

## Part I

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# The Beginnings of Narrative Economics



## Chapter 1

# The Bitcoin Narratives

This book offers the beginnings of a new theory of economic change that introduces an important new element to the usual list of economic factors driving the economy: contagious popular stories that spread through word of mouth, the news media, and social media. Popular thinking often drives decisions that ultimately affect decisions, such as how and where to invest, how much to spend or save, and whether to go to college or take a certain job. *Narrative economics*, the study of the viral spread of popular narratives that affect economic behavior, can improve our ability to anticipate and prepare for economic events. It can also help us structure economic institutions and policy.

To get a feel for where we are going, let's begin by considering one such popular narrative, recently in full swing. Bitcoin, the first of thousands of privately issued cryptocurrencies—including Litecoin, Ripple, Ethereum, and Libra—has generated enormous levels of talk, enthusiasm, and entrepreneurial activity. These narratives surrounding Bitcoin, the most remarkable cryptocurrency in history as judged by the speculative enthusiasm for it and its market price rather than its actual use in commerce, provide an intuitive basis for discussing the basic epidemiology of narrative economics (which we explore in detail in chapter 3).

An *economic narrative* is a contagious story that has the potential to change how people make economic decisions, such as the decision to hire a worker or to wait for better times, to stick one's neck out or to be cautious in business, to launch a business venture, or to invest in a volatile speculative asset. Economic narratives are usually not the most prominent narratives circulating, and to identify them we have to look at their potential to change economic behavior. The Bitcoin story is an example

of a successful economic narrative because it has been highly contagious and has resulted in substantial economic changes over much of the world. Not only has it brought forth real entrepreneurial zeal; it also stimulated business confidence, at least for a time.

## Of Bitcoin and Bubbles

The Bitcoin narrative involves stories about inspired cosmopolitan young people, contrasting with uninspired bureaucrats; a story of riches, inequality, advanced information technology, and involving mysterious impenetrable jargon. The Bitcoin epidemic has progressed as a cascading sequence of surprises for most people. Bitcoin surprised when it was first announced, and then it surprised again and again as the world's attention continued to grow by leaps and bounds. At one point, the total value of Bitcoin exceeded US \$300 billion. But Bitcoin has no value unless people think it has value, as its proponents readily admit. How did Bitcoin's value go from \$0 to \$300 billion in just a few years?

The beginnings of Bitcoin date to 2008, when a paper titled "Bitcoin: A Peer-to-Peer Electronic Cash System," signed by Satoshi Nakamoto, was distributed to a mailing list. In 2009, the first cryptocurrency, called Bitcoin, was launched based on ideas in that paper. *Cryptocurrencies* are computer-managed public ledger entries that can function as money, so long as people value these entries as money and use them for purchases and sales. There is an impressive mathematical theory underlying cryptocurrencies, but the theory does not identify what might cause people to value them or to believe that other people will also think they have value.

Often, detractors describe the valuation of Bitcoin as nothing more than a speculative bubble. Legendary investor Warren Buffett said, "It's a gambling device."<sup>1</sup> Critics find its story similar to the famous tulip mania narrative in the Netherlands in the 1630s, when speculators drove up the price of tulip bulbs to such heights that one bulb was worth about as much as a house. That is, Bitcoins have value today because of public excitement. For Bitcoin to achieve its spectacular success, people had to

become excited enough by the Bitcoin phenomenon to take action to seek out unusual exchanges to buy them.

For Bitcoin's advocates, labeling Bitcoin as a speculative bubble is the ultimate insult. Bitcoin's supporters often point out that public support for Bitcoin is not fundamentally different from public support for many other things. For example, gold has held tremendous value in the public mind for thousands of years, but the public could just as well have accorded it little value if people had started using something else for money. People value gold primarily because they perceive that other people value gold. In addition, Peter Garber, in his book *Famous First Bubbles* (2000), points out that bubbles can last a long time. Long after the seventeenth-century tulip mania, rare and beautiful tulips continued to be highly valued, though not to such extremes. To some extent, tulip mania continues even today, in a diminished form. The same might happen to Bitcoin.

Nonetheless, the value of Bitcoin is very unstable. At one point, according to a headline in the *Wall Street Journal*, the US dollar price of Bitcoin rose 40% in forty hours<sup>2</sup> on no clear news. Such volatility is evidence of the epidemic quality of economic narratives that may lead to an erratic jostling of prices.

I will make no attempt here to explain the technology of Bitcoin, except to note that it is the result of decades of research. Few people who trade Bitcoins understand this technology. When I encounter Bitcoin enthusiasts, I often ask them to explain some of its underlying concepts and theories, such as the Merkle tree or the Elliptic Curve Digital Signature Algorithm, or to describe Bitcoin as an equilibrium of a congestion-queuing game with limited throughput.<sup>3</sup> Typically the response is a blank stare. So, at the very least, the theory is not central to the narrative, except for the basic understanding that some very smart mathematicians or computer scientists came up with the idea.

Narrative economics often reveals surprising associations. Reaching back into history, we see the beginnings of the emotions behind the Bitcoin epidemic in the origins of the growth of anarchism in the nineteenth century.

## Bitcoin and Anarchism

The anarchist movement, which opposes any government at all, began around 1880 and followed a slow growth path, according to a search for *anarchist* or *anarchism* on Google Ngrams. But the term itself dates back decades earlier, to the work of philosopher Pierre-Joseph Proudhon and others. Proudhon described anarchism in 1840 as follows:

To be GOVERNED is to be watched, inspected, spied upon, directed, law-driven, numbered, regulated, enrolled, indoctrinated, preached at, controlled, checked, estimated, valued, censured, commanded, by creatures who have neither the right nor the wisdom nor the virtue to do so.<sup>4</sup>

Proudhon's words clearly appeal to people who feel frustrated by authority or blame authority for their lack of personal fulfillment. It took about forty years for anarchism to reach epidemic proportions, but it has shown immense staying power, even to this day. Indeed, the Bitcoin.org website carries a passage by anarchist Sterlin Lujan, dated 2016:

Bitcoin is the catalyst for peaceful anarchy and freedom. It was built as a reaction against corrupt governments and financial institutions. It was not solely created for the sake of improving financial technology. But some people adulterate this truth. In reality, Bitcoin was meant to function as a monetary weapon, as a cryptocurrency poised to undermine authority.<sup>5</sup>

Most Bitcoin enthusiasts might not describe their enthusiasm in such extreme terms, but this passage seems to capture a central element of their narrative. Both cryptocurrencies and *blockchains* (the accounting systems for the cryptocurrencies, which are by design maintained democratically and anonymously by large numbers of individuals and supposedly beyond the regulation of any government) seem to have great emotional appeal for some people, kindling deep feelings about their position and role in society. The Bitcoin story is especially resonant because it provides a counternarrative to the older antianarchist narratives depicting anarchists as bomb-throwing lunatics whose vision for society can lead only

to chaos and violence. Bitcoin is a contagious counternarrative because it exemplifies the impressive inventions that a free, anarchist society would eventually develop.

The term *hacker ethic* is another modern embodiment of such anarchism. Before the widespread availability of the World Wide Web, sociologist Andrew Ross wrote, in 1991,

The hacker ethic, first articulated in the 1950s among the famous MIT students who developed multiple-access user systems, is libertarian and crypto-anarchist in its right-to-know principles and its advocacy of decentralized technology.<sup>6</sup>

In his 2001 book *The Hacker Ethic and the Spirit of the Information Age*, Pekka Himanen wrote about the ethic of the “passionate programmers.”<sup>7</sup> In the Internet age, people’s willingness and ability to work together with new technology—in new frameworks that do not rely on government, on conventional profit, or on lawyers—have surprised many of us. For example, wikis, notably Wikipedia, encourage cooperation among large numbers of anonymous people to produce amazing information repositories. Another success story is the Linux operating system, which is open-source and distributed for free.

But among the many examples of viral economic narratives, Bitcoin stands supreme. It is a narrative that is well crafted for contagion, effectively capturing the anarchist spirit; and, of course, that is why most of us have heard of it. It is part bubble story, part mystery story. It allows nonexperts and everyday people to participate in the narrative, allowing them to feel involved with and even build their identity around Bitcoin. Equally appealing, the narrative generates stories of untold riches.

### **Bitcoin as a Human-Interest Narrative**

The Bitcoin narrative is a motivating narrative for the cosmopolitan class around the world, for people who aspire to join that class, and for those who identify with advanced technology. And like many economic narratives, Bitcoin has its celebrity hero, Satoshi Nakamoto, who is a central human-interest story for Bitcoin. Adding to the romance of the Bitcoin

narrative is a mystery story, for Satoshi Nakamoto has never been seen by anyone who will testify to having seen him. One early Bitcoin code-developer said that Satoshi communicated only by email and that the two had never met in person.<sup>8</sup> On its website, Bitcoin.org says only, “Satoshi left the project in late 2010 without revealing much about himself.”

People love mystery stories and love to unravel the mystery, so much so that there is a rich genre of mystery literature. Bitcoin’s mystery story has been repeated many times, especially when intrepid detectives have identified a person who may be Nakamoto. The repeated publicity for an intriguing mystery made the contagion rate of the Bitcoin narrative higher than it would have been otherwise.

### **Bitcoin and the Fear of Inequality**

In addition to tapping into anarchist sentiment and the mystery of Satoshi Nakamoto, the Bitcoin story is a story of the desire for economic empowerment. During the twenty-first century, as economic inequality in advanced countries has increased rapidly, many people feel helpless, and they desire greater control over their economic lives. Bitcoin prices first took off around the time of the 2011 Occupy Wall Street / “We are the 99%” protests. Adbusters, a social activist organization that wanted its message to go viral, launched these protests in the United States, and Occupy protests occurred in many other countries too. It is no coincidence that the Bitcoin narrative is one of individual empowerment, because, according to the narrative, the coins are anonymous and free of government control, management, and reach.

Another part of the underlying narrative that has spurred Bitcoin’s and other cryptocurrencies’ high contagion rate is the story of computers taking greater and greater control of people’s lives. In the twenty-first century, people have access to automated assistants, such as Amazon’s Alexa, Apple’s Siri, and Alibaba’s Tmall Genie, that understand human speech and respond knowledgeably and intelligently to questions with a simulated human voice. In addition, driverless cars, trucks, trains, and ships seem likely in the near future, raising the specter of mass unemployment among truck drivers and other people who drive or navigate for a



living. The “technology is taking over our lives” narrative is the most recent incarnation of a labor-saving-machinery narrative that has scared people since the Industrial Revolution.

The insistent fear in this Luddite narrative (to which we will return in chapter 13) is that machines will replace jobs. The fear is not that you will show up for work one day and be told that the company is purchasing a new computer that will do your job. Rather, the changes are more gradual, inevitable, and cosmic. More likely, as computers automate more tasks, you may find that your employer seems increasingly indifferent to your presence, fails to offer pay raises, does not encourage you to stay with the company, and doesn’t hire others like you, and eventually no longer even remembers you. Fear about your future is more an existential fear about not being needed.

In such an environment, options are eliminated. Computers can be educated to perform new tasks many orders of magnitude faster than human beings can. Calls for government expenditures on education of people to offset the job loss created by computers seem justified, but it is hard to imagine that people can win in the long run. Millions of students around the world question whether their education is preparing them for success, creating an anxiety that indirectly feeds the contagion of technologically driven cryptocurrencies such as Bitcoin, which seem at least superficially to offer some imaginable hope of mastering the computers.

