

THE INHERENT MANIPULABILITY OF MARKETS

by

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Abstract

The response of officials to recent financial “scandals” has been to call for tighter regulation and stricter enforcement to rebuild confidence in markets. They believe that markets are machines for transforming information into prices and the better they are at tuning the machines, the more perfect the prices. Information, however, is whatever we want it to be. Publicity drives financial markets, and anyone can parley random trading success into an image of trading prowess that can yield sustained trading success. Markets are inherently manipulable. We permit and even encourage manipulation while deluding ourselves that we can get rid of it.

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I. Introduction

Financial markets have been much in the news during the past few years. Prices rose spectacularly as a “speculative bubble” formed, fell precipitously when the bubble burst, and drifted still lower in response to a string of “accounting scandals” and “insider manipulations”. The response of government officials has been to call for tighter regulations and stricter enforcement to rebuild confidence in financial markets and restore price stability. This has been a common pattern in the United States over the past 140 years or so. Repeatedly in American financial markets since the time of the American Civil War, speculative bubbles have formed and burst, accounting scandals and insider manipulations have been revealed, and government officials have called for tougher oversight of financial markets.¹

The question is why this is a repetitive pattern. How is it that after 140 years no one has figured out how to prevent speculative bubbles, accounting scandals, and insider manipulations? The answer that comes most quickly to hand, to paraphrase the bank robber Willie Sutton, is that financial markets are where the money is, so this is where white-collar criminals will go to get it, regardless of regulations. There will always be a few bad apples whose greed will get the best of them, and only more rigorous security measures and more severe penalties can possibly deter them.²

But these financial bubbles, scandals, and manipulations that have made the news have not all been obvious consequences of criminal activity. Some of what has

¹ According to DeRosa (2001):

A cynical but not wholly inaccurate description of the process by which new market regulation comes into existence runs as follows. First there is a notable financial catastrophe. . . . Next there is a call for market reforms and new regulations. . . . In time, the government’s new role becomes cemented into the fabric of the marketplace. . . . The process always includes a concerted search for the guilty parties, because it is presumed that venal, self-interested persons must have been the cause of the calamity and possibly even profited from it. (DeRosa, 2001, page 14)

² A recent Wall Street Journal article “Dark Side of the Street: Why Scandals Continue to Erupt.” (Paltrow, 2002) appears to challenge this conventional answer. The article suggests that the real answer is a growing flock of naïve investors who can be fleeced without ever knowing it has happened to them by market professionals who are unlikely to be caught and unlikely to be severely punished if they are. The article nonetheless concludes that the

been happened has not been clearly illegal and some apparently not illegal at all. There are many gray areas. This suggests that a solution also requires better regulation to shrink that gray and more sharply distinguish the black from the white. Ideally over time, we'll perfect the structures, all of the loopholes in the laws will be closed, and violent price movements will be eliminated. Institutional changes and technological innovations may create new loopholes at the same time the old ones are being closed and create new instabilities at the same time the old ones are being smoothed out, but it is at least theoretically possible to get it right eventually.³ With the right laws, the right enforcement mechanisms, and the right management tools, markets will work the way they are supposed to work.

What if markets can never work the way they are supposed to work, though? What if the pattern of speculative bubbles, accounting scandals, and insider manipulations is inherent in markets? It may be possible to minimize them through laws, enforcement mechanisms, and oversight tools, but what if it is in the nature of markets that there is a not insignificant residue of problems that can never be eliminated? What if someone will always be in a position to exploit someone else in a legal way, and the regulation, enforcement, and oversight actually serves to mask this? In effect, what if there is something inherent in financial markets that has the same consequences as fraud that not only cannot be defined as fraud but also cannot even be seen as fraud? And what if academic research, instead of exposing this situation, is an essential element in the cover-up?

One definition of markets is that they are places where assets are exchanged, interpreting the words "places" and "assets" very broadly to include such "places" as the NASDAQ, the electronic network for the exchange of stock that really does not exist in any one physical location, and such "assets" as corporate control, the right to govern a corporation that does not exist apart from share ownership but is not tied to it in any precise way. Regardless of how far the definition is stretched, however, defining a market as a place sets it within a boundary across which pass the assets brought to it

solution is more enforcement and greater punishment. This slightly different answer still presumes deliberate fraud, albeit subtle. For a more comprehensive, academic expression of this point of view, see Lejeune (1984)

³ It may nonetheless be impossible to get it right in practice.

and taken from it. The dominant metaphors for markets, as discussed in section II, are that markets are machines or persons. Like places, machines and persons have interiors and exteriors, and some things are internal to them and some things are external to them. Both machines and persons can be identified as separate from the environment in which they exist, but interacting with it, affecting it and being affected by it.

This reification of markets, by definition (as a place) or by metaphor (as a machine or person), has the very useful property that we imagine markets to exist independently of ourselves. We can manage them and/or we can control them, but we can also leave them alone and even disclaim responsibility for them. They are as subject to management and/or control and especially to the influences of the environment as we ourselves are. Section III considers two core concepts in finance, “information” and “risk”. What links the two is that “risk” happens when markets respond to the random receipt of “information” from the environment. Although we can manage and/or control markets, we cannot manage and/or control the arrival of information. So we must accept risk.

