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author:

Marcin Krawczyk

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The article argues that financial charts are something more than just useful tools that allow investors to analyze and detect investment opportunities. Namely, they are also expressive visual objects and performative agents. The former means that they are replete with different meanings and references and, as such, they are not only viewed in an informational manner, but also in other more expressive ways. The latter, in turn, means that financial charts are not so much passive representations of financial exchange as active actors that shape it. Moreover, as performative agents, financial charts not only shape this exchange, but also contribute to the constitution of financial markets themselves; to the very functioning and existence of these markets. All this shows that financial charts and, from a more general perspective, that which is visual, play a very important and complex role in capital markets, much more important and complex than is usually indicated.

Marcin Marian Krawczyk - Assistant Professor at the Department of Aesthetics and Philosophy of Culture at UMCS. In his recent research, he focuses on the importance of the aesthetic and visual in the world of finance, and financial markets in particular. He authored articles published in *The Polish Journal of Aesthetics*, *Contemporary Aesthetics*, *Kultura i Wartości* [Culture and Values], *Visual Studies*.

The Financial Chart: A Tool, Expressive Visual Object and Performative Agent

Financial charts are one of the most popular and common investment tools used by investors on capital markets. As such, they serve to analyze and detect potential investment opportunities.

In detail, they allow investors to see trends in the price movements of financial instruments and, consequently, capitalize on them by joining the trend. Moreover, they allow investors to define so-called support or resistance levels and thus identify the right time to take a position in the market. Furthermore, they give investors the possibility of comparing different financial instruments in terms of a certain variable, and to choose the one that is more attractive for investment. To this should also be added that, thanks to financial charts, investors can quickly and easily find out what sentiment prevails on the market and, depending on this knowledge, make a specific investment choice (e.g., buy, sell or hold shares). Thus, financial charts are evidently useful investment tools without which it would certainly be more difficult for investors to analyze the market and detect potential investment opportunities.

Referring to Bruno Latour's theory of graphism, it can be said that financial charts are especially useful tools for investors because of specific features such as readability, scalability, combinability, immutability and mobility.¹ As a readable device financial charts are capable of rendering complex financial data sets into easily apprehended images that exploit the human capacity for perceiving visual patterns (see Figure 1). In turn, as a scalable device, through simple alterations of scale, they can make visible a variety of market phenomena that are otherwise



Figure 1. Readability: a quick look at the graph makes it easy to read what the long-term trend of the stock is. Source: stooq.pl

invisible, because, for example, of their duration (see Figure 2).

Further, as a combinable device, financial charts can reveal novel connections between seemingly unrelated market phenomena and encourage abstraction from details to generalities by facilitating comparisons between different financial data sets (see Figure 3).

Moreover, as an immutable device, they serve to stabilize ephemeral financial events by transforming them into relatively permanent traces on the visual display (see Figure 4). Finally, as a mobile device, financial charts can be taken from one place to another allowing investors to analyze the market from anywhere in the world. It's these specific features of financial charts that make them so useful as devices for investors on capital markets.

However, as is argued here, financial charts are not only useful investment tools for analyzing and detecting potential opportunities in capital markets, but also expressive visual objects and performative agents. The former means that investors see financial charts not only in an informational way, as a set of abstract lines, shapes and figures, which in certain configurations create signals to buy or sell financial instruments, but also in other, more expressive ways, in which abstract lines, shapes and figures turn themselves into specific objects, things, animals or phenomena such as a mountain peak, a speeding car, a lurking animal, or an overflowing river.² The latter, in turn, means that financial charts are not a passive and



Figure 2. Scalability: by changing the size of the chart from medium (right part of the figure) to large (left part of the figure), investors can see more clearly if small candlesticks have light or dark filling, and to what level the prices have gone within the given interval. Source: stooq.pl



Figure 3. Combinability: by combining various functions, this graph allows investors to see which index has achieved the highest return, whether there is a correlation between indexes, which index does not correlate and since when. Source: stooq.pl

neutral record of financial exchange that takes place on capital markets, but rather that they are active actors shaping this exchange. In addition, financial charts not only shape the aforementioned exchange, but also contribute to the constitution of the financial market as an empirical object that can be directly perceived and, consequently, managed.