## Bitcoin and the Future

The digital signature algorithm that underlies Bitcoin, that defines a Bitcoin’s individual owner, and that makes it prohibitively difficult for thieves to steal Bitcoin has received some attention since the early 1990s, but coverage of that narrative epidemic cannot compare with coverage of Bitcoin itself. ProQuest News & Newspapers finds only one article with the words *elliptic curve digital signature algorithm* in its entire database. It finds only five articles that use the phrase *digital signature algorithm*. The RSA algorithm, the original cryptography algorithm that may have started the Bitcoin revolution, dates back to 1977. ProQuest lists

twenty-six articles that mention the RSA algorithm. But that number doesn't begin to compare with the fifteen thousand-plus articles that mention the word *Bitcoin*.

The difference must result from the contagiousness of the larger Bitcoin narrative. The phrase *digital signature algorithm* sounds like something a student would be trying to memorize for an exam: technical, painful, boring. There is so much more to the Bitcoin story. Notably, it is a story about how Bitcoin investors have become rich simply by being aware of new things on the cutting edge. Bitcoin is about the "future." That sound bite is easily remembered, a topic to bring up with enthusiasm in conversation at a social gathering. In short, Bitcoin is a gem of a story.

People often buy Bitcoin because they want to be part of something exciting and new, and they want to learn from the experience. This motivation is particularly strong because of the underlying story, the narrative that computers are poised to replace many of our jobs. But computers can't replace *all* of our jobs. Somebody has to control those computers, and there is a narrative today that the people in charge of the new technology will be the winners. Very few people feel secure that they will be on the winning end of this curve. Even taking a degree in computer science doesn't seem to be a sure path to success today, because it may lead to a humdrum job as a low-level programmer, or even to no job at all. A desire to be on the finance side of the tech business, where Bitcoin sits, is popular because there are so many stories illustrating that financiers take control of things. Bitcoin enthusiasts may think that experimenting with Bitcoin will put them in touch with the people who are going to be winners in the new world, will give them insight about how to stay in (or gain) control. It is easy to jump-start one's connection to this new reality by buying some Bitcoin. Best of all, one doesn't have to understand Bitcoin to buy it. Vending machines at convenience stores now sell Bitcoins and other cryptocurrencies. This "Be a part of the future" narrative, enhanced by regular news of exciting fluctuations in the price of Bitcoins, gives them value. It generates fluctuations in Bitcoin prices in terms of national currencies, and these fluctuations thrive on and produce contagious narratives.

## **Bitcoin as a Membership Token in the World Economy**

We are living in a peculiar transition period in human history, in which many of the world's most successful people see themselves as part of a broader cosmopolitan culture. Our nation-states sometimes seem increasingly irrelevant to our ambitions. Bitcoin has no nationality, giving it a democratic and international appeal. Inherent in its pan-national narrative is the idea that no government can control it or stop it. In contrast, old-fashioned paper money, typically with historical engravings of famous men in a country's history, suggests an obsolete nationalism, something for losers. Paper currency resembles little national flags in a way; it is a symbol of one's nationality. Having a Bitcoin wallet makes the owner a citizen of the world and in some sense psychologically independent of traditional affiliations.

How, then, do we summarize the popularity of Bitcoin? In the end, people are interested in Bitcoin precisely because so many other people are interested in it. They are interested in new stories about Bitcoin because they believe that other people will be interested in them too.

The surprising success of Bitcoin is not really so surprising when we consider the basic principles of narratives discovered by intellectuals who have thought about the human mind, about history, and about mathematical models of feedback. We discuss these great thinkers and their contributions in the next chapter. Most of these thinkers were not economists by training or profession.

## Chapter 2

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# An Adventure in Consilience

For me, thinking about narrative economics has been an adventure in the discovery of consilience. The word *consilience*, coined by philosopher of science William Whewell in 1840 and popularized by biologist E. O. Wilson in 1994, means the unity of knowledge among the differing academic disciplines, especially between the sciences and the humanities. All these different approaches to knowledge are relevant in understanding the real and human phenomenon of the economy and its sudden and surprising changes. When one reflects that the economy is composed of conscious living people, who view their actions in light of stories with emotions and ideas attached, one sees the need for many different perspectives. Narrative economics therefore requires concepts from most university departments.

Unfortunately, academic disciplines tend to become insular. A researcher cannot know everything, and so the impulse is to think one must specialize, narrowing one's inquiry to the point where one can reasonably judge that one has all relevant knowledge on a narrowly defined subject. To some extent, university researchers must live with this reality. But the impulse can go too far, and it often leads to overspecialization.

When economists want to understand the most significant economic events in history, they rarely focus on the important narratives that accompanied those events. As Figure 2.1 shows, economics has lagged behind most other disciplines in attending to the importance of narratives. And, while all disciplines increasingly pay attention to narratives, economics and finance are still playing catch-up, despite occasional calls for a broader approach to empirical economics.<sup>1</sup>

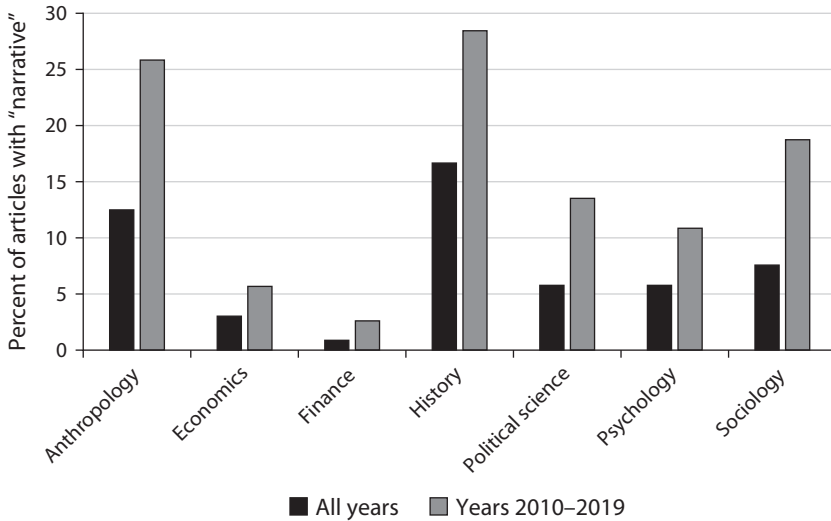


FIGURE 2.1. Articles Containing the Word *Narrative* as a Percentage of All Articles in Academic Disciplines

All fields show increased attention to narratives in recent years, but economics and finance are relative laggards. *Source:* Author's calculations using data from JSTOR.

Nor do most economists appear interested in using the enormous databases of written words that they might work with to study narratives. When they do use the word in published work, they most often do so casually and tangentially to refer to what they perceive to be a conventional view that they will criticize. In addition, they rarely document the narrative's popularity, convey its popular human-interest stories, or consider the impact of its popularity on economic behavior. Finally, the word *narrative* tends to appear in offbeat or popularizing economics journals. However, to the extent that an incipient theory of narrative economics holds promise for helping us better anticipate major economic events, economists can and should be learning more about narrative, gathering insights by scholars from the fields discussed in this chapter. This chapter is an exercise in consilience. It summarizes how thinkers in a variety of fields have used narrative to advance knowledge within their disciplines and across disciplines, and it provides a foundation on which economists might build to think more imaginatively about narrative.

## Epidemiology and Narrative

Medical schools have pursued mathematical modeling of the spread of disease epidemics for about a hundred years, making the field well developed and bursting with potential applications to economics. Epidemiology has produced not one model but rather many different models that can be applied to different circumstances, and it is central to this book, as we will see in subsequent chapters. For those who want to examine these mathematical models in detail, the appendix at the end of this book provides a survey of the models and their possible applications to economic narratives.

## History and Narrative

Historians have always displayed an appreciation for narratives. However, as historian Ramsay MacMullen noted in *Feelings in History: Ancient and Modern* (2003), a deep understanding of history requires inferring what was on the minds of the very people who made history—that is, what *their* narratives were. He does not literally stress the concept of narratives; he has told me that he would prefer a word conveying “stimulus to some emotional response, and there is no such word.” If we want to understand people’s actions, he argues, we need to study the “terms and images that energize.” For example, he asserts that it is impossible to understand why the American Civil War was fought unless we engage deeply with vividly told stories, such as the 1837 news story reporting an angry mob’s shooting of the abolitionist newspaper editor E. P. Lovejoy in Alton, Illinois, in 1837. This evocative story whipped antislavery sentiment in the North to a feverish fury that persisted for years. Academic discussion regarding the extent to which the Civil War was fought over slavery cannot be conclusive unless we take into account the emotional power of relevant narratives.

The late Douglass North, economic historian and Nobel laureate, echoes MacMullen’s conviction in his 2005 book, *Understanding the Process of Economic Change*, which emphasizes the importance of human intentionality, essentially in the form of narratives, in the development of economic institutions.

## **Insights from Sociology, Anthropology, Psychology, Marketing, Psychoanalysis, and Religious Studies**

In the social sciences, the last half century saw the blossoming of schools of thought that emphasize the study of popular narratives. Such study has been termed narrative psychology,<sup>2</sup> storytelling sociology,<sup>3</sup> psychoanalysis of narrative,<sup>4</sup> narrative approaches to religious studies,<sup>5</sup> narrative criminology,<sup>6</sup> folklore studies,<sup>7</sup> and word-of-mouth marketing,<sup>8</sup> among other terms. The overriding theme is that most people have little or nothing to say if you ask them to explain their objectives or philosophy of life, but they brighten at the opportunity to tell personal stories, which then reveal their values.<sup>9</sup> For example, in interviewing inmates at a prison, we find that the interviewee tends to respond well when asked to tell stories about other inmates, and these stories tend to convey a sense not of amorality but of altered morality.

Another example: anthropologist William M. O'Barr and economist John M. Conley interviewed investment managers about their business and found a widespread tendency for employees at the firm to tell a story about the founding of their firm and about its values.<sup>10</sup> The story has some common features across firms, and it is akin to the creation myths that, as anthropologists have noted, primitive tribes tell about their own origin. The story tends to center on one man (rarely a woman) who showed exceptional foresight or courage in founding the tribe—or, in this case, the firm. The narrative tends to revert to the founding-father story to justify the many stories about the firm as it exists today.

### **Literary Studies and Narrative**

Thinking about economic narratives brings economists to a corner of the university with which they are often unfamiliar: the literature department. Some literary theorists, inspired in part by psychoanalysis, the *archetypes* of Carl Jung<sup>11</sup> and the *phantasies* of Melanie Klein,<sup>12</sup> have found that certain basic story structures are repeated constantly, though the names and circumstances change from story to story, suggesting that

the human brain may have built-in receptors for certain stories. John G. Cawelti (1976) classifies what he calls “formula stories” with names like “the hard-boiled detective story” or the “gothic romance.” Vladimir Propp (1984) found thirty-one “functions” present in all folk stories, with abstract names like “violation of interdiction” and “villainy and lack.” According to Ronald B. Tobias (1999), in all of fiction there are only twenty master plots: “quest, adventure, pursuit, rescue, escape, revenge, the riddle, rivalry, underdog, temptation, metamorphosis, transformation, maturation, love, forbidden love, sacrifice, discovery, wretched excess, ascension, and descension.” Christopher Booker (2004) argues that there are only seven basic plots: “overcoming the monster, rags to riches, the quest, voyage and return, comedy, tragedy, and rebirth.”

