train. So, money makes a difference as to what people can do. It enables them to use goods and services. In this way, it makes them free to do so.

To appreciate this answer, it is important to understand the connection between money and property. Someone who owns a piece of land can exclude others from entering it. The notion of trespassing makes no sense without this right. More generally, property rights give people a license to exclude others from using the object owned. In many situations, money can be used to alleviate this constraint. What was off limits, no longer is; not after an appropriate payment. Property rights are often seen as the hallmark of freedom. However, they also function as constraints. And money serves to extinguish them. In this way, money provides freedom.

Now, suppose that money does indeed extinguish constraints on freedom. How does this bear on its ontology? The thing to note is that freedom is a relational property of an agent. An agent *A* is free to perform action *B* because they do not face constraint *C*. Furthermore, if money extinguishes property rights, it creates freedom. It enables an agent to use a good or service by getting another agent to remove a constraint. Hence, money is a relational property too.

THE INNOVATION ARGUMENT Social and technological innovations also put pressure on the classical idea that money is a concrete object. Think of credit money that is not backed up by gold. More recent examples, include electronic money in a bank account or of ledgers that keep track of bitcoin transactions. The zeros and ones on a computer may represent money. But it is difficult to see how they could be money. John Searle has argued that, in such cases, the status of money as a means of exchange is imposed on nothing. It is 'a freestanding status.' In other cases, the status of money is imposed on concrete objects, such as coins or pieces of paper.

But how are we to make sense of such a dual ontology of money? And what does it mean for a status to be freestanding anyway? J.P. Smit, Filip Buekens and Stan du Plessis have argued that, instead of a concrete object, money is an abstract object. Furthermore, that abstract object is incentivized such that it induces people to act in certain ways. To be sure, money is sometimes represented by a concrete object. But that object is not money. In support of this view, they present an analogy with blind chess, which does not involve concrete objects either. The claim is that, if people had perfect memories, they could perform market transactions without concrete objects, in fact without any record-keeping devices at all. This proposal is clearer than that of Searle and it provides for a unitary ontology of money.

However, this proposal sacrifices an important intuition. If I hand you a five-euro bill, I give you money. And you can put that money in your wallet. I cannot give you an abstract object. And you cannot have one in your wallet. To preserve this intuition, it has been argued that money is a concrete object some but not all of the time. The idea is of course that money is a concrete object when we use, for instance, a coin as a means of exchange. But what is it in other cases? Francesco Guala argues that it is an abstract object. So, money is always an object, either abstract or concrete.

This view has difficulty accounting for the temporal, spatial and causal properties that money has. Money comes into existence at a certain moment, its use is typically restricted to a particular region, and it has causal effects. None of this holds for abstract objects. In response, it has been argued that money is a quasi-abstract object, like books, movies and symphonies, which are also created at a particular point in time. However, bills are not plausibly regarded as copies or manifestations of money. Instead, they are the real thing. Hence, it is also problematic to regard money as a quasi-abstract object.

MONEY AS A RELATIONAL PROPERTY To arrive at a plausible ontology of money, it is best to consider the power argument and the technology argument in combination. The claim that money is a property instead of an object does not face any of the problems from which the money-as-abstract-object suffers. Hence, the claim that money is sometimes a concrete object can safely be combined with the claim that in other cases it is a relational property. As a bonus, it also makes sense of why money involves concrete objects, when it does.

I can usefully explain my proposal in terms of the notions of a means of exchange and that of purchasing power, which are near synonyms. If money is a concrete object, it is a means of exchange. Crucially, it can be used for buying goods and services by whoever happens to have it. In other cases, money is purchasing power. It is the power of a particular agent. The thing to note is that, if money is a property, the agent to whom it belongs is represented as having it. The physical or the electronic ledger will name the individual who has the purchasing power.

The upshot is that money has a dual nature after all. But maybe this is not as implausible as it seemed to be at first. After all, money that is not a concrete object is an innovation. It is similar enough to deserve the same name. But it is different enough to have a distinct ontology.

This contribution is based on 'The Social Ontology of Money', which is forthcoming in *The Philosophy of Money and Finance*, Joakim Sandberg and Lisa Warenski (eds.), Oxford: Oxford University Press.

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Financial markets design: some philosophical issues

Market design is a key issue to which the emerging philosophy of finance can make a fruitful contribution (see Ippoliti, E.: 2020. "Mathematics and Finance. Some philosophical remarks", https://doi.org/10.1007/s11245-020-09706-1, *Topoi:* 1-8.). Market design examines the different rules and procedures that characterize diverse financial markets and make them function *well* or *badly*. Of course, good or bad is relative to certain aims or functions of

financial systems. Thus, market design aims to reach an adequate understanding of the functioning and requirements of certain markets to fix them when they are malfunctioning or build them from scratch when they are not there.