All these things—the expressiveness of financial charts along with their performativity—show that they, and from a more general perspective that which is visual, are very complex elements of capital markets, much more so than is usually assumed. In addition, they show that financial charts are also a very important element of these markets, again, much more than is usually indicated. They are not only investment tools, but also expressive visual objects and performative agents.

The Financial Chart as an Expressive Visual Object

Nelson Goodman, individuating five symptoms of the aesthetic and among them relative repleteness, contrasts a single-line drawing of a mountain by Hokusai with the same line as a chart of daily stock market averages, emphasizing that whereas in the former every feature of shape, line, thickness, etc., counts, in the latter all

that counts is the height of the line above the base.³ In making such a contrast, he seems to suggest that financial charts are devoid of multiple and complex meanings and references, and that they are seen by investors only in an informational way. Of course, such seeing can differ in the sense that it can take one of the forms of seeing distinguished by James Elkins and Erna



Figure 4. Immutability: this graph stabilizes ephemeral financial events (stock market quotations) by transforming them into relatively permanent traces on visual display. Source: stooq.pl

Fiorentini – staring, peering, glimpsing or glancing⁴ – but this does not change the fact that financial charts are inexpressive objects to be seen only in a one-dimensional way. In other words, it does not challenge the idea that when investors look at financial charts they see nothing more than abstract lines, shapes and patterns that sometimes create buying or selling signals.

I think that such a view—that financial charts are exclusively “notations, and not images in a deeper sense”⁵ and, as a result, are only seen by financial agents in an informational way—is demonstrably untrue. In fact, financial charts are expressive visual objects that are replete with a great range of meanings, and as such they can be seen in different ways and modes, not only in an exclusively informational one. For example, they can also be seen in a naturalistic way, that is, as a naturalistic landscape that depicts the aforementioned mountain, car, animal, or river, or a smiling model.

There are several reasons to think this way about financial charts. Firstly, as is emphasized by James Elkins, “there is no such thing as an image that merely provides information.”⁶ To put it another way, “no image is inexpressive [and] even the simplest diagram can be replete with meaning.”⁷ Extending this thesis, James Elkins adds that “nonart” images, that is, graphs, charts, maps, geometric configurations, plans, technical engineering drawings and so on, are not only expressive objects but fully expressive objects.⁸ This is because they have affective, historically grounded meanings because, according to Elkins, “[w]hat happens in nonart images can be just as full of artistic choices, just as deeply engaged with the visual, and just as resourceful and visually reflective as in any painting, even though its purposes may be entirely different.”⁹ To be more specific, “nonart” images, such as financial charts have affective meanings mainly due to the fact that they are produced according to aesthetic ideals.¹⁰ As a result they are provided

with aesthetic elements or properties that generate different effects in the sense that the presence of these properties enables images concerned with data analysis to signify meaning more freely, that is, to produce more expressively nuanced images.¹¹ In turn, informational images such as financial charts have historical meanings simply because they are products of certain historical theories about images and about the world, as well as of certain historical conventions.¹² With shifts in these theories and conventions, the meanings of images and ways of seeing them themselves change.¹³ Moreover, financial charts have not only affective and historical meanings, but they also have that which James Elkins calls a “pictorial remnant.” Importantly, this pictorial remnant is present not only in elaborated scientific images, but also in the driest informational images such as stock market graphs.¹⁴ Thus, financial charts as examples of “nonart” images are not devoid of expressive and pictorial dimension, and the presence of this dimension allows them to be seen as something more than only a “container of financial information.”

Secondly, financial charts are expressive visual objects that can be seen in different ways, since they can contain combinations of what Nelson Goodman calls “routes of reference.”¹⁵ Such combinations, as emphasized by James Elkins, characterize not only fine art images, but also “informational imagery.”¹⁶ One example provided by James Elkins is a sonar chart which, according to him, is a composite of very different routes of reference. Namely, it is a composite of a notational route (as an x-y graph), a naturalistic route (as a naturalistic landscape), and a symbolic route (as a collection of symbols for the motion of fish).¹⁷ Applying this