According to literary theorist Mary Klages (2006), structuralist literary theory considers such efforts to list all basic stories as “overly reductive and dehumanizing.”<sup>13</sup> Although she dismisses other scholars’ lists of basic plots, she asserts, “Structuralists believe that the mechanisms which organize units and rules into meaningful systems come from the human mind itself.”<sup>14</sup> Peter Brooks (1992) says narratology should be concerned with “how narratives work on us, as readers, to create models of understanding, and why we need and want such shaping orders.”<sup>15</sup> Well-structured narratives, Brooks argues, “animate the sense-making process” and fulfill a “passion for meaning,”<sup>16</sup> and the study of narratives naturally leads to psychoanalysis.

Russian literature scholar Gary Saul Morson recently collaborated with economist Morton Schapiro in *Cents and Sensibility* (2017), in which they argue that a better appreciation of great novels—which bring us close to the essence of human experience—would help improve the modeling of economic life.

## Neuroscience, Neurolinguistics, and Narrative

Narratives take the form of sequences of words, which makes the principles of linguistics relevant. Words have both simple, direct meanings and connotations, in addition to metaphoric use. Modern



neurolinguistics probes into the brain structures and organization that support narratives.<sup>17</sup>

Contagious narratives often function as metaphors. That is, they suggest some idea, mechanism, or purpose not even mentioned in the story, and the story becomes in effect a name for it. The human brain tends to organize around metaphors. For example, we freely incorporate war metaphors in our speech. We say an argument was “shot down” or is “indefensible.” The human brain notices these words’ connection to war narratives, although the connection is not always a conscious one. The connection enriches the speech by suggesting other possibilities. So when we speak of a stock market “crash,” most of us are reminded of the rich story of the 1929 stock market crash and its aftermath. Linguist George Lakoff and philosopher Mark Johnson (2003) have argued that such metaphors are not only colorful ways of writing and speaking; they also mold our thoughts and affect our conclusions. Neuroscientist Oshin Vartanian (2012) notes that analogy and metaphor “reliably activate” consistent brain regions in fMRI images of the human brain. That is, the human brain seems wired to respond to stories that lead to thinking in analogies.

## **Consilience Calls for Collaborative Research**

The dazzling array of approaches to understanding the spread of narratives, briefly summarized in this chapter, means that collaborative research between economists and experts in other disciplines holds the promise of revolutionizing economics. Particularly important are the ideas and insights of epidemiologists, whose models successfully forecast the future trajectory of disease epidemics and explain how to counteract these epidemics. As we will see in the next chapter, economists can adapt these epidemiological models to improve their own models and forecasts. The marriage of economics and epidemiology is our first example of consilience in this book.

### Chapter 3

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## Contagion, Constellations, and Confluence

Before we embark on a study of how economic narratives go viral, it is helpful to consider how bacteria and viruses spread by contagion. The science of epidemiology offers valuable lessons and may help explain how the story of Bitcoin (and many other economic narratives) went viral.

Let us consider diseases first, caused by real viruses. Consider as an example the major Ebola epidemic that swept through West Africa—Guinea, Liberia, and Sierra Leone—between 2013 and 2015. Ebola is a viral disease for which there is no approved vaccine or treatment, and it kills most people who contract it. Ebola spreads from person to person via body fluids. Its infectiousness can be lowered through hospitalization and quarantine, and through proper handling and burial of the dead.

In Figure 3.1 we see a typical example of an epidemic curve, for Ebola, in a community, this from Liberia. Note that the number of newly reported Ebola cases has a hump-shaped pattern. The epidemic first rises, then falls. The rising period is a time when the *contagion rate*, the rate of increase of newly infected people, exceeds the recovery rate plus the death rate. During the rising period, the rise in the number of infected people due to contagion outnumbers the fall in the number due to recovery or death. The process is reversed during the falling period. That is, the fall in the number of infected people due to recovery or death outweighs the rise in the number due to contagion, putting the number infected into a steady downward path marking the termination of the epidemic.

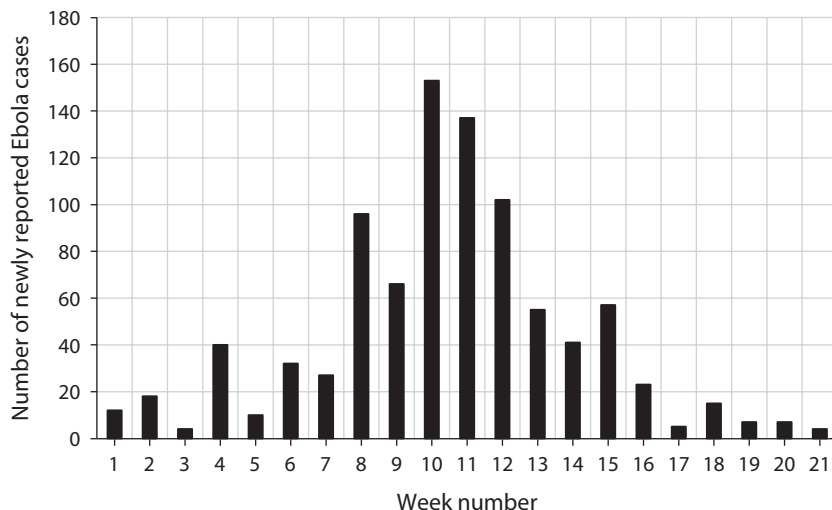


FIGURE 3.1. Epidemic Curve Example, Number of Newly Reported Ebola Cases in Lofa County, Liberia, by week, June 8–November 1, 2014

We will see many examples of economic narratives whose prevalence in digitized databases follows a similar hump-shaped pattern. *Source:* US Centers for Disease Control and Prevention.

After the epidemic started, contagion rates of the Ebola virus eventually fell for various reasons, notably the heroic efforts of Médecins Sans Frontières (Doctors Without Borders), more than a hundred nongovernmental organizations, and individuals who risked their lives to lower the contagion in Africa. According to the World Health Organization, health-care workers were twenty-one to thirty-two times more likely to catch the disease than the general population there, and there were 815 confirmed and probable cases of health-care worker infection as of 2015. Most of these workers died.<sup>1</sup>

## Contagion, Recovery, and Decline

Efforts to lower contagion rates by avoiding contact with sick people are hardly new. The history of quarantines extends back at least to 1377 when the city of Venice imposed during a plague a thirty-day isolation period on arrivals by sea, and then a forty-day isolation period for travelers by

land (the word *quarantine* derives from the Latin word for *forty*). The world has also seen occasional attempts to increase contagion as an act of war, as with the catapulting of dead bodies of plague victims into a fortified city at the Siege of Caffa, 1346.<sup>2</sup>

Another mechanism for a declining contagion rate is a decrease in the pool of susceptible people. This pool decreases through time because many people who had the disease are now immune to it (or dead). This mechanism, modeled in the appendix (p. 289), occurs even if no health-care workers take action to contain the disease, as in long-ago epidemics before modern medicine. Eventually, those epidemics ended before everyone was infected.

When the contagion rate is lower than the recovery rate plus the death rate, the disease does not disappear immediately. The contagion rate is not reduced to zero. All that is necessary to conquer the epidemic is to lower the contagion rate below the recovery rate. Unless the contagion rate is zero, there will still be new cases of the disease, but the total number of sick people declines, gradually tailing off to zero, at which point the epidemic ends.

We are talking here of the *average* contagion rate and *average* recovery rate, averaging over many people. However, both the contagion rate and the recovery rate can differ greatly from one individual carrier to another. A relatively small percentage of super-spreaders can infect many people. One such super-spreader was Mary Mallon, “Typhoid Mary,” who a century ago spread typhoid fever to at least 122 people over an interval of years.<sup>3</sup> In the context of narratives, most of us may not be contagious enough for long enough to cause an epidemic without the presence of these super-spreaders, and because of a small fraction of super-spreaders the average contagion rate can be much higher than the typical contagion rate. Today’s narrative super-spreaders may be enabled by marketing using accelerated analytics, such as recently provided by NVIDIA Corporation or Advanced Micro Devices, Inc., which is invisible to most of us. So we can’t always accurately judge the contagiousness of a narrative by our own fascination with it.

Both the appearance of the disease epidemic at a given time and place, and the decline in the epidemic after its peak tend to be mysterious. Many

factors influence the contagion rate and recovery rate, factors that may be hard to document. For example, the ultimate reason for the recovery could be a change in the weather, which is more readily documented, or it could be a decrease in the number of encounters between people that allow for transmission of the disease, which might be hard to document. Or it might be some combination of the two. The changes need not be big or obvious.

We can apply this same model to epidemics of economic narratives. Contagion occurs from person to person through talk, whether in person or through telephone or social media. There is also contagion from one news outlet and talk show to another, as they watch and read one another's stories. Once again, the ultimate causes of the epidemic might not be obvious. Fortunately, most economic narratives do not result in deaths, but the basic process is the same. The "recovery plus deaths" variable in the medical model is simply recovery, loss of interest in the narrative, or forgetting in the economic model we are developing. Economic narratives follow the same pattern as the spread of disease: a rising number of infected people who spread the narrative for a while, followed by a period of forgetting and falling interest in talking about the narrative.<sup>4</sup>

In both medical and narrative epidemics, we see the same basic principle at work: the contagion rate must exceed the recovery rate for an epidemic to get started. For example, when Ebola is found to have infected hundreds of people in one town and virtually nobody in another, the explanation could be some inconspicuous factor that made Ebola contagion rates higher in Town #1 than in Town #2, putting the Town #1 contagion rate above the recovery rate at the beginning of the epidemic. Meanwhile, in Town #2, there is no epidemic because the contagion rate isn't quite high enough to offset recovery. Similarly, with narrative epidemics there may be two different narratives, one with some minor story details that make it more contagious than the other. The minor story details make the first narrative, and not the second, into an epidemic. Let's apply this insight to the Bitcoin narrative.

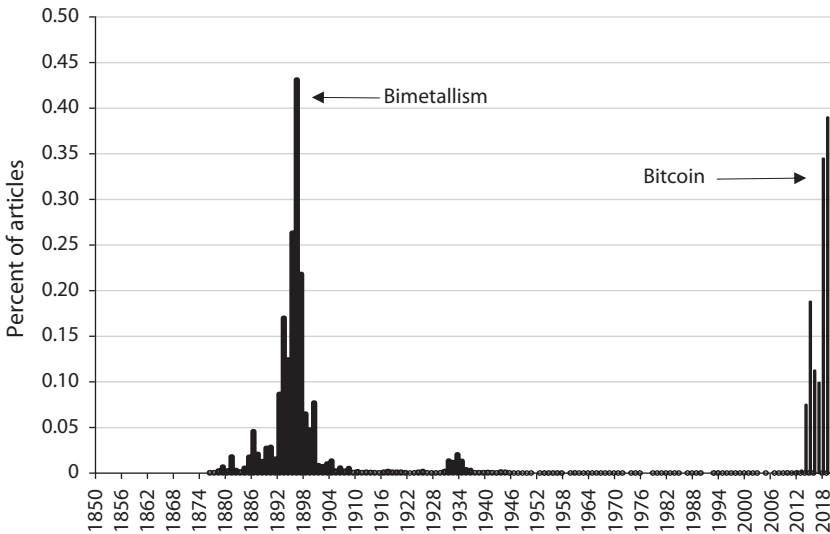


FIGURE 3.2. Percentage of All Articles by Year Using the Word *Bimetallism* or *Bitcoin* in News and Newspapers, 1850–2019

There is a remarkably similar epidemic pattern to the two popular “bi-” monetary innovation narratives a century apart and similarity to the disease epidemic curve in Figure 3.1.