That is a typical exercise in *reverse finance*, see Ippoliti (2022): we start with specific goals of financial markets, and then we reverse-engineer a market that can achieve those goals (better) by introducing, altering, or balancing certain characteristics of it.

The choice of the characteristics to be put in place, modified, or balanced is not a value-free or purely technical choice. On the contrary, it has a significant impact on the structure and agents of financial markets, and it is epistemologically and morally laden. Different markets' designs can be set up for different purposes, which derive from certain goal and values. Consequently, there is room for a philosophical investigation of these goals, values, and characteristics.

A very first philosophical issue is how these designs relate to the core functions of financial systems. Some of the core functions are discovering financial prices and providing liquidity.

Recent technological innovations have had an important impact on market design and its ability to serve the core functions of financial systems. In particular, a new phenomenon appeared with the development of high-speed trading algorithms (e.g. HFT): the possibility to place orders and then cancel them in term of milliseconds before their execution.

Let me give you a typical example (see e.g. O'Hara, M.: 2010 "What Is a Quote"? https://doi.org/10.3905/JOT.2010.5.2.010, *The Journal of Trading* 5 (2): 10-16). The stock *s* is trading at Eur 10. I place an order to buy it at Eur 9.99. If the value of *s* goes down to Eur 9.95 someone will take my bid, and I will be forced to buy the stock at Eur 9.99, instead of the better price Eur 9.95. If instead the value of the stock *s* goes up to Eur 10.05, I will not get any stock. But, if *somehow,* I get to *know* that the market is going to move against me (that is, it goes below Eur 9.99), and if I can cancel my order at Eur 9.99 before its execution (provide that orders can be cancelled at any time before execution), I can avoid buying *s* at worse price Eur 9.99. At that point, I can update my price by submitting a new buy order at Eur 9.94 and hopefully get a better price for *s*. And so on.

This is something that can be done only by machines on certain infrastructures, at least at a speed that makes it exploitable and relatively safe. In fact, the longer the order lasts, the higher the chance that it will be executed. This market's dynamics generates the so-called *phantom (ghost) liquidity* (GL) since quotes on financial markets that have a theoretical expiration date of milliseconds can appear and disappear at any time. Let us call them *micro-quotes*. A relevant epistemic question is whether these micro-quotes undermine the core functions of financial systems. In effect, they seem to compromise core functions such as price discovery or liquidity provision: the price does not reflect *actual* demand and supply, as there are no transactions here.

Thus, if we allow micro-quotes, several issues arise. The first one is ontological: what is a quote if it does not reflect real transactions? Moreover, do micro-quotes reduce the *epistemic value* of a quote to (nearly) zero? Do they produce *epistemic uncertainty*? Do they produce *epistemic injustice*?

By epistemic value of a quote, we mean the agent's belief about the *correct* price of an asset (*correct* will mean different things depending on one's theory of prices). If quotes have expiration of milliseconds, they can carry very little epistemic value because the agent' s commitment to the orders submitted is considerably reduced. The result is greater uncertainty as to the informational value of prices, and, therefore, more injustice, since those who have more technological power (i.e., speedier computers or access to the network) can use micro-quotes for their own benefit.

A famous market-based solution to these problems is designing markets with a new feature, *speed bumps*. A speed bump tries to remove an informational advantage held by faster traders by pausing certain orders, to allow at least some of the information asymmetry to dissipate.

Now, different venues set different speed bump lengths since every millisecond counts and certain informational advantages dissipate and other don't. The choice of implementing speed bumps and their time threshold (orders length), is a value-laden choice, which has significant impact on the privileged structure and agents of financial markets.

For example, a venue can favour *liquidity-takers* or *liquidity-makers*. In the first case, the venue prevents to buy an asset at the old price on other exchanges. In the second, the agents who put the asset for sale on the other exchanges receive their own halt period to update their prices and ensure that other agents cannot purchase at the old price.

These two designs express different epistemic and moral visions. The first considers the market makers as 'bad' agents, which manipulate their prices by updating them before the 'good' traders can buy from them at the old price. The second considers the liquidity takers as 'bad' traders, which buy at the old price before the 'good' market makers can update their prices.

It is important to bring out these epistemic and moral values and goals, and to show and argue how different designs promote and attract different players or orders, since this affects the way a market can serve the basic functions of financial markets properly and effectively.