The metaphor provides an ideal theoretical foundation for the efficient operation of markets as our mechanical servants for the transformation of information into prices. And anything that interferes with this function is “manipulation.” In section IV we review the two bodies of academic literature that concern manipulation. In their attempts to define and to classify manipulation and to specify the conditions under which it can occur, both the legal studies literature and the theoretical finance literature reveal the cracks in the foundation. Section V concludes the paper with the argument that information is whatever we want it to be. We could say that market participants are free to manipulate the market at will by creating what passes for information. Just calling it “manipulation,” however, implies that we can clearly identify it, even if we can not get rid of it. The more subtle forms of inherent manipulation will continue to occur because we choose not to see them, pretending that they are not possible, or choose not even to call them “manipulation.”

To judge from this type of historical experience, manipulation seems no more capable of total eradication than its first cousin, “fraud.” (Loss and Seligman, 1995, p. 945)

II. The Dominant Market Metaphors

In their well-known book *Metaphors We Live By* (Lakoff and Johnson, 1980), the authors George Lakoff and Mark Johnson propose that the conceptual system by which we think and act is fundamentally metaphorical and that language reveals these metaphors we literally live by. One of their examples of this is the metaphor that TIME IS MONEY. TIME IS MONEY is a metaphor that finance not only lives by, but by which finance lives. Without a money value of time (or time value of money, as it is more usually expressed), there would be no finance, or at least it would be much, much different. This metaphor has become so much a part of most contemporary societies that we cannot imagine life without it. Although we may find it not only advantageous but also essential to think and act as if TIME IS MONEY, there are countless societies throughout history that have not. It is a metaphor and not a law.

Consider the assorted controversies in finance concerning the “efficiency” of markets, which term is a reflection of the metaphor MARKETS ARE MACHINES. This metaphor has become so much a part of the community of finance professors and practitioners that we are quickly forgetting what life was like without it. Not so long ago, we were concerned with whether or not markets were “random walks”, a term which is an expression of the metaphor MARKETS ARE PERSONS. Although “efficiency” and “random walk” are mathematically equivalent, the underlying metaphors are not, and they cause us to think and act differently towards markets.

Before discussing this metaphor MARKETS ARE MACHINES in greater detail, however, it is necessary to look closely at the term “random walk” and its obvious personification of markets and prices.⁴ It first appeared in finance rather unobtrusively in Osborne’s (1964) article.

⁴ According to the *Oxford English Dictionary* (1989), this term first appeared in the journal *Nature* (Pearson, 1905) in a note by the statistician Karl Pearson soliciting solutions to the “Problem of the Random Walk” Pearson wanted to compute the probability that a randomly wandering person will be a given distance from his starting point after walking a given number of straight stretches of a given distance, when each stretch takes off in a random direction from the ending point of the previous stretch. The mathematics of the solution to this problem were later applied to prices.

We also ascribe an arbitrary starting point for each *random walk* $Y(\tau)$, which, to preserve the analogy with our previous notation, we shall call $\log_c P_j(t)$ for the j th pair. (Osborne, 1964, page 112, italics added)

The term “random walk” reflects two metaphors MARKETS ARE PERSONS and PRICES ARE PERSONS, since it is applied to both markets and their prices. Cootner’s (1964) anthology of seminal articles contains numerous other linguistic reflections of these metaphors. Markets “organize”, “react”, “predict”, “assess”, “believe”, “quote”, “exaggerate”, “recognize errors”, “correct themselves”, are “free”, are “competitive”, have “characteristics”, have “tendencies”, have “behavior”, and have “memories” Prices “correspond”, “jump”, “reverse themselves”, “behave”, “wander”, “go wrong”, are “sensitive”, are “responsive”, are “quoted”, have a “nature”, have “neighbors”, and have “character”. It is important to recognize that it is *objective, scientific* papers that are making this extensive use of metaphor, and some of these linguistic reflections of the metaphors MARKETS ARE PERSONS and PRICES ARE PERSONS have become so common that we no longer recognize them as metaphorical.

According to Lakoff and Johnson (1980), such personifications are very common metaphors.

What [personification metaphors] all have in common is that they are extensions of ontological metaphors and that they allow us to make sense of phenomena in the world in human terms--terms that we can understand on the basis of our own motivations, goals, actions, and characteristics. Viewing something . . . in human terms has an explanatory power of the only sort that makes sense to most people. (Lakoff and Johnson, 1980, page 34)

We might argue, however, that MARKETS ARE PERSONS is not actually a metaphor; rather, it is a closely related rhetorical device called “metonymy”, which performs a referential function in which something stands for something else in order to provide understanding. Here, the institution (markets) stands for the people (investors) responsible for its functions. In a metonymic sense, then, markets really *are* persons. But this can not be said of prices, and PRICES ARE PERSONS is indeed a metaphor.

The term “efficiency” was first applied to markets by Eugene Fama in a 1965 *Journal of Business* article (Fama, 1965).

We saw in Section II [Theory of Random Walks in Stock Prices] that a situation where successive price changes are independent is consistent with the existence of an “efficient” market where, given the available information, actual prices at every point in time represent very good estimates of intrinsic values. (Fama, 1965, page 90, italics in original)⁵

By enclosing the word “efficiency” in quotes, Fama is clearly indicating that he is introducing a new word into the finance vocabulary.