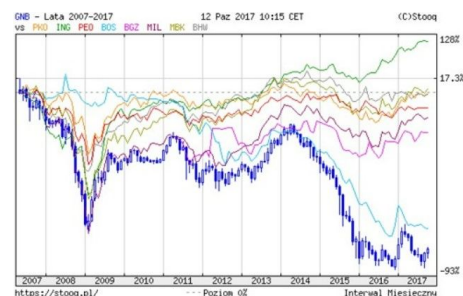


Figure 5. Financial chart as a composite of different reference routes, i.e. notational route (as an x-y graph), symbolic route (as a collection of symbols of price movements of various securities) and naturalistic route (as a fragment of seabed). Source: stooq.pl

to financial charts, it can be said that they can also be composites of very different routes, such as notational, symbolic and naturalistic (see Figure 5). The latter, that is, the naturalistic route, allows them to be seen as figures, such as those mentioned above: a mountain peak, a speeding car, etc. Such a mode of seeing comes from certain inherent features of financial charts as well as from the technologization of capital markets.

For instance, seeing a financial chart as an overflowing river results from the fact that financial charts, as graphs in general do, dramatize their data by linking discrete events in time to produce an impression of temporal continuity.¹⁸ In turn, the mediation of financial exchange on capital markets by information and communication technologies contributes to the vision of a financial chart as an overflowing river, in that it enhances the abovementioned impression and the financial chart starts to appear as something that is in constant motion.¹⁹

Additionally, by recording all transactions that take place on a given market, as well as the slightest change in the prices of financial instruments, information and communication technologies, such as the stock ticker, make the motion of a financial chart line more intensive, generating the impression of something dynamic; something that looks like an overflowing river. Thus, it can be said that it is this dramatization through the financial chart and the technologization of financial markets that allows investors to set in motion such pictorial meanings, that is, to see in them abstract lines, shapes and figures, mountain peaks, overflowing rivers, and so on.

Thirdly, it is investors' language that turns abstract chart lines into mountain peaks, speeding cars, lurking animals, overflowing rivers and smiling models.²⁰ To put it differently, it is investors' language that defuses the abstractness of financial charts, making them replete with different meanings and causing investors see in them the mountain peak, the speeding car

and so on. This effect of the investors' language results first and foremost from the fact that it is full of various metaphors.²¹ Importantly, these metaphors are something more than just poetic expressions that perform an ornamental and eloquent function. Namely, they also put something before the eyes of their audience or make their hearers see things,²² that is, they perform a picturing function through the work of resemblance.²³ What is more, this picturing function is so important because the metaphors put images before financial agents' eyes, which allows them to see that which is immaterial and abstract (the capital market) as something concrete material, and clearly delineated (e.g. as a speeding car).²⁴ Thus, it can be said that it is the omnipresence of metaphors in investors' language that makes it possible to see in financial charts not only abstract lines, shapes or figures, but also certain concrete entities such as rivers, animals, cars or models.²⁵

The Financial Chart as a Performative Agent

The idea that financial charts are something more than just useful tools does not exhaust itself in the argument that they are expressive visual objects. To this should also be added that financial charts are performative agents as well. I borrow the expression "performative" or "performativity" from the theory of economic and financial performativity.²⁶ Within this theory, the performativity of economics or finance is generally understood as the idea that economic reality or the world of finance is not something that is observed, described and reflected by economic and financial theories and models, but rather something that is created, shaped, brought to life, enacted, established, in short, performed, by these theories and models.²⁷ Donald MacKenzie, specifying the above idea, distinguishes the following versions of performativity: generic performativity, effective performativity, Barnesian performativity and counterperformativity.²⁸

Generic performativity refers to the situation when an aspect of economics (a theory, model, concept, procedure, data set, etc.)²⁹ is used by participants in economic processes, regulators, etc. Effective performativity takes place when the practical use of an aspect of economics has an effect on economic processes.³⁰ Barnesian performativity means that the practical use of an aspect of economics makes economic processes more like their depiction by economics.³¹ In turn, counterperformativity means that the practical use of an aspect of economics makes economic processes less like their depiction by economics.³² In this article I follow these various meanings of performativity as well as other meanings of the term.³³

Thus, starting from the general understanding of performativity, it can be said that financial charts are not neutral and passive records of financial exchange that takes place on capital markets, but rather active actors that shape it. Namely, they shape it through their impact on investment decisions and choices of investors, especially those called “technical analysts.” Technical analysts, one of the main groups of economic actors on capital markets, are investors that are generally not interested in macroeconomic data, financial reports and the activity of the company.³⁴ All that they require is a price history in the form of a graph. Thus, it is first and foremost the financial chart that shapes their investment decisions and choices, causing them to buy, sell or hold financial instruments (see Figure 6).