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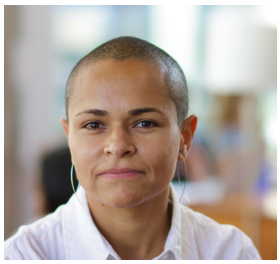
When theory trumps data



According to Chicago economist Eugene Fama, "Finance is the most successful branch of economics in terms of theory and empirical work, the interplay between the two, and the penetration of financial research into other areas of economics and real-world applications" (Fama, E. F.: 2016. "My Life in Finance" in *The Fama Portfolio: Selected Papers of Eugene F. Fama,* J. H. Cochrane & T. J. Moskowitz, Eds., University of Chicago Press, 3). Surely, this is a contentious assessment. Incontrovertible, however, is the importance data has in finance. Data has driven the questions that have shaped the field as we know it today. Theories have been persistently tested against the data and modified accordingly. And yet, there are instances in which theory trumps data; where theory seems to weight more than data when they disagree. Analysis of these instances, why they are there at all are worth of philosophical considera-

tion. First I describe the significance of data and its interaction with theory and then sketch the instances in which theory trumps data.

A FIELD SHAPED BY DATA. Finance is the branch of economics concerned with the allocation of economic resources across time and space in an uncertain environment. To allocate resources distant in time and space, claims on those resources, assets, are traded. An asset is thus a claim on the present value of an uncertain stream of cashflows. The subfield of Asset Pricing is occupied with establishing their intrinsic or fair value—how much worth is the stock of say, Tesla today, given the uncertain stream of (future) cashflows it represents?

A way to establish the intrinsic value of assets was to ask whether their price could be predicted. If past prices help predict future prices, then past prices must convey information about their value. In 1900, French mathematician Louis Bachelier analysed French stock market data to conclude that prices behave like Brownian motion; they are impossible to predict. Similarly, in 1933, Alfred Cowles 3rd evaluated the forecasting efforts of 45 investment managers. His results indicated these professional forecasters—who, nota bene, forecast for a fee—were lousy forecasters. A systematic effort took shape later at the University of Chicago. Various scholars were part of an empirical programme that tackled the question. There, Eugene Fama established that the time-series properties of stock prices follow a random walk—price changes are independent and identically distributed and can't be predicted—if they reflect all available information. This result is at the crux of Fama's Efficient Market Hypothesis (EMH), crucially relating empirical finance to economic theory: it connects this statistical property of stock prices with market equilibrium.

THEORY CONFRONTS THE DATA. Parallel to the empirical programme was the development of a theory of how to invest. Since the stream of cashflows is uncertain, a critical element in establishing the intrinsic value of an asset is the risk it is exposed to. In 1952, Harry Markowitz, against intuition and standard investment practice, demonstrated that it's not the risk of a single asset what matters; it's the risk of a *portfolio of assets* what does. There's a trade-off between risk and return; different correlations between assets' returns allow investors to manage this trade-off by buying diversified portfolios that maximise returns for a desired level of risk.

Building on this rational decision rule, the Capital Asset Pricing Model (CAPM), the first and most fundamental equilibrium model in asset pricing, reached a remarkable conclusion for its simplicity: "market risk", the co-movements of a stock with the market, is the single source of risk investors care about.

Models like the CAPM and the EMH are the two pillars of asset pricing. Or, as Fama calls them, the Siamese twins. The second half of the twentieth century was marked by the testing of both theories. To test the models, market efficiency must be presupposed—otherwise, it is unclear whether there are inefficiencies in the market or the model is faulty. To test the EMH, the models must be assumed to correctly measure risk and price assets accordingly. Another empirical initiative facilitated the tests: the establishment of the Center for Research in Security Prices (CRSP) in 1960, which systematised historical data on stock prices of the NYSE since 1926. The efficiency tests have shown that, while markets tend to be efficient, there are also niches of inefficiencies that are not always easily explained. The tests of the CAPM demonstrated that there are 'anomalies' in the data that the CAPM can't explain (see for details Vergara-Fernández, M. et al.: 2023. "Describing model relations: The case of the capital asset pricing model (CAPM) family in financial economics", https://doi.org/10.1016/j.shpsa.2022.12.002, *Studies in History and Philosophy of Science*, *97*, 91–100). This suggested there are other sources of risk priced by investors, leading to further explorations of how asset prices are determined and, specifically, what the sources of risk are which determine them.

One proposal by Fama and French in 1996 suggested there are three factors. While previous attempts relied on a theoretical framework—mainly the CAPM—this one relied solely on data, spawning a massive literature of equally atheoretical "factor models" whose purpose is to identify risk factors that can explain the differences in average returns across assets. By now, the literature has identified hundreds of factors, which the financial industry uses to guide investment strategies.

WHEN THEORY TRUMPS DATA. Despite the role data has had in shaping the field, there are at least three instances in which theory prevails when theory and data are in disagreement.

1. Risk factors. Factor models are a burgeoning literature, but there is apprehension about them. This literature has been argued "to be out of control" given the number of factors identified. The worry is that they may be the result of statistical trickery rather than risk factors proper. An important reason for the apprehension is their lack of theoretical underpinning.