In truth, there was no existing meaning of “efficiency” that would strictly apply to the condition of markets that Fama was attempting to describe. The closest from the *Oxford English Dictionary* (1989) is “The ratio of useful work performed to the total energy expended or heat taken in.” Prices are a sort of output and information is a sort of input, and it is conceivable that you could measure the quality of prices by their deviation from intrinsic values and measure the quantity of information in some way or another. It is a bit of a stretch, however, to regard the conversion of information into prices as a process that can be efficient or inefficient. It is more likely that the word “efficiency” was a natural choice given the metaphors MARKETS ARE MACHINES and PRICES ARE OBJECTS, and since then its continued use has reinforced those metaphors and contributed to their dominance in finance.

What complicates an analysis of the implications of metaphors is that metaphorical structuring is not complete. Although the metaphor MARKETS ARE MACHINES means that some things about machines apply to markets, not everything about a machine does. Nonetheless, thinking that MARKETS ARE MACHINES and PRICES ARE OBJECTS that they produce is likely to have the following consequences that are suggested by common phrases we use concerning markets: 1) Markets are subject to mechanical principles (“markets *took off* and *soared* to new heights”); 2) Markets are designed, engineered, and/or constructed (“market *makers* agreed”); 3) Markets are operated (“the SEC oversees market *operations*”); 4) Markets can be

⁵ Four pages later there is a virtually identical statement, but the change from “very good” estimate to “best” estimate is not a trivial one.:

We saw earlier that independence of successive price changes is consistent with an “efficient” market, that is, a market where prices at every point in time represent best estimates of intrinsic value. (Fama, 1965, page 94)

broken (“the market *crashed*”) and repaired (“the market experienced a *correction*”); 5) Markets can be adjusted, tweaked, or tuned to improve, or at least alter, their performance (“the market was *rigged*”); 6) Markets consume information as a fuel (“the market *absorbed* the news and *surged* upward”); 7) There is a standard against which to assess prices (“prices are *in line* with fundamentals”); 8) Prices can be defective (“the price bubble *burst*”); 9) The performance of the machine is tied to the quality of the prices it produces (“prices went into *free-fall* when the market *failed*”).

The key point, though, is the first in the list. However we may design, engineer, operate, adjust, tweak, and tune markets, we can not violate the physical laws which govern them. MARKETS ARE MACHINES in the same sense that the Newtonian UNIVERSE IS A MACHINE. Other important points, though, are the last ones in the list. They assume there must be a perfect design standard, the intrinsic value, against which the quality of prices can be measured. So the better we are at designing, engineering, operating, adjusting, tweaking, and tuning, the more perfect the prices that our markets will produce. One special entailment for emerging markets is that markets can be exported. History, society, and cultural are irrelevant, as the physical laws which govern markets are the same throughout the world, or throughout the universe for that matter.

MARKETS ARE MACHINES is not today’s only metaphor in English for markets. It is still true that MARKETS ARE PERSONS, and it is not hard to find vivid phrases in the financial press that are expressions of the metaphors MARKETS ARE WARFARE (“investors *fought* their way back after last month’s *collapse* in prices”, “markets *braced* themselves against an *onslaught* of bad economic numbers”), MARKETS ARE NATURAL PHENOMENA (“yesterday was a *stormy* day on the exchange”; “investors *rode out* the market *turbulence*”), and others. It would in fact be quite difficult to confidently assert which is the dominant market metaphor from a practitioner perspective. But from an academic perspective, the methodology and methods of finance research clearly demand that MARKETS ARE MACHINES. What little “behavioral” finance there is, which approach would be an obvious accompaniment to the metaphor MARKETS ARE PERSONS, looks a lot more like behaviorism in psychology, which, when it was in fashion decades ago, was based upon the metaphor PERSONS ARE MACHINES.

There may not be such a thing as *the* dominant market metaphor in any language, since there *can be* (and in English, *are*) many extant market metaphors and many perspectives on markets which use different metaphors to express their points of view. But it does appear that in English the dominant academic market metaphor is MARKETS ARE MACHINES, at least in the sense that this is the metaphor which drives finance research. And markets that are machines are our tools for transforming information into prices.

III. Information and Risk

In their advanced finance theory textbook, Copeland and Weston (1988) state that “The notion of efficient capital markets depends on the *precise* definition of *information* and the *value of information*” (ibid., p. 332, italics added). Unfortunately, there is no *precise* definition of *information* in Copeland and Weston or elsewhere in the finance literature. Usually it appears in a mathematical expression as the set of information available at a certain time Φ_t . Just about anything can be an element of this set:

The set of information Φ_{t-1} available at time t-1 includes what might be called the “state of the world” at time t-1: e.g., current and past values of any relevant variables, like the earnings of firms, GNP, the “political climate,” the tastes of consumers and investors, etc. Since Φ_{t-1} includes the past history of all relevant variables, Φ_{t-1} includes Φ_{t-2} ; equivalently, Φ_{t-2} is a subset of Φ_{t-1} . In addition to current and past values of relevant variables, Φ_{t-1} is also assumed to include whatever is knowable about relationships among variables. This includes relationships among current and past values of the same or different variables, and also whatever can be predicted about future states of the world from the current state. In short, Φ_{t-1} , the information available at t-1, includes not only the state of the world at t-1, but also whatever is knowable about the process that describes the evolution of the state of the world through time. (Fama, 1976, p. 135).