Source: Author’s calculations using data from ProQuest News & Newspapers.

## Contagion of the Bitcoin Narrative

Figure 3.2 plots the frequency of appearance in news articles of the words *bimetallism* and *Bitcoin*. This figure is not a plot of a price but rather an indicator of public attention. Both bimetallism and Bitcoin represent radical ideas for the transformation of the monetary standard, with alleged miraculous benefits to the economy. Each word is a marker for a constellation of stories that include not only stories of theory but also human-interest stories. The plots for both words look quite similar, and each is similar to a typical infective curve as seen in Figure 3.1. We haven’t seen a definitive end of the Bitcoin narrative yet, as we did with bimetallism; only time will tell.

We will discuss the remarkable bimetallism epidemic at length in chapter 12, along with other narrative epidemics. For now, it is enough to know that bimetallism and Bitcoin both invoke monetary theory. In both cases, an enormous number of people began to regard a particular

innovation as cool, trendy, or cutting-edge. In both cases, the contagion is represented by a hump-shaped curve resembling an epidemic curve. In contrast, in Figure 3.2, the curves look more spiky (that is, compressed left to right) because the figure plots more than a century of data, beyond the virulent periods. In fact, the bimetallism and Bitcoin narratives played out over years, rather than weeks as in the case of Ebola, but the same epidemic theory applies to all three. In the case of bimetallism, we also see a smaller secondary epidemic in the 1930s, during the Great Depression, but it never amounted to much. It was like a secondary epidemic of a disease.

So narrative epidemics really mimic disease epidemics. And it is more than just that. It is interesting also to note that there are co-epidemics of diseases and narratives together. Medical researchers in the Congo during a 2018 outbreak of Ebola linked the high contagion to narratives reaching the population. Over 80% of the interviewees said they had heard misinformation that “Ebola does not exist,” “Ebola is fabricated for financial gains,” and “Ebola is fabricated to destabilize the region.” For each of these statements, over 25% said they believed the narrative. These narratives discouraged prevention measures and amplified the disease.<sup>5</sup> The two epidemics fed on each other to grow large.

The appendix to this book looks at theories and models from epidemiology, including the original 1927 Kermack-McKendrick SIR model, to help explain the spread of economic narratives. These models divide the population into compartments: susceptible to the disease ( $S$ ), infected and spreading the disease ( $I$ ), and recovered or dead ( $R$ ). All of the models feature contagion rates and recovery rates. We can think of Figures 3.1 and 3.2 as evidence on the number of infectives ( $I$ ). These models tend to predict hump-shaped paths for an epidemic, like that in Figure A.1 in the appendix, page 291, even if there is no medical intervention at all. The epidemic will eventually start weakening because the percentage of the population that has still not been exposed to the disease is declining, bringing down the contagion rate below the recovery rate.

In the appendix we will see also that the time to peak and the duration of an epidemic can vary widely, determined by model parameters. The Ebola epidemic ran for a matter of months in a given locale, but we

should not assume that all epidemics must follow that same short timetable. In other words, the Ebola epidemic could have stretched on for years if the initial contagion rate had been lower, so long as contagion did not fall below recovery.

For example, epidemiologists have described the acquired immune deficiency syndrome (AIDS) caused by the human immune deficiency virus (HIV) as not very contagious, and they have recommended that health-care professionals should not shrink from treating HIV patients for fear of catching it.<sup>6</sup> AIDS tends to be transmitted only in certain circumstances involving unsafe practices. AIDS has been a slow epidemic, developing over decades, even slower than the bimetalism and Bitcoin epidemics, and it is able to grow despite low contagion because it has a smaller recovery rate: an HIV-infected person can continue to infect others for many years.

## The Contagion of Economic Models

In 2011, Jean-Baptiste Michel and a team of coauthors published an article in *Science* providing evidence that mentions of famous people in books tend to follow a hump-shaped pattern through time, rising, then falling, over decades rather than months or years. They amplified their conclusions in a book, *Uncharted: Big Data as a Lens on Human Culture*, by Erez Aiden and Jean-Baptiste Michel (2013).

The same patterns seem to apply to economic theories. In chapter 5 we consider the contagion of one of these narratives, the Laffer curve, a simple model of the relationship between tax rates and the amount of tax revenue collected. But let us first note briefly that these patterns apply even to “highbrow” economic theories that circulate primarily among professional economists. Figure 3.3 shows Google Ngrams results for four economic theories: the IS-LM model (published by Sir John Hicks in 1937), the multiplier-accelerator model (Paul A. Samuelson, 1939),<sup>7</sup> the overlapping generations model (Samuelson, 1958), and the real business cycle model (Finn E. Kydland and Edward C. Prescott, 1982). All show hump-shaped patterns similar to those of disease epidemics.<sup>8</sup> For our purposes here, it doesn’t matter what is in these theories. None of them



has been proven completely right or wrong. They are all potentially interesting. Each of them is a story whose popularity followed the expected path of an epidemic.

For three of the models, the epidemic first became visible more than a decade after the model was introduced, a phenomenon that we also see in the medical-epidemic framework, where epidemics may go unobserved for a while after very small beginnings. The number of cases may be growing steadily percentage-wise, but the disease fails to be widely noticed until the number of cases hits a certain threshold. In practice, the long lag between the publication of an economic theory and its eventual strong epidemic status represents a time interval over which the model evolves from something regarded as peculiar and thought provoking into something that is clearly correct and recognizably great. Over this gestational interval, other scholars in the discipline increasingly appreciate the model, and the epidemic spreads through academic rituals, such as paper presentations at seminars and major conferences.<sup>9</sup> Eventually the models make their way into textbooks. Still later, the model is talked about enough that the news media begin to feel that it should be mentioned, and people outside of the economics profession who pride themselves on their general knowledge begin to feel they should know something about it. But in this late stage of the epidemic, the model may begin to lose some of its contagion. Some people begin to consider it stale and unoriginal even if it has merit, while others end up forgetting about it completely.

The contagion of these theories did not generally take the form of someone sitting down with a pencil and paper and saying, "Let me explain the IS-LM model to you." In most cases, the communication was probably much more elementary and human. Economic historian Warren Young suspects that the contagion of the IS-LM diagram had something to do with its resemblance to the intersection of supply and demand that is perhaps the most famous image in all of economics.<sup>10</sup>

In addition, the IS-LM model was a formalization of John Maynard Keynes's theory. Keynes was a brilliant writer, but as we have seen, many narratives are associated with celebrities. Keynes himself was a colorful figure and a celebrity in his own right: he hobnobbed with the

Bloomsbury group of artists and intellectuals, among other celebrities (including the writer Virginia Woolf, who was embarking on her own epidemic of fame, which did not peak at least until near the end of the twentieth century, long after her death in 1941). Keynes was reputed to be gay or bisexual, and his male relationships were well known among the tolerant Bloomsbury group, providing a spicy bit of gossip that, at that time, could travel only by word of mouth. Gayness was not generally a good thing for one's career in Keynes's day, but it might have been in the context of a certain narrative. Keynes later married a beautiful ballerina, Lydia Lopokova, who experienced her own epidemic of popularity after she retired from dancing, likely because of her association with Keynes. And, as we have already noted, Keynes was famous for his 1919 best seller, *Economic Consequences of the Peace*, which in effect predicted World War II. In contrast, John Hicks, who first published the IS-LM model, was not quite so colorful a figure. Thus stories about Keynes were possibly "donkeys" that helped carry the IS-LM model to contagion.<sup>11</sup>

Figure 3.3 shows the life history of four economic models. These histories resemble not only the normal course of a disease epidemic but also the life history of other kinds of narratives. Elements of the essential ideas in economic narratives may survive as they are adapted and incorporated in later narratives involving other contagious ideas, but they tend to lose their punch and identity in the process. Their ability to direct thought and action becomes much diminished.

A key proposition of this book is that economic fluctuations are substantially driven by contagion of oversimplified and easily transmitted variants of economic narratives. These ideas color people's loose thinking and actions. As with disease epidemics, not everyone becomes infected. In the case of narrative epidemics, the people who miss the epidemic may tell you that there was no such important popular narrative. But in a historic epidemic, for most people the narrative will be fundamental to their reasons for doing, or not doing, things that affect the economy. Just like the economic theories in Figure 3.3, popular theories among the general public grow on an upward epidemic path, but only for a while. They then recede unless they get renewed.

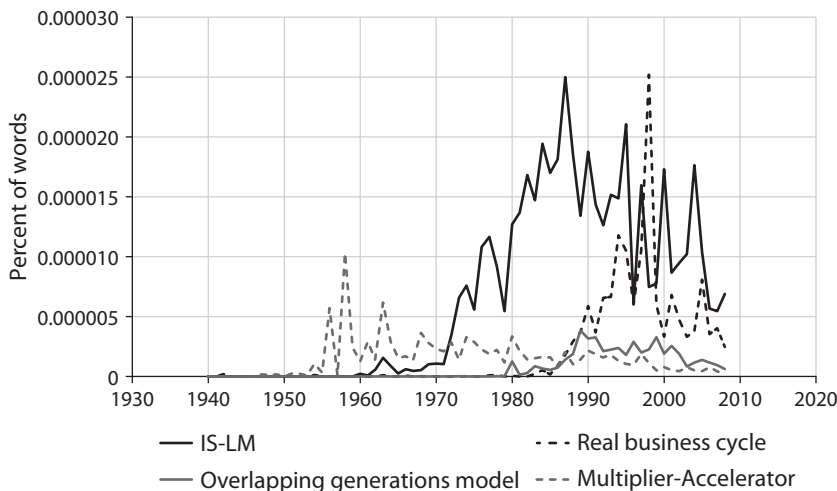


FIGURE 3.3. Frequency of Appearance of Four Economic Theories, 1940–2008

The figure shows four important models: the IS-LM model (Hicks, 1937), the multiplier-accelerator model (Samuelson, 1939), the overlapping generations model (Samuelson, 1958), and the real business cycle model (Kydland and Prescott, 1982). All four show hump-shaped patterns through time. *Source*: Google Ngrams, no smoothing.

It is noteworthy that Keynes's book *The General Theory of Employment, Interest, and Money* (1936) put forth the idea of a perfectly mechanical contagion without using that phrase. According to Keynesian theory, an economic boom starts when some initial stimulus, such as government deficit spending, causes an initial increase in some people's income. These people then spend much of their additional income, which in turn generates income for other people who sell to them or work for companies that sell to them. They in turn spend much of this extra income, thus generating another round of income increases for yet other people, and so on in multiple rounds of expenditure. The Keynesian theory can be tweaked to add some investment dynamics, as Paul Samuelson showed in 1939 with his multiplier-accelerator model, thus creating hump-shaped responses in national income as a result of an economic stimulus. These hump-shaped responses resemble the epidemic curves we have seen. We can view the Keynes-Samuelson

model as an epidemic model of sorts, where the contagious element is income. However, it is not enough to think solely in terms of mechanical, multiple rounds of expenditure. We must think of multiple rounds of expansion of economic narratives, and of the ideas and feelings embodied in them.

## Constellations and Confluences of Narratives

Just as the world experiences co-epidemics of diseases, where two or more diseases interact positively with each other, we also see co-epidemics of narratives in which the narratives are perceived as sharing a common theme, such as case studies that illuminate a political argument, creating a picture in the mind that is hard to see if one focuses on just one of the narratives. In other words, large-scale economic narratives are often composed of a *constellation* of many smaller narratives. Each smaller narrative may suggest a part of a larger story, but we need to see the full constellation to discern the full theme.