2. Momentum. Momentum refers to the observation that some stocks that have performed well in the past (up to a year) continue to perform well in the future. This is an 'anomaly' because this opportunity should be quickly arbitraged away by investors. But it persists. It continues to be observed in the data. Nevertheless, financial economists do not acknowledge it as genuine risk factor. The primary reason is that there is not a dominant theory that accounts for it. Some behavioural theories explain it as over- and underreaction to news. Others link it to macroeconomic and idiosyncratic risks. But they can be thought of as ex-post rationalisations rather than explanations that are coherent with and derived from the dominant theories. Lack of a dominant theory trumps statistical significance.

3. The CAPM. The CAPM has prevailed both as a fundamental theory and as a model used for practical decisions despite the many empirical disconfirmations (anomalies) and the general acknowledgement that there are other sources of risk than market risk. Theory trumps data because the empirical disconfirmations of the model aren't enough to discredit it.

Different attitudes from financial economists towards theory and data that are not obviously justifiable seem to be at work. Understanding them may reveal insights about the development of the field and potential idiosyncrasies about how scientific progress in this field is understood.

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Epistemic Dimensions of Risk Management

In his 2009 letter to shareholders of JPMorgan Chase, Jamie Dimon cites regulatory lapses and mistakes as contributing causes of the 2008 financial crisis. But, he goes on to say, "We should not and do not blame regulators for thex failures of individual companies, ever – management is solely to blame. ... The heart of the problem – across all sectors – was bad risk management." Dimon identifies excessive reliance on rating agencies, stretching too much for current earnings, and failing to act quickly enough when markets got bad as among the bad risk management practices of market participants (JPMorgan Chase: "2009 annual report", 25-26). Risk management thus understood encompasses the responsibilities of managers who are engaged in revenue generation as well as those who oversee aggregate risk management functions.

Banking is essentially a business of assuming and managing risk, and the same can be said for much of the financial services industry. It is an ongoing challenge to do risk management well. The risk management failures of the 2008 financial crisis were preceded by the collapse of the Long Term Capital Management hedge fund in 1998, due to an underestimation of risks posed by economic crises. And they were followed by JPMorgan's own 'London Whale' trading in losses in 2012, in which the Bank lost in excess of $6.2 billion due to an ill-conceived trading strategy that was neither appropriately vetted nor monitored.

Risk management is *inter alia* epistemic: Risk management relies on individual and collective cognitive successes such as knowledge, understanding, well-founded judgment, and accurate prediction; and risk managers implicitly take these cognitive successes as among their central aims. Cognitive successes and the means by which they are achieved constitute the epistemic dimensions of risk management.

Failures of risk management are often epistemic failures. The aforementioned excessive reliance on credit rating agencies, underestimation of risks posed by economic crises, and failure to vet a trading strategy are all examples of epistemic failings. Given the epistemic character of risk management, we might do well to consider its challenges from a distinctively epistemic perspective. From such a perspective, effective risk management requires identifying, cultivating, and implementing organizational *good epistemic practices*. Organizational good epistemic practices are practices that realize valued epistemic ends and that are suitable for adoption.

The notion of 'good' or 'best' practices is familiar enough from professions such as law, medicine, and accounting. In the accounting profession, for example, a standard-setting body issues statements of accounting best practices. These are general guidelines that articulate concepts and objectives for financial reporting, together with specific guidelines that have been developed in accordance with the general ones. The guidelines in their totality are subject to ongoing review and revision.

Similarly, a statement of good epistemic practices will articulate guidelines for epistemic conduct for individual and groups. A candidate good epistemic practice will be one that can reasonably be expected to further an epistemic objective, for example, timely updating of a set of beliefs on incoming evidence or accurate prediction. Good epistemic practices encompass adopted policies, procedures, methods, norms, and general ways of doing things. They may include guidelines for inquiry and the transmission of information between members of a group. Like other 'good' or 'best' practices, good epistemic practices are, in principle, subject to further refinement or revision. (I discuss organizational good epistemic practices in some detail in 'Organizational Good Epistemic Practices', *JBE*, forthcoming.)

Good epistemic practices may be general or specific. General epistemic policies and norms serve to guide the development of more specific epistemic practices for specialized areas. In the financial services industry, specific epistemic practices may be adopted for lines of business such as lending, asset management, trading, investment banking, and insurance. These practices may be developed by thinking about how best to achieve line-of-business-specific epistemic goals and by learning from past mistakes.

The good epistemic practices approach to risk management dovetails with recent work on organizational epistemic virtues and vices by, for example, Boudewijn de Bruin (2015: *Ethics and the global financial crisis*, Cambridge University Press), Christopher Baird and Thomas Calvard (2019: Epistemic vices in organizations: Knowledge, truth, and unethical conduct, *JBE* 160, 263–276), Marco Meyer and Chun Wei Choo (2023: Harming by deceit: epistemic malevolence and organizational wrongdoing *JBE*, https://doi.org/10.1007/s10551-023-05370-8).