An important feature of this interpretation of information is its specification of two forms of information: (1) “the state of the world”, and (2) “the process that describes the evolution of the state of the world”. This corresponds to the deductive-nomological model of explanation/prediction. (Hempel and

Oppenheim, 1953) Through logical deduction, statements of conditions (“the state of the world”) and general laws (“the process that describes the evolution of the state of the world”) are sufficient to explain an empirical phenomenon which has already occurred or to predict one which has not yet occurred. It also corresponds to the standard vector of position and velocity in statistical mechanics. Were Laplace’s supreme intelligence to have perfect information of this vector for every particle in the universe, the future would be as certain as the past.

Risk in finance is the probability that future prices will differ from present expectations. As prices ought to move only in response to the receipt of new information, it is the information concerning the future that we do not have at present that results in future prices differing from present expectations. Furthermore, we recognize information as information by its effect on prices. Ignorance of information is the source of risk, and if we had perfect information, prices would reflect intrinsic values and there would be no risk. All of this is consistent with the metaphor that markets are machines effecting a transformation in prices as a consequence of an input of information. While the information may arrive randomly, and the prices consequently vary randomly, the transformation process is decidedly non-random. Risk does not come from markets but from the environment of markets out of which information appears.

Astute traders are only supposed to trade on information, since only information can cause prices changes that reflect value changes. But not all traders do so. Black (1986) refers to “noise traders” in a market, and the term has become quite common in the finance literature, although it is far from clear just what he meant by it or whether it has been used consistently since.⁶ Consider some quotations from his seminal article:

⁶ The opposition between information and noise comes out of communication theory, and this research not attempted to determine who first applied it to finance. It appears in Kyle (1985), a fundamental paper in the manipulation literature, but Black (1986) is usually given credit.

In the particular model we investigate, one risky asset is exchanged for a riskless asset among three kinds of traders: a single insider who has unique access to a private observation of the ex post liquidation value of the risky asset; uninformed noise traders who trade randomly; and market makers who set prices efficiently (in the semi-strong sense) conditional on information they have about the quantities traded by others. (Kyle, 1985, p. 1315)

In my basic model of financial markets, noise is contrasted with information. People sometimes trade on information in the usual way. They are correct in expecting to make profits from these trades. On the other hand, people sometimes trade on noise as if it were information. If they expect to make profits from noise trading, they are incorrect. (page 529)

Noise trading provides the essential missing ingredient. Noise trading is trading on noise as if it were information. People who trade on noise are willing to trade even though from an objective point of view they would be better off not trading. Perhaps they think the noise they are trading on is information. Or perhaps they just like to trade. With a lot of noise traders in the market, it now pays for those with information to trade. (page 531)

Why do people trade on noise? One reason is that they like to do it. Another is that there is so much noise around that they don't know they are trading on noise. They think they are trading on information. Neither of these reasons fits into a world where people do things only to maximize expected utility of wealth, and where people always make the best use of available information. Once we let trading enter the utility function directly (as a way of saying people like to trade), it's hard to know where to stop. If anything can be in the utility function, the notion that people act to maximize expected utility is in danger of losing much of its content.⁷ (page 533)

There are two key difficulties concerning noise trading that Black never resolves. One he dodges – just how it is possible to distinguish information from noise. To say that traders make money trading on information and lose money trading on noise, which is the same as saying that information concerns value and noise does not, is the usual circular argument in which information and value changes define each other. The other he confronts – just why people trade on noise. The problem, however, is that no one should. Sooner or later as they inevitably lose money, noise traders should either disappear from the market or recognize their error and become information traders. (Friedman, 1953) De Long et. al. (1990) have subsequently suggested that noise traders can make trading so risky that their returns exceed those of sophisticated investors. And Palomino (1996) advances this argument with his model in which noise traders can profit from irrational trading strategies that hurt informed traders more than they hurt themselves. This is an important point to be addressed later in the paper.

⁷ It was probably far too late for this in 1986. There are no limitations on what can be in a utility function, and it has never had much content.

Within three years of Black's paper, the term "noise traders" had come to refer to something much different: those trading for liquidity purposes; that is, to convert less liquid investments to cash or vice versa.

In the two examples above, "noise trading" is crucial. The term "noise trading" refers to trading due to an exogenous reason (for instance, taxes, liquidity, etc.), e.g. a mutual fund rebalancing its portfolio. (Vila, 1989, p. 22)

Kyle even joins Vila in this definition of noise trading as "uninformative trading for liquidity of life cycle motives" (Kyle and Vila, 1991).⁸ It is interesting that the pejorative term "noise trader", sometimes with the equally pejorative adjective "irrational" added to it, is applied to traders who, while not trading on information, are still trading for what most would consider to be legitimate economic purposes. Ironically, there is no trading unless someone trades for a reason other than the exploitation of information. Informed traders will never trade with each other. (Kyle, 1989)

The mechanistic interpretation of information is consistent with the roots of economic information theory in communication theory and statistical estimation theory, but it is somewhat inconsistent with the humanistic interpretations of information in the management information systems literature. (Massoumi, 1987) There, *information* is often a level in a hierarchy—above *data* and below *knowledge* and perhaps also *intelligence* and *wisdom*. (Tuomi, 1999) To be consistent with the mechanistic interpretation, we might say that data consists of observations (states of the world), information consists of patterns (the processes by which the states of the world evolve), and knowledge consists of predictions (logical deductions).