However, financial charts not only manifest their performative power by being the main investment tool for many investors (technical analysts),³⁵ but also in a more discrete way. Namely,



Figure 6. Example of a simple financial chart used by technical analysts. It shows resistance lines (green line, dashed blue line and blue line), trendline (falling red line) and moving averages (dashed blue curve and dashed red curve). At the top of the figure there are curves representing MACD indicator (of strength, direction, momentum, and duration of a trend in stock's price) and RSI indicator (it measures the speed and magnitude of recent price changes). Source: stooq.pl

they do so by means of a graphic line connecting the previous prices of financial instruments with current ones, giving rise to the feeling that there is continuity between them, that there is a link between the stock prices on one day and those on the next day. As a result, investors start to use the current prices of stocks as indicators for their predictions of the future and, consequently, place too much importance on them, revealing what is called “end-anchoring bias.”³⁶ Importantly, this bias has an impact not only on the behavior of investors, but also on their financial performance, meaning negative consequences for their investment portfolio.³⁷

In the context of this kind of performative power of financial charts, a very interesting question arises. Bearing in mind that these charts are the main tool for a large group of investors (technical analysts) and, as such, they induce a certain type of bias in the perception, thinking and behavior of financial agents, one may ask to what extent is that which is happening on capital markets—including increases, decreases and pricing of financial instruments—the result of the influence of economic factors, and to what extent is it the operation of the financial charts themselves. In other words, it may be asked whether what is happening to these markets is a derivative of economic processes, the impact of which is reflected in the financial chart, or is it primarily the financial chart, or broadly, that which is visual, that shapes what it has supposed to reflect.

Without providing an unequivocal answer to this question,³⁸ I would like to emphasize that in the practice of investing on financial markets, one can encounter situations in which only



Figure 7. Financial graph that has the support line (in blue at the level of 400) and other such lines determined by Fibonacci retracements (in red, black, red and blue) at which decreases can stop after breaking the blue support line.

Source: stooq.pl

breaking a certain line on the chart by quotations causes ups or downs that then stop at one of the price levels determined by Fibonacci retracements (see Figure 7).³⁹ Thus, even if everything that happens in the stock market is not just the effect of the financial chart, there are nonetheless instances when it is so; when it is the financial chart that shapes the economic facts of buying, selling, or holding stocks.⁴⁰

But the abovementioned work of financial charts is only one side of their performativity, because the performative power of the discussed charts goes far beyond just shaping financial exchange on capital markets; beyond just creating financial facts in the form of buying, selling or holding stocks. It also affects the very functioning and existence of these markets. In other words, financial charts contribute to the constitution of financial markets—to the possibility of their functioning and existence—and they do this in at least three ways. Firstly, contemporary capital markets are something formless and intangible “made up of trillions of pieces of information about trading transactions the world over.”⁴¹ Thus, to become a concrete worldly thing that can be perceived at all, they require a process of “representational mapping.”⁴² Financial charts contribute to this process, reducing the trillions of pieces of information to several abstract lines, shapes and figures. In short, and following John Law and John Whittaker’s analysis of the function of charts and graphs in representing scientific data in the popular press,⁴³ financial charts take complex and often thorny information and homogenize it, thus making it presentable.⁴⁴ Such work is so important that thanks to it, that which was invisible gains “material form.”⁴⁵ In other words, it becomes sensible, analyzable, measurable, examinable, manipulable and intelligible.⁴⁶

Thus it can be said that financial charts that make financial markets visible, at the same time make them manipulable, manageable and workable.