How might managing for good epistemic practices have helped in the 2008 global financial crisis? An investigation of risk management practices during the subprime mortgage loan crisis that preceded the global financial crisis suggests some answers. In early 2008, a group of senior bank supervisors evaluated the risk management practices of eleven major financial service firms. The bank examiners identified several practices that differentiated performance, at least three of which are of interest from an epistemic perspective. First, institutions that shared quantitative and qualitative information across the organization and engaged in robust dialog about risks in the subprime market fared better than those who left their business units to make these decisions on their own. Second, firms who conducted their own assessments of the credit quality of the underlying mortgages in mortgage-backed securities and CDOs fared better than those who relied solely on the ratings of the credit rating agencies. Finally, the more successful firms utilized adaptive rather than static processes of risk analysis that could make rapid adjustments to underlying assumptions in risk measures in order to reflect current and projected market conditions (2008: *Observations on risk management practices during the recent market turbulence*, SSG).

The general good epistemic practices implicated in the practices that led to more favorable outcomes include (1) sharing information across the organization, (2) subjecting judgments about risk to critical review, (3) refraining from relying on potentially unreliable testimony, and (4) revising assumptions in light of new evidence. (The first practice identified by the Supervisors is an instance of (1) and (2).) These good epistemic practices might have been developed by identifying epistemic goals and thinking about how best to achieve them; they might also have been informed by past epistemic failures.

Adopting a good epistemic practices approach to risk management provides a conceptual framework for identifying and endeavoring to achieve various epistemic aims that are implicit in effective risk management. Endeavoring to identify the epistemic aims of risk management brings these aims more clearly into focus, which in turn, helps us to be guided by them.

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The Climate Emergency: Epistemic Challenges for Sustainable Finance

The global financial crisis inspired an early case study in vice epistemology (B. de Bruin 2015: *Ethics and the Global Financial Crisis: Why Incompetence is Worse than Greed*. Cambridge University Press). About 15 years after the crisis, it is time to consider what leads finance practitioners and policymakers to believe that sustainable finance helps save the planet.

The story starts with the mountain pine beetle, an animal only about the size of a pea, which has had disastrous impact on North America's economy and ecology. Since a first outbreak in the 1990s in Colorado, mountain pine beetles have destroyed about 40 million acres of forests in British Columbia alone, with dire consequences for one of the province's key industries.

Jocelyn Stacey (J. Stacey 2018: *The Constitution of the Environmental Emergency*. Hart Publishing), professor of law in the University of British Columbia, uses the mountain pine beetle to illustrate two important epistemic observations about future environmental emergencies and catastrophes.

> (1) We are unable to predict what exactly future catastrophes will look like.
>
> (2) We are unable to predict what the best ways will be to respond to such future catastrophes.

The mountain pine beetle did what experts had assured it could not at all accomplish. It flew from southern to northern regions, it settled in British Columbia, and it attacked lodgepole pine trees so aggressively and systematically that entire forests had to be given up. What the experts had failed to anticipate was, among others things, that since 1995 winters in British Columbia wouldn't witness temperatures below -35°C – and it is only at such temperatures that the beetles' larvae die (Stacey2018).

It is easy not to foresee things, even if you are an expert. A popular view about the origins of the 2008 financial crisis is that it was caused by Wall Street's notorious "Greed is Good" culture. As several scholars have argued (L. Warenski 2018: "Disentangling the Epistemic Failings of the 2008 Financial Crisis." In D. Coady and J. Chase (eds.), *The Routledge Handbook of Applied Epistemology*. Routledge, 196–210.), however, the more important factor contributing to the collapse of the financial system was epistemic rather than moral. It was an endless array of epistemic vice, ranging from credit rating agencies applying straightforwardly flawed methodologies to rate structured securities (A. Booth and B. de Bruin 2021: "Stakes Sensitivity and Credit Rating: A New Challenge for Regulators." *Journal of Business Ethics* 169.1, 169–179), banks ignoring quite basic theoretical and empirical findings from financial economics (C. Walter and B. de Bruin 2017: "Research Habits in Financial Modelling: The Case of Non-normativity of Market Returns in the 1970s and the 1980s." In E. Ippoliti and P. Chen (eds.), *Methods and Finance: A Unifying View on Finance, Mathematics, and Philosophy*. Springer, 73–93), and more generally a culture in which hierarchical authority is privileged over expertise, where asking questions is seen as a sign of weakness that has to be avoided at all costs, and where often no one cared to listen (B. de Bruin 2020: "Epistemic Corporate Culture: Knowledge, Common Knowledge, and Professional Oaths." *Seattle University Law Review* 43, 807–839.). The Madoff saga might well have ended very differently had the Securities and Exchange Commission decided to listen to the whistleblower presenting two dozen of serious and well-corroborated red flags (B. de Bruin 2014: "Epistemically Virtuous Risk Management: Financial Due Diligence and Uncovering the Madoff Fraud." In C. Luetge and C. Jauernig (eds.), *Risk Management and Business Ethics*. Springer, 27–42).