What distinguishes the humanistic interpretation from the mechanistic interpretation, however, is that in the humanistic interpretation data, information,

⁸ In another paper, Black (1990) uses the term "passive traders" rather than "liquidity traders." And in reference to Kyle's (1985) article, he suggests that liquidity traders are insensitive to price and that noise traders alternate randomly between buying and selling. A survey article (Madhavan, 2000) provides a more recent, comprehensive explanation of terminology, but this does not mean that it is the standard.

The concept of an informed trader is distinct from that of an insider, usually defined as a corporate officer with fiduciary obligations to shareholders. Noise traders are liquidity motivated, smoothing their intertemporal consumption stream through portfolio adjustments; alternatively, uninformed traders may simply believe they have current information. (Madhavan, 2000, p. 215)

and knowledge are embedded in culture and society. Information does not simply assemble data into patterns of causation, but in patterns of relevance or purpose. Knowledge is not simply a logical extraction but a construction of meaning or context. (Davenport and Prusak, 1997) In the mechanistic interpretation, there is apparently no question what one is to do with knowledge. In the humanistic interpretation, it requires intelligence to put knowledge to use and wisdom to do so with compassion. And Tuomi (1999) reminds us that data is not just lying around out there in plain sight waiting for us to make something out of it. It takes wisdom, intelligence, knowledge, and information just to reveal it. *Relevance, purpose, meaning, context, and compassion* are not precise terms, and the humanistic interpretation of information seems hopelessly vague in comparison with finance's mechanistic interpretation.

Markets are a part of society and culture, and as such, they are not just tools for the processing of information, the origin of which is somehow external to the markets. Markets create information; they do not just acquire it from somewhere else. Furthermore, information not only comes from within markets through the activity of those markets, but markets are also responsible for determining what is and is not information. This is not to say that this is true of all information. There are still physical phenomena such as weather, that ubiquitous example in finance textbooks, that can affect prices in the classical manner, but the amount and impact of such "exogenous" information is likely to pale in comparison to the amount of "endogenous" information. What this means is that prices are not beyond our control, churned out by an independently operating machine-like market in response to the input of information that is also beyond our control. Rather, we are able to create information, both about the state of the world and about the processes that describe the evolution of the state of the world. Markets, information, risk, and prices are all social constructions.

But we must set aside these concerns for the time being. What has been asserted so far is the dominant metaphor of markets as efficient machines for the transformation of information into prices. Markets are risky in that we cannot predict future prices, but this risk is supposed come only from our inability to predict the arrival of information. If we could predict it, it wouldn't be information,

since we must have already known it. What has also concerned the legal studies community and the academic finance community has been another form of risk from the manipulation of markets; that is, interference in the efficient operation of the machine.

IV. Manipulation

There is an extensive body of legal studies literature concerning manipulation, one reason for which is that the law itself on manipulation is so vague. As Williams (1995) introduces his book on the Hunt Silver Case, in which the Hunt brothers allegedly attempted to corner the silver market:

In such a setting as commodity markets, there is no generally accepted definition of manipulation, the result for the applicable law being, as a leading treatise puts it, “a murky miasma of questionable analysis and unclear effect” . . . To make the same point, . . . uses different diction: “The law governing manipulations has become an embarrassment – confusing, contradictory, complex, and unsophisticated.” (Williams, 1995, p. 5)

A useful starting point within the literature is Fishel and Ross (1991), which points out a number of problems that the academic finance literature never confronts. Their critique begins with a summary of the standard definitions of “manipulation”:

According to these definitions, conduct is manipulative if it is designed to do one of three things: (1) interfere with the free play of supply and demand; (2) induce people to trade; or (3) force a security’s price to a artificial level. . . . (Fishel and Ross, 1991, p. 507)⁹

⁹ A somewhat more limited but still quite similar definition was used in a frequently-cited analysis of security markets from the 1930s:

As used in this chapter, the word manipulation will mean planned effort by an individual or group of individuals to make the market price of a security behave in some manner in which it would not behave if left to adjust itself to uncontrolled or uninspired supply and demand (Bernheim and Schneider, 1935, p. 444)

Section 9 (a)(2) of the Securities and Exchange Act states:

It shall be unlawful for any person, directly or indirectly, by the use of the mails or any means or instrumentality of interstate commerce, or of any facility of any national securities exchange, or

The problem with the first point is that all traders are a part of supply and demand, and there is no independent definition that distinguishes between legitimate supply and demand and illegitimate supply and demand unless palpable fraud (by false statement or by conduct) is involved. The problem with the second point is very similar. All traders induce others to trade, and there is no independent definition that distinguishes between legitimate inducement and illegitimate inducement unless palpable fraud is involved. And the problem with the third point is also very similar. One could say that an artificial price does not reflect the free play of supply and demand, but as already noted that there is no independent definition that distinguishes between legitimate supply and demand (free) and illegitimate supply and demand (induced) unless palpable fraud is involved. A favorite definition in finance theory is that proper prices reflect all relevant information, but this relevant information includes information about supply and demand, and once again no one can distinguish between legitimate supply and demand (information about which is relevant to value) and illegitimate supply and demand (information about which is irrelevant to value).¹⁰ In short, all attempts at an objective definitions of manipulation lead to circularity. (Easterbrook, 1986; Fishel and Ross, 1991)

Fishel and Ross conclude that there can only be subjective definitions of manipulation, which must include intent.