The analogy to constellations should be clarified. Astronomical constellations, such as Cygnus the Swan, are chance alignments of stars, but humans interpret them in a way that seems natural to the human mind—in this case, as a swan. Sometimes humans co-opt constellations for certain purposes. For example, Christians have renamed Cygnus as the Northern Cross to put one of their symbols in the sky. They also paired it with another constellation, the Southern Cross, for people living in the Southern Hemisphere. Other groups and cultures have different narratives with other motivations.

Narratives appear in constellations partly because their credibility relies on a set of other narratives that are currently extant. That is, they sound plausible and interesting in the context of the other narratives. The storyteller does not need to refute the other narratives to set the stage for the current one. Also, the narrative may be based on certain assumed facts that the teller and the listener do not know how to test. Some narratives are contagious because they seem to offer a confirming fact. We can say with some accuracy that most people put on a show of their own

knowledgeability and try to conceal their ignorance of millions of facts. Hence narratives that seem contrary to prevailing thought may have lower contagion rates that do not result in epidemics.

Some narrative constellations may at their peak infect only a small fraction of the population, but if that fraction of the population curtails its spending substantially, the narrative may matter a lot. For example, if the narrative has reached only 20% of a country's population, but that fraction decides to postpone purchasing a new car or fixing up their house, the impact of its decreased spending may be big enough to tip the country into a recession.

In addition to a *constellation* of narratives, there is a *confluence* of narratives that may help drive economic events. By a confluence, I mean a group of narratives that are not viewed as particularly associated with one another but that have similar economic effects at a point in time and so may explain an exceptionally large economic event. For example, in my 2000 book *Irrational Exuberance*, I listed a dozen precipitating factors, or narratives, that happened to occur together around 2000 to create the most elevated stock market in the United States ever, soon to be followed by a crash. The list, in brief, comprised the World Wide Web, the triumph of capitalism, business success stories, Republican dominance, baby boomers retiring, business media expansion, optimistic analysts, new retirement plans, mutual funds, decline of inflation, expanding volume of trade, and rising culture of gambling. If we want to know why an unusually large economic event happened, we need to list the seemingly unrelated narratives that all happened to be going viral at around the same time and affecting the economy in the same direction. However, it is important to recognize that big economic events usually can't be described as caused by just a single constellation of narratives. It is far more likely that big economic events are not explainable in such satisfying terms. Instead, explaining those events requires making a list of economic narratives that itself cannot be described as a simple story or a contagious narrative.

In part III of this book, we focus on some of the brighter stars in the narrative constellations, those that are significant enough to contribute

substantially to changes in economic motivations. We cannot yet link these constellations precisely to severe economic events. But even with partial views of the constellations and confluences, we are making progress toward understanding the events.

We also have no more than a partial view of the forces that make some narratives into epidemics. The ability of narratives to “go viral” is something of a mystery, which we attempt to unravel in the next chapter.

## **Chapter 4**

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# **Why Do Some Narratives Go Viral?**

It is difficult to state accurately or to quantify the reason a few economic narratives go viral while most fail to do so. The answer lies in a human element that interacts with economic circumstances. Beyond some simple and predictable regularities, a network of human minds sometimes acts almost like a random number generator in selecting which narratives go viral. The apparent randomness in outcomes has to do with randomness in the mutation of stories to more contagious forms, and with moments of our individual lives and attentions, that can lead to a sudden climax of public attention to specific narratives. We routinely find ourselves puzzling years later over the reasons for the success of popular narratives in history and for their economic consequences.

### **The Spontaneity of Narratives in Human Thinking and Actions**

At the beginning of the twentieth century, scholars from a wide array of disciplines began to think that narratives, stories that seem to have entertainment value only, are central to human thinking and motivation. For example, in 1938 the existentialist philosopher Jean-Paul Sartre wrote,

A man is always a teller of tales, he lives surrounded by his stories and the stories of others, he sees everything that happens to him through them; and he tries to live his life as if he were recounting it.<sup>1</sup>

The story of oneself and the stories one tells about others inevitably have diverse connections to what we call “human interest,” either directly or indirectly.

When we are asleep at night, narratives appear to us in the form of dreams. We do not dream of equations or geometric figures without some human element. Neuroscientists have described dreaming, which involves characters, settings, and a hierarchical event structure, as based on a storytelling instinct. In fact, the brain’s activity during dreaming resembles the activity of certain damaged brains, in which lesions of the anterior limbic system and its subcortical connections lead to spontaneous confabulation.<sup>2</sup>

In their attempts to understand social movements, sociologists have begun to think of the contagion of narratives as central to social change. For example, sociologist Francesca Polletta, who studied the sit-in social movement of the 1960s in which white Americans participated in protests of discrimination against blacks, reported that students described the demonstrations as unplanned, impulsive, “like a fever,” and “over and over again, spontaneous.”<sup>3</sup> These demonstrations were often driven by a particular popular narrative about blacks demanding service at lunch counters that were labeled as “white only,” accompanied by young white supporters who showed moral outrage at the exclusion of blacks. This kind of protest, christened the “sit-in,” ultimately became a symbol of a new social movement.

The sit-in story emerged from a single story about a February 1, 1960, protest involving four students from Greensboro Agricultural and Technical College. The story revolved around polite young black people who ignored orders to leave the lunch counter where blacks were not served. The young people sat patiently, waiting to be served, until the restaurant closed, and they returned the next day with more young people. The story went viral, through word of mouth and through news media attention, and within weeks the sit-ins spread throughout much of the United States. The story’s spread was not entirely unplanned, Polletta concludes. Activists tried to promulgate the story, but they were not in tight control of the social movement, which was largely viral. The word *sit-in*, coined in 1960, was a true epidemic, with a hump-shaped curve resembling the



hump-shaped pattern through time that we see in disease epidemics (see Figure A.1). Use of the term *sit-in*, as revealed by Google Ngrams, grew until 1970, ten years later. In the interim, the movement spawned the word *teach-in*, which had a similar epidemic curve, though less intense and fading earlier.

Several generations earlier, another story had raised white people's sympathy for the plight of black people in the United States. It appeared in Harriet Beecher Stowe's 1852 novel *Uncle Tom's Cabin*. The book was the most successful novel in the nineteenth-century United States, selling over a million copies when the country's population was much smaller and less able to afford books. It tells the story of an older slave, Uncle Tom, who loves children and who tells stories to Little Eva, the white slave owner's innocent little daughter. Eva, still a child, dies of a sudden illness, but not before asking to have locks of her hair cut off and distributed to the slaves, with a wish that she will see them again in heaven. Tom is separated from his wife and children and sold to a vicious slave owner, Simon Legree, who beats him mercilessly for refusing orders to beat another slave.

The book contains some highly evocative scenes, including one of a slave mother, Eliza, fleeing with her four-year-old son after she is told that he will be sold. Pursued by the slave owner's bloodhounds, Eliza clutches her son as she struggles to cross the dangerous ice of the Ohio River. A hit song (in the form of sheet music), "Eliza's Flight," appeared in 1852, and numerous plays, called "Tom shows," typically including the Eliza scene, sprang up all over the northern United States, likely infecting far more people than the printed book did. The Uncle Tom, Simon Legree, and Eliza narratives played an unmistakable role in the North's decision to invade the South after it seceded. The Civil War began in 1861, a historic event with enormous human and economic significance.

## On the Universality of Narrative

Anthropologists, who research the behavior of diverse cultures around the world, have observed a class of behaviors that they call "universals," found in every human society if not in every individual. Anthropologist

Donald E. Brown identified a universal that is important to this book: that people “use narrative to explain how things came to be and to tell stories.”<sup>4</sup> In fact, the narrative is a uniquely human phenomenon, not shared by any other species. Indeed, some have suggested that stories distinguish humans from animals, and even that our species be called *Homo narrans* (Fisher, 1984), *Homo narrator* (Gould, 1994), or *Homo narrativus* (Ferrand and Weil, 2001). Might this description be more accurate than *Homo sapiens* (i.e., wise man)? It is more flattering to think of ourselves as *Homo sapiens*, but not necessarily more accurate.

In ancient Greece, the philosopher Plato appreciated the importance of narratives; he wrote his philosophy in the form of fictional dialogues featuring the celebrity Socrates. The narrative force helps to explain what makes his work still popular today. In his dialogue *Republic*, written around 380 BCE, Plato has a character argue that the government should censor popular stories. Talking with Adeimantus, Socrates says:

I do not say that these horrible stories may not have a use of some kind; but there is a danger that the nerves of our guardians may be rendered too excitable and effeminate by them.<sup>5</sup>

In his book *De Oratore* (*On the Orator*, 55 BCE), itself a book about narrative, the Roman senator Cicero says:

Nature forms and produces men to be facetious mimics or storytellers; their look, and voice, and mode of expression assisting their conceptions.<sup>6</sup>

Other species have culture, but narratives do not transmit that culture. How is it that other animals learn fundamental survival skills, such as fearing specific predators? Experiments have shown that monkeys are genetically predisposed to fear snakes, and birds are genetically predisposed to be afraid of hawks. Moreover, experiments have shown that monkeys and birds acquire fear when they observe others attack their own species. They also acquire fear, even lasting fear, when they observe circumstances that arouse fear among others in their group even if no attack occurs.<sup>7</sup> But that mechanism of cultural transmission is imperfect, and the ability to transfer stories with language is uniquely human.

Human narratives' power in inspiring fear lies in the fact that the information can be transmitted without any observation of the fear-inducing stimulus. If the narrative is strong enough to generate a salient emotional response, it can produce a strong reaction, such as an instinctual fight-or-flight response.

Also universal are norms of polite conversations that facilitate the transmission of narratives. Basic politeness involves simple actions like looking at the person with whom one is speaking, and giving some indication of hello at the beginning of the conversation and good-bye at the end. These norms tend to flatter the other party. They are so engrained that, as experiments have shown, people are somewhat polite when conversing with computers too.<sup>8</sup> Visitors to any human society will observe people facing each other, sitting around the television or the campfire, and talking—and, more recently, tweeting and posting to other social media—to learn others' reactions, to seek feedback that will either confirm or disconfirm their thoughts. It seems that the human mind strives to reach an enduring understanding of events by forming them into a narrative that is embedded in social interactions.

It has also been suggested that our species be called *Homo musicus*, man the musician, because composed music is found in all human cultures, but in no nonhuman species.<sup>9</sup> Linguist Ray Jackendoff sees many parallels between mental processing of narrative and of music.<sup>10</sup> In his book *Music, Language, and the Brain*, Aniruddh Patel concludes there is a "narrative tendency" in music.<sup>11</sup> Purely instrumental music does exist, but when it is successful in the marketplace, it typically merges into program music or symphonic poems whose titles or movements suggested a story that stimulates the listener's imagination. According to musicologist Anthony Newcomb, the classical symphony is in effect a "composed novel" that at least vaguely, emotionally, suggests a story.<sup>12</sup>

## Conspiracy Theories in Narrative

Popular narratives often have an underlying "us versus them" theme, a Manichaeian tone that reveals the evil or absurdity of certain characters in the story. Jokes are quite often at somebody else's expense—members

of some other group. In extreme cases, they may focus on events as evidence of an imagined conspiracy. According to historian Richard Hofstadter, who offers many examples of unfounded conspiracy theories in US history, the narratives tend to show “almost touching concern with factuality,”<sup>13</sup> despite often being almost absurd. Of course, it is rational for people to be alert to conspiracies, because history is filled with real conspiracies. But the human mind seems to have a built-in interest in conspiracies, a tendency to form a personal identity and a loyalty to friends based on the desire to protect oneself from the perceived plots of others. This disposition appears to be related to human patterns of reciprocity and of vengeance against presumed enemies, two tendencies that have been found relevant to economic behavior in terms of willingness to give in bargaining or eagerness to punish unfair behavior, even if doing so means economic loss.<sup>14</sup>

## Story and Narrative

The words *narrative* and *story* are often used interchangeably. But according to the Merriam-Webster online dictionary, a narrative is “a way of presenting or understanding a situation or series of events that reflects and promotes a particular point of view or set of values.”<sup>15</sup> So a narrative is a particular form of a story, or of stories, suggesting the important elements and their significance to the receiver. Narratives generally take the form of some recounting of events, whether actual or fictional, though often the specific events described are little more than bits of color brightening a concept and making it more contagious.