Secondly, contemporary financial exchange on capital markets

brings together a huge number of unrelated subjects that are dispersed across different places. How is it possible—one may ask—that these unrelated actors, distributed over a large territory, embedded in different contexts, and with different upbringings, engage in similar activities whose outcomes are so uncertain? Furthermore, how can this engagement arise and be maintained over time?⁴⁷ In answer to this question, Alex Preda points to integrative practices that make and maintain the aforementioned engagement. According to Preda, these integrative practices consist of a specific combination of mutually reinforcing representation modes, legitimating discourses, and cognitive instruments.⁴⁸ Among the latter are financial charts. Their integrative role consists in making financial securities and the market itself independent of the people who exchange them and independent of the place where this exchange takes place. They do this by the transformation of the market and its components into abstract lines, figures, shapes and numbers on the financial chart. Thanks to this transformation the market can move between different places and contexts and, importantly, under the same unchanged form, ceasing to be limited to a single marketplace. As such, financial charts are an example of what Bruno Latour calls “immutable mobiles,”⁴⁹ that is, “cognitive instruments for transporting complex social entities across various contexts.”⁵⁰ Thus, financial charts contribute performatively to the very functioning and existence of capital markets in ways that make investment possible as a widespread activity and, as a result, also make possible the existence of the market as an integrated homogeneous network, one not limited to a single marketplace, but extending itself across heterogeneous events.⁵¹

Thirdly, financial charts not only make the market the concrete worldly thing it is, that can be perceived and, consequently, subjected to an action, but by doing so they also allow the market to be seen as a single entity with its own dynamics and history;⁵²

as a coherent sphere that has its own laws and regularities and its own inner life cycle.⁵³ Such an image carries with it two important consequences—it “gives back to observers a reassuring perception of the rationality and the wholeness of the economic order they are confronting.”⁵⁴ As a result, investors start to believe that the market can be captured, understood and predicted (seeing that it is rational and ordered by its own laws and regularities). This, in turn, is not without impact on the propensity of financial agents to participate in the financial exchange on capital markets. Put differently, it is difficult to imagine that people would be so willing to participate in capital markets without the impression that the market is understandable and predictable; the impression which is induced by the aforementioned image of the financial market.⁵⁵ Moreover, the image of the capital market as a coherent sphere with its own laws, regularities and inner life cycle, generated by financial charts, not only has psychological consequences in the form of perceiving the market as understandable and predictable (which in turn can affect investors’ propensity to engage in financial exchange), but also has social and political consequences. In particular, such a perception gives the impression that capital markets and investment in financial securities are quite different from casinos and gambling – whereas the latter is governed only by chance, it is suggested the former is guided by inherent laws and regularities. This is an important difference which, when established, morally and socially legitimizes financial investing and markets.⁵⁶ As such, financial charts contribute to the moral legitimization of capital markets through helping to differentiate between gambling and financial market practices, and by imputing the image of the market as a coherent sphere with its own laws and dynamics.⁵⁷

Conclusion

Financial charts are one of the most widely used investment tools on capital markets. However, they are not only useful tools that, due to characteristics such as readability, scalability, combinability, immutability and mobility, have accompanied speculative financial practices since the mid-1830s,⁵⁸ but also expressive visual objects and performative agents. As expressive visual objects they are seen not only in one, informational way, that is, as a source of financial information and instruction, but also in other more complex ways, or to paraphrase Nelson Goodman, through different routes of reference. To put it another way, they are seen not only as a notation, but also as an image in a deeper sense. This means that investors not only see buying or selling signals in the abstract shapes, lines and figures of a financial chart, but also such things as mountain peaks, speeding cars, lurking animals, or overflowing rivers. In turn, as performative agents, financial charts are not just a “dead instrument”⁵⁹ that passively records financial exchanges taking place on capital markets, but rather living beings with desires of their own, forms of life that “speak to us and look back to us.”⁶⁰

Such a view of financial charts runs counter to what Rob Aitken calls the growing abstraction of finance and financial markets, through which they have been separated from the social, cultural and political context in general and gambling and games of chance in particular, and through which they have gained their moral and social legitimacy.⁶¹ It does so because it shows that one of the most popular and common investment tools used by investors, i.e. financial graphs, are not only abstract, dry notations, but also expressive visual objects that have affective, cultural and historical dimensions. Moreover, it does so by showing that financial charts, transforming the market and its components into abstract lines, figures, shapes and numbers in a visual display, contribute performatively to the

very process of financial abstraction, and consequently to the separation of finance from gambling and to its moral legitimization. Without financial charts, or from a broader perspective, that which is visual, this kind of separation and legitimacy would certainly be more difficult.⁶²