Manipulative trades could be defined as profitable trades made with “bad” intent – in other words, trades that meet the following conditions: (1) the trading is intended to move prices in a certain direction: (2) the trader has no belief that the prices would move in this direction but for the trade; and (3) the resulting profit comes solely from the trader’s ability to move prices and not from his possession of valuable information. (Fishel and Ross, 1991, p. 510)

for any member of a national securities exchange . . . [i] To effect, alone or with one or more other persons, a series of transactions in any security registered on a national securities exchange, [ii] creating actual or apparent active trading in such security, or raising or depressing the price of such security, [iii] for the purpose of inducing the purchase or sale of such security by others. (quoted in Loss and Seligman, 1995, p. 938)

¹⁰ As will be shown, information about who is trading and why they are trading, whether such trading is part of legitimate or illegitimate supply and demand, is nonetheless relevant to prices.

A manipulation without fraud can only be distinguished by the intent of the trader to engage in manipulation, which the trader is unlikely to reveal and which is difficult to prove without documents, wiretaps, or the testimony of co-conspirators. (Gastineau and Jarrow, 1991) As Edwards and Edwards (1986) point out in their paper concerning futures markets manipulations:

. . . the plaintiff (or the government) has a heavy burden of proof in establishing manipulative intent. Such intent must almost always be inferred from a trader's actions and conduct. To sustain this burden plaintiff must show unusual or uneconomic behavior on the part of the defendant, and probably the absence of a plausible nonmanipulative rationale as well. (Edwards and Edwards, 1986, p. 343)

Manipulations are indeed difficult, if not impossible, to prove, but according to Fishel and Ross they are also difficult to engage in successfully.

Profitable (successful) manipulations require two conditions: first, trading must cause the price of the relevant security to rise; and second, the manipulator must be able to sell at a price higher than the price at which the manipulator purchased (plus transactions costs incurred). . . . it is extremely difficult to satisfy both conditions simultaneously. In most cases, anonymous trades will have no effect on security prices, a violation of the first conditions. To satisfy this condition, the manipulator will have to convince other traders that he has information about the value of the security they do not have, or he will have to expend huge amounts of capital. The consequence of this strategy, however, is that the price of the relevant security is likely to rise simultaneously with the trades but not to rise thereafter, a violation of the second condition. Thus, the basic dilemma of the prospective manipulator is to seem informed enough to cause prices to rise by purchasing, but not so informed as to cause the price to rise simultaneously with purchase. Also, he must not appear informed at the time of sale, lest his sales cause the price to fall. The relationship between trading and price movements thus creates an intractable dilemma for the potential manipulator. (Fishel and Ross, 1991, p. 512-513)

Manipulations are also difficult to engage in successfully more than once. Whatever reputation a manipulator has to induce artificial price rises as a consequence of a purchase should be lost when prices naturally decline to their correct level and the market realizes what has happened. The problem with this reasoning is that it is not so

easy: (1) to distinguish artificial price rises from natural price rises and natural price declines from artificial ones, (2) to associate the artificial price rise with the natural price decline, and (3) to attribute the combination of the two to the manipulator. Short of the market being able to do so, the manipulator simply appears to be an astute trader, if anyone else is even aware of the profits he or she has made on the manipulation. This is particularly true if the manipulator does not try to be too greedy, effecting only what regulators call “mini-manipulations”. (Gastineau and Jarrow, 1991)

The academic finance literature on manipulation is not so pragmatic as the legal literature. It consists of numerous theoretical models of the conditions under which markets can be manipulated and very few attempts to empirically investigate whether they actually are.¹¹ Although Kyle (1985) does not explicitly address manipulation, his article is almost invariably cited by subsequent articles which do. In his model, insiders in sole possession of information optimally exploit their monopoly power by using noise traders to provide the camouflage which enables them to profit at the expense of market makers. This article opens a crack in the MARKETS ARE MACHINES metaphor in that someone outside the machine (the insider) can influence the operation of the machine (by the market makers) by managing the process by which input (information) is delivered to the machine. Not only does information not arrive completely at random, but how information arrives is itself information. One might argue that the market maker normally has a monopoly on this latter form of information, which monopoly the insider is using the noise traders to break.

The academic finance literature on speculation, which is often cross-referenced with that on manipulation, does further damage to the metaphor. Hart (1977) shows that a single speculator who understands the behavior all other passive price-taking nonspeculators can profit from dislodging prices from an explosively unstable equilibrium.¹² Hart never explains just how this obviously artificial situation might apply to real markets, but it has been a common fear that speculators are able to hijack the market machine, interfere with its operation and destabilize prices, and profit from having done so. It's unclear just what it is that gives the speculators their power to

¹¹ The large number of articles specifically on futures market manipulation is essentially a separate body of literature that is tangential to the concerns of this paper.

move prices in this model, but it appears to be their information concerning the behavior of all other market participants. Thus, the speculators are a sort of insider having sole possess of information regarding the operation of the machine. In effect, how the machine transforms information into prices becomes information which is transformed into prices.