The human tendency to form simple narratives around even the most complex chains of events infects even the most analytical minds. Garry Kasparov, international chess grandmaster, commented from his own experience:

The biggest problem was that even the players would fall into the trap of seeing each game of chess as a story, a coherent narrative with a beginning and a middle and a finish, with a few twists and turns along the way. And, of course, a moral at the end of the story.<sup>16</sup>

Historian Hayden White has emphasized the distinction between a historical narrative and a historical chronicle, which merely lists sequences of events:

The demand for closure in the historical story is a demand, I suggest, for moral meaning, a demand that sequences of real events be assessed as to their significance as elements of a *moral* drama.<sup>17</sup>

Economists have tended to write theories as if a benevolent dictator can implement a specific plan to achieve the greatest social welfare. But we have no such planner. We do have people who can be selfish, altruistic, or both. These people can be influenced by stories.

### Of Scripts and Rolling Suitcases

According to psychologists Roger C. Schank and Robert P. Abelson, narratives may be seen as nothing more than *scripts*.<sup>18</sup> These scripts are also called *social norms*, and they partially govern our activities, including our economic actions. For example, the “prudent person rule” in finance is one social norm with economic impact. Fiduciaries and experts do not have the right to act on their own judgment. Instead, they must instead mimic a “prudent person,” which in effect means following a script.<sup>19</sup>

When in doubt about how to behave in an ambiguous situation, people may think back to narratives and adopt a role they have heard of, as if they are acting in a play they have seen before. We can debate whether such behavior is rational. In one sense it is rational to copy the behavior of apparently successful people, even if one does not see any logic in the behavior. Those being copied might have mysterious or unobserved reasons for such behavior, and their success suggests they have at least stumbled onto an advantageous behavior. But traditional economic theory does not model this kind of rationality. It sees the following of others’ behavior as more reflexive, not as a thoughtful application of the principle “When in doubt, imitate.” This reflexivity does not generally follow the typical economic assumption that people attempt to maximize their utility based on all available information. On the contrary, following scripts set by others often looks like quite stupid behavior.

People often fail to notice ideas if those ideas are not part of a script or are not packaged well enough. In my 2003 book *The New Financial Order*, I argued that some obvious financial inventions have not been adopted anywhere, and I asked: Why? As an analogy, I gave the example of wheeled suitcases. These did not become popular until the 1990s, when a Northwest Airlines pilot, Robert Plath, invented his Rollaboard with both wheels and a rigid handle that can collapse into the suitcase. An earlier version of the wheeled suitcase by Bernard Sadow in 1972 had achieved only limited acceptance. The traveler pulled it along by a leather strap, and it worked moderately well, though not perfectly because it tended to flop over sideways. Still, it was a big improvement over non-wheeled suitcases. Sadow had great difficulty getting his wheeled suitcase accepted in the market. Nobody was interested, but why? The idea was good, and today almost every traveler owns Rollaboards or their descendants. Most people wouldn't even think about buying a suitcase without wheels.

Years after *The New Financial Order* was published, I received an email from a former patent examiner who told me of a wheeled trunk patent in 1887, and it looks like much the same idea.<sup>20</sup> But I could not find it advertised in newspapers of that era. I later found a 1951 article by John Allan May, who recounted his efforts to manufacture and sell a wheeled suitcase starting in 1932. May wrote:

And they laughed. I was very serious about it. But they laughed, the whole lot of them.

When I spoke to any group about the further application of the theory of wheels they would express themselves as vastly entertained in a kind of soporific way.

(Why not make full use of the wheel? Why haven't we fitted people with wheels?) . . .

I calculate I have outlined the wheeled suitcase idea to 125 groups of people and possibly 1,500 individuals. My wife tired of hearing about it back in 1937. The only man who ever took me seriously was an inventor who lived for a time a couple of houses away. The trouble was, nobody took him seriously.<sup>21</sup>

I have never understood why the wheeled-suitcase idea wasn't absolutely contagious. My best guess is that, with Plath's invention, glamour overcame the sense that wheels on a suitcase looked ridiculous. Its 1991 newspaper ads attached the Rollaboard narrative to airlines, which seemed much more glamorous in the 1990s than they do today:

It's pilot-designed and approved for carry-on aboard most airlines. With its built-in wheels and retractable handle you can roll it through the airport, aboard the plane and down the aisle.<sup>22</sup>

The epidemic was fueled when flight crews adopted the Rollaboards, and passengers saw these glamorous-looking people walking through airports, pulling their Rollaboards effortlessly behind them. By 1993, the ads for Rollaboards took advantage of this publicity, citing them as the "first choice of aircrews worldwide." Maybe that is all it took to make a good idea, over a hundred years old, suddenly contagious.

## Experimental Evidence on Virality

Experimental evidence shows that the success of individual creative works depends on how people assess the reactions of others who are observing the work. In one experiment,<sup>23</sup> sociologist Matthew J. Salganik and his colleagues set up an "artificial music market" online. The market included an array of songs that customers could listen to, rate, and, if they chose, download. Unknown bands performed all the songs, and none of the listeners had ever heard any of the songs before taking part in the experiment.

This artificial market simulated real online markets in that subjects never communicated with one another except that they could observe the popularity of songs. This popularity ranking was the only "spark." The subjects were randomly assigned to two conditions: independent and shared. Those in the independent condition had to choose songs entirely independently, never seeing others' choices. Those in the shared condition were divided into eight worlds and saw others' downloads in their own world only. In the extreme shared condition, the computer screen always showed the songs in rank order in terms of popularity measured

by downloads. The first subject-customer to buy in each shared-condition world saw no information about others' choices, the second customer saw the first customer's first choice, the third customer saw the first two customers' choices, and so on.

The researchers found that each of the eight worlds developed its own set of hits, only imperfectly correlated across worlds, and that the inequality of success across worlds was uniformly higher than in the independent world where customers never saw information about others' choices. It seems logical to conclude that something about the random initial choices in the shared worlds got amplified as time went on. In the real world, the effect is likely even stronger because real-world marketers attempt to play up the audience size as much as possible. This research may be taken as experimental confirmation that random small beginnings can lead to big epidemics.

The lesson is that history, including economic history, is not the logically ordered sequence of events that is presented by subsequent narratives that try to make sense of it or try to achieve public consensus. Major things happen because of seemingly irrelevant mutations in narratives that have slightly higher contagion rates, slightly lower forgetting rates, or first-mover effects that give one set of competing narratives a head start. These random events can feed back into bigger and more pervasive narrative constellations, as we will see in the next chapter, which examines the narrative constellations associated with the famous (or infamous) Laffer curve.



## Chapter 5

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# The Laffer Curve and Rubik's Cube Go Viral

One of the toughest challenges in the study of narratives is predicting the all-important contagion rates and recovery rates. Despite all the work by epidemiologists and other scholars, we can't precisely observe the mental and social processes that create contagion, and so we have trouble understanding how they play themselves out.<sup>1</sup>

To take an example from popular culture, predicting the success of motion pictures before their release is widely known to be all but impossible.<sup>2</sup> Jack Valenti, former president of the Motion Picture Association of America, said:

With all the experience, with all the creative instincts of the wisest people in our business, *no one, absolutely no one* can tell you what a movie is going to do in the marketplace. . . . Not until the film opens in a darkened theater and sparks fly up between the screen and the audience can you say this film is right.<sup>3</sup>

Screenwriter William Goldman had a similar thought, in the opening lines of his book:

Nobody knows anything. Not one person in the entire motion picture field knows for a certainty what's going to work. Every time out it's a guess and, if you're lucky, an educated one.<sup>4</sup>

In fact, many films and songs by one-hit wonders<sup>5</sup> attest to the difficulty of going viral. The same person who's had a hit often can't do it again. Also,

hits from past years never seem to become real hits again, at least not without significant modification.

Economics has its own one-hit wonders, including the now-infamous Laffer curve. Examining how this economic narrative went viral provides further insight into how economic narratives lead to real-world results.

## The Laffer Curve and the Infamous Napkin

The Laffer curve is a diagram famously used by economist Art Laffer at a dinner in 1974 to justify the government cutting taxes without cutting expenditures, which would please many voters, if the justification were valid. The narrative can be spotted by searching for the words “Laffer curve” (see Figure 5.1). There are two epidemic-like curves (not to be confused with the Laffer curve itself) in succession, the first rising until the early 1980s, the second rising after 2000, when it became involved with another narrative justifying government deficits, associated with the words “modern monetary theory.”

The Laffer curve looks like a simple diagram from an introductory economics textbook, with one important difference: it is very famous among the general public. The curve, which takes an inverted U-shape, relates national income tax revenue to the rate at which income is taxed, taking account of the fact that higher tax rates make people work less, thus decreasing national income. The concept sounds like something that most people would find dull and boring. But, somehow, the Laffer curve went viral (Figure 5.1).

The Laffer curve described in the narratives that are tallied in the figure owes much of its contagion to the fact that it was used to justify major tax cuts for people with higher incomes. The Laffer curve’s contagion related to fundamental political changes associated with Ronald Reagan, who was elected US president in 1980, and with Margaret Thatcher, who became prime minister in the United Kingdom a year earlier, in 1979. Both were conservatives whose campaigns promised to cut taxes. However, the Laffer curve narrative may not have played a role in France’s election of a socialist president, François Mitterrand, around the same time. An analysis of digitized French newspapers shows that



FIGURE 5.1. Frequency of Appearance of the Laffer Curve

The economic narrative of Arthur Laffer's dinner napkin diagram about the effects of taxes on the economy shows a sharp epidemic around 1980 and a secondary epidemic after 2000.

Sources: Author's calculations using data from ProQuest News & Newspapers 1950–2019, Books (Google Ngrams) 1950–2008, no smoothing.

“la courbe de Laffer” went viral in France too, but not as much it did in the United States and the United Kingdom.

The Laffer curve narrative has a striking punch line that comes as a surprise but usually does not provoke any laughter. The narrative goes like this: What is the relationship between the rate at which income is taxed and the amount of tax revenue collected by the government? Well, it is very clear that if the tax rate is zero, zero tax revenue will be collected. At the other extreme, if the tax rate is 100%, then all income is confiscated by taxes. At a 100% tax rate, no one will work, and again the tax revenue is zero. For tax rates between 0% and 100%, some positive amount of tax revenue will be collected. When you connect the points, you have the Laffer curve. And here is the punch line: because the curve has the shape of an inverted U, there are always *two* tax rates that will collect a given amount of tax revenue. That conclusion is a surprise, for hardly anyone talks of a pair of tax rates for a given revenue. Obviously, to fund the

government, it is better to apply the lower of the two tax rates, not the higher.