- 1 Bruno Latour, "Drawing Things Together," in *Representation in Scientific Practice*, ed. Michael Lynch and Steve Woolgar, (Cambridge: The MIT Press, 1990), 19-68.
- 2 See Galit Ailon, "Rethinking Calculation: The Popularization of Financial Trading Outside the Global Centres of Finance," *Economy and Society* 44, No. 4 (2015), 604-605.
- 3 Nelson Goodman, *Ways of Worldmaking* (Indianapolis: Hackett, 1978), 68, see also *Idem, Languages of Art: An Approach to a Theory of Symbols* (Indianapolis: The Bobbs-Merrill Company, Inc., 1968), 229-230.
- 4 James Elkins and Erna Fiorentini, *Visual Worlds: Looking, Images, Visual Disciplines* (New York and Oxford: Oxford University Press, 2020), 59-72.
- 5 James Elkins, "Art History and Images That Are Not Art," *The Art Bulletin* 77, No. 4 (1995), 557.
- 6 *Ibid.*, 560.
- 7 *Ibid.*, 555.
- 8 *Ibid.*, 561.
- 9 *Ibid.*, 559.
- 10 Two main aesthetics ideals that are said to be virtually universal in the production of numerical pictures are clarity and parsimony. See Wendy N. Espeland and Mitchell L. Stevens, "A Sociology of Quantification," *European Journal of Sociology* 49, No. 3 (2008), 423.
- 11 Tom Corby, "Landscapes of Feeling, Arenas of Action: Information Visualization as Art Practice," *Leonardo* 41, No. 5 (2008), 362.

- 12 This means that we can speak of "Renaissance," "Romantic," "modern," and even "postmodern" financial charts in the same way as it is sensible to talk about, for example, "Renaissance," "Romantic," "modern," and "postmodern" crystallographic drawings. See Elkins, "Art History and Images That Are Not Art," 560.
- 13 For a concrete example of changes in the meanings of "nonart" images and ways of seeing them see *Ibid.*, 565.
- 14 *Ibid.*, 559.
- 15 Nelson Goodman, "Routes of Reference," *Critical Inquiry* 8, No. 1 (1981), 121-132.
- 16 Elkins, "Art History and Images That Are Not Art," 563-564.
- 17 *Ibid.*, 564.
- 18 *Ibid.*, 559, see also Françoise Bastide, "The Iconography of Scientific Texts: Principles of Analysis," in *Representation in Scientific Practice*, ed. Michael Lynch and Steve Woolgar, (Cambridge: The MIT Press, 1990), 214-215.
- 19 According to Alex Preda, visual representations of capital markets, including financial charts, can be divided generally into two groups. Namely, they can be divided into representations showing working action visualized as a continuous flow of data and those that show performed action visualized as closed visual arrangements. See Alex Preda, *Framing Finance: The Boundaries of Markets and Modern Capitalism* (Chicago, London: The University of Chicago Press, 2009), 119. Here I refer first and foremost to the former.
- 20 Ailon, "Rethinking Calculation," 604-605.
- 21 Caitlin Zaloom, in a book summarizing her ethnographic research on financial markets, states that stock markets are saturated with metaphorical language of violence, see Caitlin Zaloom, *Out of the Pits: Traders and Technology from Chicago to London* (Chicago, London: The University of Chicago Press, 2006), 111. Although her statement refers to the past form in which capital markets operated, in my opinion it is also valid for electronic financial markets. Observing modern Internet forums which gather stock market investors, we can still come across such terms as: "to escape from under the axe" (close a position with a small loss, a position where the loss was already a dozen or more percent), "not to catch falling knives" (not to buy shares of companies whose price is falling rapidly and which are at risk of bankruptcy) or more bluntly "get screwed" (e.g. closing the position by an automatic stop loss order, after which the share price stops falling and begins to grow dynamically). However, the metaphors used by investors are