While the financial crisis offers us an interesting early case study in vice epistemology, it is more than a decade behind us. Today's crisis is the climate emergency. Do sustainable finance practitioners and policy makers appreciate the seriousness of the climate emergency and the epistemic challenges that characterize it? Perhaps not fully.

Sustainable finance is built on the assumption that investing in sustainable projects contributes to climate change mitigation and adaptation, that it helps protecting water and marine resources, that these flows of funding benefit biodiversity and ecosystems, and that they encourage the transition to a circular economy based on energy from renewable sources that are produced and distributed equitably. The Sustainable Finance Action Plan (COM(2018) 97 final) that the European commission published in 2016 – a key policy document for sustainable finance in the European Union – starts from the observation that about Eur 270 billion a year may be needed to make Europe sustainable, and proposes an impressive array of policy measures to raise these funds.

One of the instruments inspired by the Action Plan is the EU Taxonomy Regulation (Regulation (EU) 2020/852), which is meant to classify economic activities as sustainable, and thereby to help investors channel their money to such activities. For an economic activity to qualify, it has to contribute positively to such goals as climate mitigation and the circular economy, it must not harm other sustainability related goals, and must also respect international human and labor rights and standards. Examples include such diverse things as afforestation, bio waste, solar panels, wind turbines, windows, and roofing systems (Commission Delegated Regulation (EU) 2021/2139).

In light of Stacey's remarks about the epistemic features of the climate emergency, we should ask ourselves the following questions, among others: How sure can EU policymakers be that the technologies singled out in these instruments are indeed what is needed to save the planet? How sure can they be that what is missing to save the planet is an awareness among investors of what to invest in? It has great prima facie appeal to think that all will be well once everything is financed and insured (R. Shiller 2013: *Finance and the Good Society*. Princeton University Press), or to think that we help averting disaster by channeling funds to manufacturers of solar panels and wind

turbines. Such views, however, sound decidedly naïve as they downplay the tremendous complexity of climate change and ignore the vastly changing views in the climate science community. And they sound self-serving to the extent that they suggest that we can sit back and relax while our money solves climate change instead of calling upon us radically to change the way we live. Perhaps they even sound epistemically vicious.

Finance is increasingly seen as essential to addressing climate change, and sustainable finance practitioners and policymakers seem sufficiently certain about what problems climate change leads to, and how to solve these problems. Not denying the importance of sustainable investing (B. de Bruin 2022: *The Business of Liberty: Freedom and Information in Ethics, Politics, and Law*. Oxford University Press), it is time, however, that virtue and vice epistemologists examine what these high hopes are based on.

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Central banks and inequality

In the 21st century, central banks have evolved from being institutions that quietly work in the background to ensure price stability to that of an emergency squad whom governments increasingly rely on to promote the general health of the economy.

Increased responsibility comes with increased scrutiny. Questions now arise not just as to how effectively central banks are fulfilling their mandate, but also concerning the unintended consequences the use of their powerful monetary instruments has for other policy objectives, including the distribution of income and wealth in society.

In a nutshell, the array of unconventional monetary policies that central banks have employed in response to the financial crisis and to Covid-19 exacerbates economic inequality. Through massive asset purchases, *aka* quantitative easing, and lending to commercial banks at preferential rates – see for instance the European Central Bank's (ECB) LTRO program –, central banks hoped to stimulate the economy in order to meet their inflation targets. However, a significant part of the liquidity they injected ended up in secondary assets markets, thus increasing the wealth of stockholders, house owners, and other already privileged groups without doing much for the economy.

You might think that the inflationary pressures economies have experienced in 2022 and 2023 mean that these concerns are already outdated, but this would be a mistake. Distributive considerations arise in the "unwinding" of the bloated central banks' balance sheets just as much as when these measures were first taken.

From the horse's mouth One particularly instructive way to analyse the debate on the link between unconventional monetary policy and its repercussions is to look at how central bankers have positioned themselves in this debate, as for instance in Fontan, Claveau & Dietsch (2016: "Central Banking and Inequalities: Taking Off the Blinders" *Politics, Philosophy & Economics* 15/4: 319-57) or Claveau, Fontan, Dietsch & Dion (2022: "Central Banking and Inequalities: Old Tropes and New Practices." In: Kappes S, Rochon LP, Vallet G (eds.) *Central Banking, Monetary Policy and Social Responsibility*. Edward Elgar, pp. 88-111). Here is, in stylised fashion, how their attitude has evolved in the last 15 years.