Hart and Kreps (1986) provides theoretical support for another common fear, that speculation itself destabilizes prices. In this article, the authors define speculators as trading on their information regarding the probability distribution of future liquidity trading. In their model, speculators are not insiders, since the information they have is public information. They are in fact noise traders, albeit not wholly uninformed ones, because they are ultimately trading on a personal belief regarding specific future liquidity trading as if this belief were private information. Yet there must be some way to systematically profit from this speculator-induced price volatility or speculation would disappear. Unlike in Hart (1977), where speculators intentionally destabilize prices in order to profit from it, in Hart and Kreps (1986) speculators attempting to profit from their beliefs destabilize price from which they unintentionally profit. There must be something about the market machine that generates price changes without the input of information.

What the frequently-referenced models of Kyle (1985) and Glosten and Milgrom (1985) share is an assumption that markets consist of informed traders/insiders and liquidity traders/noise traders. Allen and Gorton (1992) suggest that liquidity traders are more likely to sell than buy, there being more reasons to need to increase liquidity than to reduce it. If it is not possible to tell the difference between informed traders and liquidity traders, purchases are more suggestive of private information than sales and uninformed investors are better able to mimic informed investors and initiate an upward movement in prices.

Jarrow (1992) extends Hart (1977) and formalizes the intuition of Allen and Gorton (1992) and Gastineau and Jarrow (1991), showing the conditions under which uninformed traders, whose wealth or (mistaken) reputation for being informed gives them market power, can initiate an upward movement in prices from which they can profit. Benabou and Laroque's (1992) model zeros in on the traders who are expected

¹² Hart states that his article formalizes the intuition in Bagehot (1971), "Walter Bagehot" being a pseudonym adopted here by Jack Treynor.

to be informed – corporate officers, journalists, and market “gurus” – and how they might exploit that reputation in market manipulation through misleading announcements. Fishman and Hagerty’s (1995) model looks even more closely at how insiders can trade without having information and profit from outsiders interpreting the disclosure of the trade as being based upon information.

Fisher Black places an interesting twist on this in his unpublished working paper “Bluffing” (1990). He suggests that traders who know they have information must trade rapidly (i.e. use market orders) in order to take advantage of it and that traders who know they do not have information are able to trade more slowly (i.e. use limit orders). Uninformed traders may pretend to be informed (i.e. bluff) by trading rapidly and then unwind their positions by trading more slowly, thereby avoiding the problem with manipulation posed by Fishel and Ross (1991). Ironically, according to Black, these traders are not only bluffing with their initial trade in pretending to be informed when they are not, but they are also bluffing in their subsequent trades in pretending to be uninformed when they really have the information that they were bluffing. This sort of “information”, in effect conjured up out of nothing, falls well outside of the textbook definition.

Allen and Gale (1992) distinguish between action-based manipulation (taking actions that change the value of a stock¹³), information-based manipulation (issuing false information as in the Vila (1989) and Benabou and Laroque (1992) models), and trade-based manipulation (as in the Jarrow (1992) model).¹⁴ From a legal standpoint, both action-based and information-based manipulation would be considered forms of fraud. Only trade-based manipulation is true manipulation in that it differs from normal trading only because of the intent of the manipulator/trader. In their model, Allen and Gale (1992) show how uninformed manipulators can profit from mimicking informed

¹³ Historically, such actions have included rescinding the rights to railroad routes (Harlem Railroad), closing mills (American Steel and Wire), and randomly poisoning the company’s product on store shelves (targeting Johnson and Johnson) (Allen and Gale, 1992;)

¹⁴ Chatterjea et. al. (1993) and Cherian and Jarrow (1995) also use this classification in their survey articles. Bagnoli and Lipman (1996) extend it, breaking down trade-based manipulations into those based upon the the order flow of the trades and those based on holdings resulting from those trades. Their model specifically concerns manipulations associated with takeover bids, and this situation points out the ambiguities in the Allen and Gale classification. The accumulation of a large holding to give the appearance of a takeover bid could be considered either an action-based or trade-based manipulation. Falsely announcing a takeover bid would be an information-based manipulation.

traders. This contrasts with Madrigal's (1996) model, in which uninformed speculators can profit from inferring the information possessed by insiders through their own knowledge of the trading process. But John and Narayanan (1997) and Huddart et. al. (2001) show how insiders who have to disclose their trades can manipulate the market by occasionally trading against the information they possess.

Vitale (2000) cautions against the conflation of noise traders and liquidity traders that was described in the preceding section. In his model of the foreign exchange market extending Madrigal (1996), he shows how noise traders can confuse dealers, reducing their ability to learn from the orders of informed traders and permitting them to earn profits of their own.

V. Inherent Manipulability

It is not so obvious how much academic research and public policy is conditioned by the metaphor, **MARKETS ARE MACHINES**. This metaphor portrays markets as machines which transform raw material, information, into finished goods, prices. Insiders, who obtain their information by virtue of their positions, and informed traders, who expend resources to obtain their information, can drop their information into the machine and receive a profitable change in prices in return. It is possible to fool the machine by dropping in something that looks like information, but isn't, (information-based manipulation) or to tamper with the machine to change its mechanism to produce distorted prices (action-based manipulation). We also have market participants (liquidity traders) who are knowingly willing to pay for the right to use for practical purposes the prices produced by the machine, and we have other market participants (noise traders) who are unknowingly willing to pay for the right to use for amusement purposes the prices produced by the machine. The purpose of public policy is to 1) tune the machine so that it precisely transforms information into prices according to the specifications of long-run supply and demand, 2) detect fraudulent attempts to supply tainted information or produce misshapen prices, 3) fairly reward those who supply information to produce prices and fairly charge those who use the prices, and 4) promote equal opportunity access to information.