- not only related to violence. Jean-Pierre Hassoun who treats metaphors used by financial agents as expressions of market emotions, lists the following categories of metaphors: metaphors related to performance, competition, extremes, violence, combat, fear, power, gaming, pleasure, sexual activities and eating (see Jean-Pierre Hassoun, "Emotions on the Trading Floor: Social and Symbolic Expressions," in *The Sociology of Financial Markets*, ed. Karin Knorr Cetina and Alex Preda (Oxford: Oxford University Press, 2005), 112-113.
- 22 Richard Moran, "Seeing and Believing: Metaphor, Image, and Force," *Critical Inquiry* 16, No. 1 (1989), 89.
- 23 Paul Ricoeur, "The Metaphorical Process as Cognition, Imagination, and Feeling," *Critical Inquiry* 5, No. 1 (1978), 143-145.
- 24 In this respect metaphors present in investors' language play the same role as the so called "ontological" and "structural" metaphors that, according to George Lakoff and Mark Johnson, allow us to see complex and abstract phenomena such as events, activities, emotions, ideas, etc., as entities and substances, as something that is clearly delineated. George Lakoff and Mark Johnson, *Metaphors We Live By* (London: The University of Chicago Press, 2003), 23, 59.
- 25 This work of metaphors confirms clearly that the verbal and the visual are not separated from each other, but mutually intertwined, that the visual and the verbal always invade and inform each other. Mieke Bal, *Reading "Rembrandt": Beyond the Word-Image Opposition* (Cambridge: Cambridge University Press, 1991), 19.
- 26 See, for example, Donald MacKenzie, *An Engine, Not a Camera: How Financial Models Shape Markets* (Cambridge, Massachusetts London, England: The MIT Press, 2006), Donald MacKenzie, Fabian Muniesa, and Lucia Siu, *Do Economists Make Markets? On the Performativity of Economics* (Princeton and Oxford: Princeton University Press, 2007), Michel Callon, "Performativity, Misfires, and Politics," *Journal of Cultural Economy* 3, No. 2 (2010), 163-169. For criticism, see Nicolas Brisset, *Economics and Performativity: Exploring Limits, Theories, and Cases* (London: Routledge, 2018).
- 27 Michel Callon, "Introduction: The Embeddedness of Economic Markets in Economics," in *The Law of Markets*, ed. Michel Callon (Oxford: Blackwell, 1998), 2.
- 28 MacKenzie, "An Engine Not a Camera," 17.
- 29 Ibid.
- 30 Ibid.

- 31 Ibid.
- 32 Ibid.
- 33 I mean here first and foremost the distinction between strong and weak performativity (see Brett Christophers, "From Marx to Market and Back Again: Performing the Economy," *Geoforum* 57 (2014), 18), between Austinian and Barnesian performativity (see Łukasz Afeltowicz, "Performatywność: w jaki sposób ekonomia współtworzy przedmiot swoich badań," *Studia Metodologiczne* 36 (2016), 201), and between performativity as illocution and performativity as perlocution (see Judith Butler, "Performative Agency," *Journal of Cultural Economy* 3, No. 2 (2010), 151-153).
- 34 Philip Roscoe and Carole Howorth, "Identification Through Technical Analysis: A Study of Charting and UK Non-Professional Investors," *Accounting, Organizations and Society* 34, No. 2 (2009), 206.
- 35 That is, through generic performativity (see MacKenzie, "An Engine Not a Camera," 17).
- 36 Rod Duclos, "The Psychology of Investment Behavior: (De)biasing Financial Decision-Making One Graph at a Time," *Journal of Consumer Psychology* 25, No. 2 (2015), 317-325.
- 37 Ibid.
- 38 Such a question has its roots in the view that financial markets have become so hyperreal that they no longer have any relationship with the sphere of the "real" economy, meaning that investors decisions are based not so much on the "external" world of the "real" economy as on the "internal" reality of financial markets, an inseparable part of which are financial charts. For the transformation of financial markets into hyperreality and its reasons see, for example, Elton McGoun, "Hyperreal Finance," *Critical Perspectives on Accounting* 8 No 1-2 (1997), 97-122, Norman B. Macintosh, "From Reality to Hyperreality: Paradigm Poker," *International Review of Financial Analysis* 12 No. 4 (2003), 453-465, Christophe Schinckus, "The Financial Simulacrum: The Consequences of the Symbolization and Computerization of the Financial Market," *The Journal of Socio-Economics* 37 No 3 (2008), 1076-1089.
- 39 Here I rely on my own experience as an individual investor with many years of participation in the financial exchange on capital markets.
- 40 These instances would be examples of performativity in the strong sense in which something is performative when it functions as a sovereign power (see Christophers, "From Marx to Market and Back Again," 18). Moreover, they would be instances of