1) *Denial*: Even after the financial crisis of 2008, some central bankers clung on to the implausible idea that money is a 'mere veil' cast over the real economy and thus is "by essence neutral as regards income distribution" (Cœuré: 2013, "Outright Monetary Transactions, one year on")

2) The events since 2008 have powerfully illustrated that this view is obsolete and that, more plausibly, money is a social technology used to promote social objectives and with direct consequences for the real economy even in the long run. Subsequently, many central bankers have acknowledged this. Mark Carney, for instance, stated that "the distributional consequences of the response to the financial crisis have been significant." (Carney: 2014, "Inclusive Capitalism: Creating a Sense of the Systemic")

3) *Passing the buck*: Realising that the unintended consequences of their actions posed a threat to their legitimacy (e.g. Tucker: 2018, *Unelected power: The quest for legitimacy in central banking and the regulatory state*, Princeton University Press), central bankers changed tack. They acknowledged the effects on inequality, but argued that it was not their job to do anything about those or even incorporate them into their decision making. For instance, an ECB representative stated that "governments have to take care of redistributive effects." (Praet: 2015, interview at *Süddeutsche Zeitung*) This response is both partially inaccurate and unsatisfactory. It is inaccurate in the sense that the mandates of several central banks, including the ECB, already require them to be sensitive to distributive concerns, provided this does not undermine their promotion of price stability. More fundamentally, the fact that inequality does not form a more substantive part of *current* central bank mandates does not imply that it shouldn't.

4) *Why is inequality bad?* Central bankers accept that they need to care about inequality when it risks undermining the policy objectives defined in their mandate. In other words, when inequality undermines price stability – for instance because a lack of demand leads to deflationary pressures – or compromises any other policy objective included in their mandate, it is on their radar. This is better than nothing, but it represents an incomplete understanding of why we care about inequality. Inequality matters not just because it undermines other values, but in its own right.

5) *Attempts at changing the goalposts*: We can distinguish between the *direct* effect that unconventional measures such as quantitative easing have on inequality (by boosting the value of assets largely owned by the wealthy) and their *indirect* effect (through the positive effect on employment). Some studies conducted by central banks suggest that the *inegalitarian* direct effects of quantitative easing have in practice been compensated by their *inequality-reducing* indirect effects (e.g. Lenza and Slacalek: 2018, "How Does Monetary Policy Affect Income and Wealth Inequality? Evidence from Quantitative Easing in the

Euro Area", European Central Bank Working Paper No. 2190). This argument suffers from a baseline problem. While it may be true that unconventional measures compare favourably with doing nothing in terms of their inegalitarian consequences, the relevant question is how they compare to *alternative* policies. This is not a question central banks have prioritised.

6) *Appeal to lack of capacity*: The Governor of the Bank of Canada, Tiff Macklem (2020: "Economic progress report: an uneven recovery"), stated in the context of the Bank's COVID-19 response that "monetary policy is a broad macroeconomic instrument that cannot target specific sectors or workers." Two aspects of this argument need to be disentangled here. First, as an observation of the *capacity* of central banks to support specific sectors, it depends on the instruments employed. The COVID-19 response is an interesting illustration both of the fact that targeted support is possible and of the more general observation that money creation generally benefits some economic agents more than others. Second, central bankers are reluctant to acknowledge this because it potentially undermines their legitimacy as apolitical experts.

Change in policy needed This quick survey illustrates that, thus far, central bankers have not made a convincing case for excluding distributive concerns from their decision-making. They and/or the governments who design their mandates need to change course on this issue (cf. Dietsch, Claveau & Fontan: 2018, *Do Central Banks Serve the People?* Polity Press). Economic inequality already represents too important a scourge of our time. We can ill afford to exacerbate it further through public policy.

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Finance as a case of niche epistemology – and what democratic societies can do about it

Modern societies are differentiated societies, and with the division of jobs comes the division of knowledge. This is a trivial point, but it has massive political implications. For it means that democratic politics has to deal with a plethora of social spheres of which the average citizen, and probably also the average politician, understand very little. And this makes challenging the question of how democratic politics can "control" or "set the rules" for such spheres. But, at the same time, what happens in these fields can impact or harm the wider society – so oversight and regulation are nonetheless crucial.

Finance is one of the areas in which this problem has played an important role in recent years. Some of the challenges are similar to others like how democratic politics can deal with specialized knowledge, for example in areas such as epidemiology or biodiversity loss. But there is an additional dimension in finance: there is an adversarial relation between private companies and public authorities, and a lot of expertise is hosted in the former. From a democratic perspective, more counter-knowledge is needed, and philosophy of finance can contribute to this – or so I will argue.