The notion that taxes might reduce the incentive to earn income and create jobs was hardly new. Adam Smith expressed the idea in the eighteenth century.<sup>6</sup> Andrew Mellon, US treasury secretary from 1921 to 1932, was famous for his “trickle-down” economics, and, along with US president Calvin Coolidge (1923–29), successfully argued for reduction of income taxes that had remained high for a while after World War I. But then the Mellon name began to fade (outside of Carnegie-Mellon University), and the narrative lost its momentum.

The story of the Laffer curve did not go viral in 1974, the reputed year that Laffer first introduced it. Its contagion is explained by an anecdote that was published in Jude Wanniski’s 1978 book *The Way the World Works*. An editorial writer for the *Wall Street Journal*, Wanniski wrote a colorful story about Laffer sharing a steak dinner at the Two Continents restaurant in Washington, DC, in 1974 with Wanniski and two top White House powers, Dick Cheney<sup>7</sup> and Donald Rumsfeld.<sup>8</sup> As the story goes, Laffer drew his curve on a napkin at the restaurant table. Years later, after Wanniski’s death, his wife found a napkin with the Laffer curve among her late husband’s papers. The National Museum of American History now owns the napkin.<sup>9</sup> Museum curator Peter Liebhold writes of this napkin on the museum’s website:

Every museum curator searches for that incredible iconic object, a fabulous artifact that is both physically interesting and represents a great moment in American history. Sadly, such artifacts rarely materialize, and some of the best stories turn out to be apocryphal. However, sometimes you strike gold. It was my luck to beat the odds and collect an incredible story about American business history, a story of political change, economic revolution, and social impact—it was the real deal.<sup>10</sup>

The trouble is, Laffer himself disowned the napkin story. He wrote:

My only question on Wanniski’s version of the story concerns the fact that the restaurant used cloth napkins and my mother had raised me

not to desecrate nice things. Ah well, that's my story and I'm sticking to it.<sup>11</sup>

Laffer was being honest about his recollections, but his honesty could not stop a story that was too good to be stopped.

## Visual Aids Go Viral

Why did the napkin story go viral? Good storytelling seems at least partially responsible. After the Wanniski story exploded, Laffer said that he could hardly remember the event, which had taken place four years earlier.<sup>12</sup> But Wanniski was a journalist who sensed that he had the elements of a good story. The key idea, as Wanniski presented it, is indeed punchy.

It may seem absurd to conclude that a story element of a drawing on a napkin helped make the story go viral. But there is ample scientific evidence that unusual visual stimuli aid memory and can help to make a narrative "iconic." It's not that everybody remembers the napkin in the story. Rather, a small detail like a graph drawn on a napkin might have raised the contagion rate at the beginning of the narrative above the forgetting rate.

The Laffer curve embodies a notion of economic efficiency easy enough for anyone to understand. Wanniski suggested, without any data, that we were on the inefficient side of the Laffer curve. The drawing of the Laffer curve seemed to suggest that cutting taxes would produce a huge windfall in national income. To most quantitatively inclined people unfamiliar with economics, this explanation of economic inefficiency was a striking concept, contagious enough to go viral, even though economists protested that the United States was not actually on the inefficient declining side of the Laffer curve.<sup>13</sup> However, there may be some situations in which the Laffer curve offers important policy guidance, notably with taxes on corporate profits. A small country that lowers the corporate profits tax rate below that of other countries may see companies moving their headquarters to that country, enough to raise that country's corporate tax revenue.<sup>14</sup> But an objective analysis of the Laffer curve did

not lend itself to a punchy story that could have stifled the Laffer epidemic and the relating of it to personal income taxes. To tell the story really well, one must set the scene at a fancy restaurant, with powerful Washington people and a napkin.

In the end, the Laffer curve napkin story may have gone viral because of the sense of urgency and epiphany conveyed by the story: the idea was so striking, so important, that an economics professor wanted to do something out of place at a fancy restaurant to make government officials see its brilliance.

Ultimately, the story's rich visual imagery helped it evolve from an economic anecdote into a long-term memory. The visual detail of the napkin may have lowered the speed at which people forgot the narrative, which could have helped the epidemic penetrate a large fraction of the population. There is a lesson to be learned here for those who want their stories to go viral: when authors want their audience to remember a story, they should suggest striking visual images. In ancient Rome, the senator Cicero advocated the use of this strategy, quoting the scholar Simonides:

For Simonides, or whoever else invented the art, wisely saw, that those things are the most strongly fixed in our minds, which are communicated to them, and imprinted upon them, by the senses; that of all the senses that of seeing is the most acute; and that, accordingly, those things are most easily retained in our minds which we have received from the hearing or the understanding, if they are also recommended to the imagination by means of the mental eye.<sup>15</sup>

Indeed, psychology and marketing journals have found that, at least in some circumstances, bizarre mental images do serve as memory aids.<sup>16</sup> For example, Harry Lorayne, a memory-training specialist, has long advocated that people who would like to improve their memory should try to form unusual, highly visual mental images. His suggestion for people who mislay their keys:

As you drop your keys into the flowerpot, form a mental image of the two vital entities—the keys and the place where you're putting them.

Make it a silly or impossible image. Example: "See" a gigantic key growing in a flowerpot.<sup>17</sup>

As neuroscience has shown us, long-term memory formation involves many regions of the brain, including visual-image processing regions.<sup>18</sup>

### **Rubik's Cube, Corporate Raiders, and Other Parallel Epidemics**

Another fad appeared around the same time as the Laffer curve. Rubik's Cube, invented in 1974 by Ernő Rubik, is a puzzle in the form of a cube-shaped stack of multicolored smaller cubes. As the narrative went, Rubik was a creative Hungarian sculptor and architect whose puzzle captivated the scientific and mathematics community worldwide because it fostered a narrative that it represented some interesting mathematical principles. *Scientific American* magazine did a cover story on the cube in its March 1981 issue, with the lead article by Douglas R. Hofstadter. Author of the best-selling *Gödel, Escher, Bach* (1980), Hofstadter was a science writer with a gift for uniting science with art and the humanities. His article presented Rubik's Cube as representing deep scientific principles. He described connections to quantum mechanics and the rules for combining the subatomic particles called quarks. Few people remember these details today, but they do remember that Rubik's Cube is somehow impressive. Rubik's Cube was bigger than the Laffer curve on ProQuest News & Newspapers, but smaller than the Laffer curve on Google Ngrams. Both show similar hump-shaped paths through time.

Other narratives in the same constellation with the Laffer curve sprang up around the same time. The terms *leveraged buyouts* and *corporate raiders* also went viral in the 1980s, often in admiring stories about companies that responded well to true incentives and that produced high profits as a result. One marker for such stories is the phrase *maximize shareholder value*, which, according to ProQuest News & Newspapers and Google Ngrams, was not used until the 1970s and whose usage grew steadily until the twenty-first century. The phrase *maximize shareholder value* puts a nice spin on questionable corporate raider practices, such

as saddling the company with extreme levels of debt and ignoring implicit contracts with employees and stakeholders. *Maximize* suggests intelligence, science, calculus. *Shareholder* reminds the listener that there are people whose money started the whole enterprise, and who may sometimes be forgotten. *Value* sounds better, more idealistic, than *wealth* or *profit*. Use of the three words together as a phrase is an invention of the 1980s, used to tell stories of corporate raiders and their success. The term *maximize shareholder value* is a contagious justification for aggressiveness and the pursuit of wealth, and the narratives that exploited the term are most certainly economically significant.

### **The Laffer Curve, Supply-Side Economics, and Narrative Constellations**

After the Laffer curve epidemic, the Reagan administration (1981–89) reduced the top US federal income tax bracket from 70% to 28%. It also cut the top-bracket US corporate profits tax rate from 46% to 34%, and it reduced the top US capital gains tax rate from 28% to 20% in 1981 (though it returned to 28% again in 1987 during the Reagan presidency). If the Laffer curve epidemic had even a minor effect on these changes, then it must have had a tremendous impact on output and prices.

For these reasons, the Laffer curve is well remembered to this day, but it was only one part of the narrative constellation now known as *supply-side economics*, which holds that governments can increase economic growth by decreasing regulation and lowering taxes. The term *supply-side economics* went viral around the same time the Laffer curve did. The Laffer curve contributed to the impact of the many supply-side narratives because it was a particularly powerful narrative. It had good visual imagery in the form of a scribbled-on napkin, it had authorities behind it just as Rubik's Cube had *Scientific American*, and it suggested that politicians who raised taxes were fools.

One narrative circulating in the supply-side economics constellation was a widely spread story about the consequences of the Swedish Socialist government under Olof Palme, whose government, in a measure of extreme incompetence, inadvertently made the effective income tax rate



(on high incomes) go over 100%. People who worked more ended up with *less* after-tax income. The story was reported all over the world, as for example in the United States in 1976 in the *Boston Globe*:

The typical Swedish dentist works fewer than 30 hours per week because any further earning would actually reduce his retained pay. Film director Ingmar Bergman, probably the country's most famous and admired citizen, left permanently last year after tax inspectors harassed him and seized his records in the middle of a rehearsal—based on a misunderstanding about his corporate rather than personal taxes.<sup>19</sup>

This story of tax rates above 100% in Sweden further mutated in 1976 when Astrid Lindgren, the acclaimed Swedish author of children's books, published an amusing adult fairy tale about it, *Pomperipossa in the World of Money*. The "Pomperipossa Effect" may have contributed to the downfall of the Palme government that year.

Similar narratives of people paying more than 100% of their marginal income in taxes went viral in subsequent years, even in the United States, forming a constellation of narratives.<sup>20</sup> These stories fed on one another. These narratives were about government incompetence, not arguments for lowering tax rates that were already well below 100% overall, but they supported a general impression that tax rates had gone too high. We can find evidence for the existence of this narrative constellation by searching digitized newspapers for the term *highest tax bracket*. In the 1950s, even though the highest US income tax bracket was extremely high, ranging from 84% to 92%, ProQuest News & Newspapers produces only 33 stories with this phrase. In the decade of the 1980s, even though the highest income tax bracket was gradually being reduced from 70% to 28%,<sup>21</sup> there were 520 ProQuest stories featuring the term. Since the 1980s, the epidemic of stories about the highest tax bracket has continued to grow.

Attention to the highest tax brackets naturally drew attention to the lowest tax brackets and to effectively negative tax rates for the poorest, who were now judged in a less sympathetic light. In the United States, the term *welfare mother* refers to an unmarried woman and her children

who are supported by unwilling male taxpayers. Use of the term exploded from zero in 1960 to a peak in the early 1970s, after President Lyndon Johnson announced his Great Society plan to eliminate poverty.

Property taxes came in for strong criticism too. In the 1970s, the news media began to notice a public opinion change (strongly in evidence for at least another decade after that) associated not with a celebrity but with a California referendum called Proposition 13. Passage of the proposition led to a 1978 constitutional amendment in California that put a firm limit on property tax increases. The “taxpayer revolt,” so named in newspapers of the time, swept the United States:

The taxpayer revolt that has started in California is about as grassrootsy as Grape Nuts. But it has California state and local officials shriven with fear and perhaps guilt . . . Proposition 13 is spawning imitators in half the states of the Union.<sup>22</sup>

The stories that were circulating in an epidemic sweeping across the United States in 1978 were of tax rates so high that some homeowners could no longer afford to live in their homes and were forced to sell. Related stories railed against government inefficiency and corruption in the spending of tax revenue. These ideas, and the underlying narrative of a “tax revolt” in the United States, became contagious. But the taxpayer revolt came and went quickly, in the few years around 1978.