- Barnesian performativity (see MacKenzie, "An Engine Not a Camera," 17-19) since the graph creates exactly what it describes (ups and downs and their range).
- 41 Michael Emmison, Philip Smith, and Margery Mayall, *Researching the Visual* (Los Angeles, London, New Delhi, Singapore, Washington: Sage Publications, 2012), 241.
 - 42 Susan Buck-Morss, "Envisioning Capital: Political Economy on Display," *Critical Inquiry* 21, No. 2 (1995), 440. Importantly, the constitution of financial markets, or more generally the economy, through representation is not limited to the visual. Other forms of cultural mediation (discourses, narratives) also take part in the constitution through representation. See Paul Crosthwaite, Peter Knight, and Nicky Marsh, "The Economic Humanities and the History of Financial Advice," *American Literary History* 31, No. 4 (2019), 1, and Torsten Andreasen, "From Socially Engaged Art to the Abolition of Wage Labor," *View. Theories and Practices of Visual Culture* 30 (2021), 3-4.
 - 43 See John Law and John Whittaker, "On the Art of Representation: Notes on the Politics of Visualisation," *The Sociological Review* 35, No. 1 (1987), 160-183.
 - 44 Following Michael Lynch, it is worth noting that this process consists not only of reduction, but also of adding visual features that clarify, complete and extend the things presented. See Michael Lynch, "The Externalized Retina: Selection and Mathematization in the Visual Documentation of Objects in the Life Sciences," *Human Studies* 11, No. 2/3 (1988), 229.
 - 45 Michael Lynch, "Discipline and the Material Form of Images: An Analysis of Scientific Visibility," *Social Studies of Science* 15, No. 1 (1985), 43.
 - 46 Ibid.
 - 47 See Alex Preda, "The Rise of the Popular Investor: Financial Knowledge and Investing in England and France, 1840-1880," *Sociological Quarterly* 42, No. 2 (2001), 206.
 - 48 Ibid.
 - 49 Latour, "Drawing Things Together," 26.
 - 50 Preda, "The Rise of the Popular Investor," 221, 227-228.
 - 51 See Ibid., 206-207, 221, 227-228, also Marcin M. Krawczyk, "The Aesthetic and Financial Markets. Beyond Mere Representing and Supporting," *Contemporary Aesthetics* 17 (2019), par. 3.
 - 52 Preda, "The Rise of the Popular Investor," 226-228.

- 53 Marieke de Goede, *Virtue, Fortune, and Faith: A Genealogy of Finance* (Minneapolis and London: University of Minnesota Press, 2005), 89, 101, 119-120.
- 54 Detlev Zwick, "Where the Action Is: Internet Stock Trading as Edgework," *Journal of Computer-Mediated Communication* 11, No. 1 (2005), 28.
- 55 Thus, it can be said that financial charts are a good example of what Michael Lynch calls a "rhetorical mathematics." See Michael Lynch, "Pictures of Nothing? Visual Construals in Social Theory," *Sociological Theory* 9, No. 1 (1991), 1, 12-13.
- 56 As shown by Marieke de Goede, the process of the moral legitimization of finance, which financial markets are a part of, was accomplished by creating a contrast between gambling and finance. In other words, it was only through the separation from gambling that finance could emerge as a morally responsible sphere of thought and action. See de Goede, *Virtue, Fortune, and Faith*, 50.
- 57 Last three examples of performative work of financial charts are rather instances of what Judith Butler and Ekaterina Svetlova call "perlocutionary acts," i.e., acts that do not so much produce realities on the basis of a certain sovereign power (see Butler, "Performative Agency," 151), as rather contribute to their construction, and they do so by manipulating and coordinating the beliefs and expectations of economic agents. See Ekaterina Svetlova, "Performativity and Emergence of Institution," in *Enacting Dismal Science: New Perspectives on the Performativity of Economics*, ed. Ivan Boldyrev, Ekaterina Svetlova (New York: Palgrave Macmillan, 2016), 191-192.
- 58 See Preda, "The Rise of the Popular Investor," 225.
- 59 Michael Pryke, "Money's Eyes: The Visual Preparation of Financial Markets," *Economy and Society* 39, No. 4 (2010), 452.
- 60 W. J. T. Mitchell, *What Do Pictures Want?: The Lives and Loves of Images* (Chicago and London: The University of Chicago Press, 2005), 30.
- 61 See Rob Aitken, "Performing the Limits of Finance," *Journal for Cultural Research* 18, No. 1 (2014), 82-83.
- 62 I would like to thank the anonymous reviewers of my article for their invaluable suggestions, and the editors of *View. Theories and Practices of Visual Culture* for their tremendous support.

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