Specialized knowledge is typically hosted in communities of experts or "epistemic communities" in which individuals often spend years of theoretical and practical training to acquire the relevant expertise. Outsiders understand little to nothing of the jargon that experts use among themselves. To overcome these epistemic barriers and to build trust between epistemic communities and the broader public, it is necessary that both, together, take on three responsibilities: the provision of expertise, the management of "interfaces", and the taking of steps towards ensuring epistemic justice (for a detailed discussion see my forthcoming (2023). *Citizen Knowledge. Markets, experts, and the infrastructure of democracy*, Oxford: OUP, chap. VIII).

The first responsibility involves ensuring that relevant knowledge is generated, especially to make sure that harms to society can be prevented. Of course, in many areas, knowledge that brings potential benefits (e.g., creating innovative products) and knowledge that points to potential harms are narrowly intertwined. For example, take the questions raised by research on "dual use" technologies that have both military and civic applications. This makes it all the more necessary to ensure an unbiased production of such knowledge and an independent review of new evidence. Second, the "interfaces" between specialists and other relevant actors need to be managed, for example by translating specialist knowledge into understandable language, but also by explaining the conditions under which certain results generalize. And third, in all these processes, both within epistemic communities and in their interaction with society at large, epistemic justice needs to be ensured: individuals must not be discriminated against for reasons such as gender, race, or class, for this creates not only moral harms, but also epistemic deficits such as blind spots. A famous example of the latter are the many ways in which medicine has, historically, neglected the perspectives of women and their specific health issues (see e.g. Criado-Perez, C. (2019). *Invisible Women. Exposing Data Bias in a World Designed for Men*, London: Vintage, chap. 10-11).

These responsibilities are challenging, but they are manageable, and many epistemic communities go to great length to meet them, engaging in outreach and dialogue and finding innovative ways of overcoming epistemic injustices. There are also specialized institutions that serve as places of encounter and that help to "translate" different forms of knowledge, such as academies specialized in policy advice.

The problem gets an additional dimension, however, if monetary incentives come into play – and this is undeniably the case in the field of finance. Knowledge about finance is highly specialized. The more complex financial products and the markets in which they are traded have become, the more it takes specialists to understand them. Customers are left with endless pages of small print when they buy financial products; journalists need to make heroic efforts to report about the "inside" of banks or financial markets in accessible ways; politicians and civil society actors who *do* have sufficient expertise struggle to place the topic on the agenda because it seems so obscure. One might say that this is not so different from other areas of expertise, whether vaccination development or climate change mitigation – and one can indeed see similar struggles in these areas. But, in the case of finance, many of those who hold most expertise work for commercial parties, e.g., investment banks

– and they have no incentive for putting their knowledge into the service of the democratic public (see for a case study, Mandis, S.G. (2013) *What Happened to Goldman Sachs. An Insider's Story of Organizational Drift and its Unintended Consequences,* Cambridge, MA: Harvard Business School Publishing.

Of course, there are also public institutions that deal with finance, such as central banks or regulatory authorities, and I certainly do not want to belittle the expertise of the individuals working there. But after the 2008 subprime mortgage crisis there was some soul-searching about how well regulatory authorities, let alone politicians or the broader public, really understood what had happened – not least because for well-educated financial experts, working in the private sector was financially more attractive than working for a public authority (see e.g. Bitner, R. (2008) *Confessions of a Subprime Lender: An Insider's Tale of Greed, Fraud, and Ignorance,* Hoboken, NJ: Wiley).

What about academia as an area in which there is independent expertise? That is often the case, and academic experts played a crucial role in advising politics in, for example, the corona crisis. But until 2008, with regard to expertise in finance another problem prevailed: economics, as a field, had a number of blind spots that concerned precisely those areas of expertise that would have mattered for regulation, e.g., the question of whether "financial deepening" – higher levels of private-sector debt, relative to GDP – would always increase efficiency (see e.g. Turner, A. (2016) *Between Debt and the Devil. Money, Credit, and Fixing Global Finance,* Princeton: Princeton University Press, chap. 1). Of course, after the crisis, more attention has been paid to those areas – and yet, I would argue that the discussion of finance, and the development of expertise that is independent from commercial parties, should not be left to one academic field only. Like all other fields, the vision of economics is limited by the methods it uses and the paradigms from within which it operates.

This leads me, finally, to philosophy of finance as an emerging field. Together with sociology of finance and related approaches, it can provide additional perspectives on finance, especially by explicitly addressing normative issues. To do so, it needs to develop the relevant expertise, but also translate it into a language that is accessible to others and engage in dialogue with them. And it needs to pay attention to whether it itself lives up to the ideal of epistemic justice (for example, it would certainly benefit from including more voices from the Global South). As such, it is an exciting new field that we need not only in order to understand the philosophical aspects of finance, but also to contribute to democratic oversight over the financial sector.

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