Crucial to the metaphor, though, is a clear distinction between information and the market; that is, between the input and the machine that processes it. This is a point upon which the academic finance literature is largely mute. The process by which information is impounded in prices, consistent with the metaphor, has received considerable attention. But there is some confusion with the process which hasn't received much attention at all. Information can only affect prices through trading; therefore, someone must introduce the information into the market through a trade which will necessarily be profitable for that person once the market on the whole learns the information. Because the introductory trade has to be at a price that does not incorporate the information and any subsequent trade must be at a price which does, the introductory trader will capture the value impact of the information. For a market to be perfectly fair, as is presumably the goal of legislation and regulation, all information

must be public in the sense that everyone has possession of it prior to the introductory trade and an equal opportunity to be the introductory trader. Such perfect fairness would reduce the amount of information in the market, because it would preclude the opportunity to profit from the information that one has spent to discover.

The problem is that incorporating information in prices does not necessarily reveal just what it was. As several finance models have assumed, it is sufficient that someone have a reputation for having information and to act (trade) as if they have information for prices to incorporate that information. Even if we accept that in the long run there must actually have to be information or else it would be impossible to sustain a reputation for having it, it is not at all clear what it is that moves prices. Is it the information itself or the combination of a reputation for having information and behaving as if one has it? Is the price response to the latter the same as it would be for the former? Can we really say that information has been introduced into prices if no one ever knows it except one trader who never revealed it? And if it is never revealed, has it really lost its ability to influence prices?

Can we perhaps say that the reputation and the trading are themselves information? If so, markets are machines that can produce their own sole input, something that is not true of any real machines in this universe. All finance models take it for granted that there is information in the traditional sense of something external to markets that changes prices through changes in rational expectations. Presumably, all trading activity is also information. But trading is done by those who have (informed traders) and do not have (uninformed traders) information in the traditional sense. Informed traders presumably know that they are informed, although it may not often be so obvious just how they know this. Only some uninformed traders (liquidity traders) know they are uninformed. Others (noise traders) think they are informed, which raises the question just why they think they are informed. Bluffers are informed that they are uninformed.

Finance models have incorporated informed traders who attempt to appear uninformed and uninformed traders who attempt to appear informed, and this is trade-based manipulation. As the legal studies literature makes clear, there is no way to detect the latter form short of intent, since uninformed traders who successfully appear informed are for all objective purposes informed traders. All finance models take it for

granted that it is possible to profit from trading on information in the traditional sense. But we have seen models that show that it is also possible to profit from trading on information regarding trading, whether or not that trading is itself based upon information in the traditional sense.

Ironically, it is the belief in information in the traditional sense that makes markets inherently manipulable. It is possible for market success and wealth to appear at random, but we are loath to attribute them to random events and instead attribute them to information. If wealth and success signal information, then the trades of the wealthy and successful are themselves information that signals the more traditional form of information. In such a way we build up Baudrillard's familiar hierarchy.

This would be the successive phases of the image: --it is the reflection of a basic reality --it masks and perverts a basic reality --it masks the *absence* of a basic reality --it bears no relation to any reality whatever: it is its own pure simulacrum. In the first case, the image is a *good* appearance--the representation is of the order of sacrament. In the second, it is an *evil* appearance--of the order of malefice. In the third, it *plays at being* an appearance--it is of the order of sorcery. In the fourth, it is no longer in the order of appearance at all, but of simulation. [Baudrillard, 1983, page 11]

McGoun (1997) applied this to finance with regard to stock prices.

. . . phase one is a stock price that accurately indicates some intrinsic value of the corporation; phase two, a stock price that because of distortions and noise, is an imperfect indicator of some intrinsic value of the corporation; phase three, a stock price that is the only value one knows for the corporation, as there is no such thing as intrinsic value; and phase four, a stock price that is in a sense a "pure" value, as the corporation to which it is attached is irrelevant. (McGoun, 1997, page 107)

With regard to information, phase one is information in the traditional sense of something external to markets that changes prices through rational changes in expectations. Phase two is information regarding trading that masks and distorts the information on which traders are actually trading. Phase three is trade-based manipulation in which trading masks the absence of information. And in phase four there is only trading, out of which we conjure something we refer to as information.

The message hidden in the academic literature is that we are indeed in a phase-four market in which information is whatever we want it to be and in which we can expand the amount of information at will. What drives the economy is a publicity machine, not a market machine, with which anyone can parley random trading success into an image of trading prowess that can yield sustained trading success. Some might consider this manipulation, and according to the legal definition it is. But is it really? Is it manipulation when you know that having guessed right in the past and been recognized for it, it becomes increasingly likely that you will guess right in the future precisely because you are the one to have made the guess? Since the phenomenon is undetectable, let alone virtually unrecognizable, there is no way to eliminate it. Markets are indeed inherently manipulable, and we all conspire in permitting it and even encouraging it at the same time deluding ourselves that we can get rid of it.

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