In the background was the rise of a free-market, laissez-faire narrative in the second half of the twentieth century in Anglo-Saxon countries. This rise was promoted by stories, such as Ayn Rand’s 1943 novel *The Fountainhead*. Its readership was limited in the 1940s, but the novel gradually rose to ever-greater prominence through the rest of the twentieth century. Rand’s 1957 novel, *Atlas Shrugged*, went viral. The novel was about a large national strike of productive people against the majority of people, the looters who support government regulation (including taxes) to extract wealth for their own selfish interests. The influence of Rand and her novels has continued to grow since her death in 1982, unlike the taxpayer revolt story, which was contagious only briefly. It seems that the novels were a slower but ultimately larger epidemic. A bit earlier, the phrase *stimulate the economy* had emerged in the late 1950s, and its use grew

rapidly from 1978 to 1980, suggesting that tax cuts for higher-income people might serve as an energizer, freeing the supposedly superior people to contribute to society.

## Celebrities, Quips, and Politics

Though the Laffer curve epidemic may have played a role in the election of Ronald Reagan and Margaret Thatcher, other narratives were surely influential, such as this quip by Reagan:

Government's view of the economy could be summed up in a few short phrases: If it moves, tax it. If it keeps moving, regulate it. And if it stops moving, subsidize it.<sup>23</sup>

Reagan used these words in a 1986 speech. But the underlying idea dates back in slightly different form at least to 1967, when Walter Trohan, a conservative commentator for the *Chicago Tribune*, wrote that:

The federal government operates pretty much in line with the quip, "If it moves, tax it; if you can't tax it, control it; if you can't control it, give it a million dollars."<sup>24</sup>

Thus the quip was already known in 1967. But it needed a celebrity to make it truly contagious, and Ronald Reagan was the celebrity who did just that.

Note the poetic quality of the three elements of the quip, but improved upon between Trohan and Reagan. Each line in Reagan's version has the same basic structure of an "if-then" statement, with the dependent clause starting with "if" and the independent clause a simple two-word statement that is a command in the form of a verb followed by the word "it." The rhetorical form not only added dignity to the quip but also aided its unaltered transmission and contributed to its high rate of contagion, probably because it suggests that everyone is talking about how onerous taxes are and that it isn't just the speaker who is complaining.

In short, it seems likely that narratives like the Laffer curve and other supply-side stories touched off an intense public mandate for tax cutting.

We might argue, too, that the constellation of narratives about tax cutting and smaller government propelled a social movement: entrepreneurship. In 1987, the *New York Times* reported on one of Reagan's pro-entrepreneurship narratives. It is often remembered today for its wit:

"You know I have a recent hobby," the President remarked in a speech on economic matters earlier this month. "I have been collecting stories that I can tell, or prove are being told by the citizens of the Soviet Union among themselves, which display not only a sense of humor but their feeling about their system."

Mr. Reagan then told his current favorite, about a Russian who wants to buy a car. A Matter of Delivery.

The man goes to the official agency, puts down his money and is told that he can take delivery of his automobile in exactly 10 years.

"Morning or afternoon?" the purchaser asks. "Ten years from now, what difference does it make?" replies the clerk.

"Well," says the car-buyer, "the plumber's coming in the morning."<sup>25</sup>

Rubik's Cube was just a toy, not support for an economic narrative. But Reagan's lighthearted jokes made for economically powerful entrepreneurial narratives. These new narratives encouraged entrepreneurial spirit and risk taking, and they brought about profound changes in the legal structure of the world's advanced economies.

These examples, the Laffer curve and Rubik's Cube, are just two of a vast universe of narratives. We need to understand their organizing force. The storage points for all these narratives is the human brain, with its prodigious memory capacity. In the next chapter, we use neuroscience to consider the structure of this repository.

## **Chapter 6**

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# **Diverse Evidence on the Virality of Economic Narratives**

Further evidence on the impact of narrative contagion on the economy can be found in the story structures in the human brain, in the brain's processing of frightening stories, in the long history of the news media in reinforcing primordial human interactions, in the emotional impact of effective book jackets, logos, and beauty contests.

### **The Impulse to Convey Stories**

In 1958, brain surgeon Wilder Penfield implanted electrodes into the brains of human subjects while performing brain surgery, undertaken for medical reasons on wide-awake patients, under only local anesthesia because the brain itself has no pain receptors. He discovered that electrically stimulating certain narrowly focused parts of the brain caused it to hear a sequence of sounds in chronological order:

When the electrode was applied in gray matter on the cut face of the temporal lobe at point 23, the patient observed: "I heard some music." Fifteen minutes later, the electrode was applied to the same spot again without her knowledge. "I hear music again," she said. "It is like radio." Again and again, then, the electrode tip was applied to this point. Each time she heard an orchestra playing the same piece of music. It apparently began at the same point and went on from verse to chorus. Seeing the electrical stimulator box, from where she lay under the surgical coverings, she thought it was a gramophone that someone was turning on from time to time.<sup>1</sup>

Stimulating a different part of the brain caused a story to be told, again in chronological sequence:

A young woman (N. C.) said, when her left temporal lobe was stimulated anteriorly, at point 19 in Figure 5, “I had a dream, I had a book under my arm. I was talking to a man. The man was trying to reassure me not to worry about the book.” At a point 1 cm. distant, stimulation at point 20 caused her to say: “Mother is talking to me.” Fifteen minutes later the same point was stimulated: The patient laughed aloud while the electrode was in place. After the withdrawal of the electrode, she was asked to explain. “Well, she said, “it is kind of a long story but I will tell you. . . .”<sup>2</sup>

Penfield’s work has been highly influential in a number of disciplines. For our purposes, his results indicate the extent to which the human brain structure appears to embody some of the traits that we think of as exclusively human: the propensity to make music and the propensity to tell stories as sequences of events, stories that trigger emotions.

Modern neuroscience is trying to pin down the determinants of the human impulse to tell stories. For example, a team from Emily B. Falk’s neuroscience lab at the Annenberg School at the University of Pennsylvania has used functional magnetic resonance imaging to study the brains of people making decisions whether to share health news stories. The team concluded that people tended to share content that enhances self-related thoughts—that is, information that “engages neural activity in regions related to such processes [self-presentation or mental concept], especially in medial prefrontal cortex,” and that “involves cognitions or forecasts about the mental states of others.”<sup>3</sup> In other words, these people are more willing to share their health information in the form of stories about themselves and others.

Paul J. Zak, a neuroeconomist, has shown experimentally that narratives with a “dramatic arc” increase levels of the hormones oxytocin and cortisol in the listener’s bloodstream, as compared with more “flat” narratives.<sup>4</sup> These hormones in turn have well-documented effects on behavior. Oxytocin, sometimes called the “love hormone,” plays a role in facilitating relationships. Cortisol, sometimes called the “stress

hormone,” has been shown to play a role in regulating blood sugar, assisting memory formation, and reducing inflammation.

## Neurological Responses to Stories Evoking Fear

News media and popular discussions have long described financial crises as panics created by a spate of sudden economic failures following a period of excessive complacency about economic risks. It may seem like journalistic hype to use charged words such as *panic*, which conjures images of a stampeding mob trying to escape a sudden physical danger, and *complacency*, which suggests a sort of smug stupor. Yet people mostly seem perfectly rational during such financial events, which take place over months and years of largely normal living, and they tend to present themselves as sorting through the facts. Even during a financial “panic,” people seem mostly normal and relaxed, joking and laughing.

But are *panic* and *complacency* really so far off the mark? Both words describe mental states that must be supported through neurological structures. We need to study those structures to determine whether there is any common neurology between financial panics and other panics, between financial complacency and other types of complacency.

Consider an example that is current during the writing of this book: the pattern of increasing risk taking by banks as the tenth anniversary of the 2007–9 world financial crisis approached. In 2017, the Federal Deposit Insurance Corporation issued a report expressing concern that US banks, in a reach for yield, were taking excessive risks by extending the maturity of their investments. For nearly ten years after the financial crisis, interest rates had been very low, though higher at longer maturities. Reaching for these higher yields was risky for banks, because if interest rates suddenly increased, they might have to pay more to keep depositors than they earn from the longer-maturity investments, which could cause the banks serious trouble. Ultimately, the banks decided to take the risk, but how did they form their expectations of future interest rates?

No expert has a proven record of forecasting interest rates years into the future. No one can tell a banker how long to wait out a period of low

interest rates or guarantee that the low rates will go on forever. All that bankers have are fading memories of narratives of other historical periods when interest rates rose dramatically, leading droves of depositors to run to their banks and withdraw their money. Those stories seem less relevant when interest rates have been low for ten years, but there is no way to quantify how much less relevant.

It may be best to think of bankers' behavior at such times as driven by primitive neurological patterns, the same patterns of brain structure that have survived millions of years of Darwinian evolution. The fact that dogs and rodents today have some of these same fear-management brain structures is evidence for their common Mesozoic origins. Fear is a normal emotion for all mammals and higher animals, and it is supported by brain structures. The extinction of fear is a process that must take place over time to release the fear after the danger has passed.

Scientists first observed the action of these brain structures indirectly. In 1927, Ivan P. Pavlov, a Russian physiologist, reported his research on dogs. If dogs were repeatedly given a dose of acid on their tongue as a metronome clicked in the background, then later the sound of the metronome alone, without the acid, would induce the same involuntary reactions as if acid had been applied. In a subsequent phase of the experiment, Pavlov repeatedly turned on the metronome but withheld the acid, and the dogs' aversive reaction was gradually extinguished. Later, the brain structures involved in such reactions were discovered. In rats, the neurons of the lateral amygdala (an almond-shaped area of the brain) play a fundamental role in both the fear-acquisition stage and the fear-extinction phase, increase their firing during fear acquisition, and reduce their firing during extinction of the fear. Not all of the neurons reduce their firing, keeping a residual fear intact. Neuroscientists have concluded:

Collectively, there is much evidence suggesting that a distinct neural circuitry involving interactions between the amygdala, vmPFC [ventromedial prefrontal cortex], and hippocampus underlies the ability to extinguish fear, and that this circuitry is preserved across evolution.<sup>5</sup>



Rats show much the same circuitry, and involuntary triggering of fear, that humans do. In humans, thickness of the ventromedial prefrontal cortex is correlated with success in fear extinction.<sup>6</sup> Some human neurological disorders, such as post-traumatic stress disorder (PTSD), represent failures of extinction, and studying these disorders can reveal the underlying structures of fear management.<sup>7</sup> It seems safe to say that the evolutionary process of optimizing the neural circuitry for fear and its extinction has not yet been completed in humans, because civilization is only a few millennia old.

A mental state akin to PTSD may afflict a whole population at times. In his 1951 book *The Captive Mind*, the Polish poet Czesław Miłosz, describing his impressions of the whispered and unofficial narratives that existed late in the Stalinist regime, noted that the atmosphere of fear created by this regime was profoundly important. The fear was of disappearing at the hands of the secret police, of being forcibly transported with one's family to Siberia and, once there, starving or freezing to death:

Fear is well known as a cement of societies. In a liberal-capitalist economy fear of lack of money, fear of losing one's job, fear of slipping down one rung on the social ladder all spurred the individual to greater effort. But what exists in the Imperium is *naked* fear. In a capitalist city with a population of one hundred thousand people, some ten thousand, let us say, may have been haunted by fear of unemployment. Such fear appeared to them as a personal situation, tragic in view of the indifference and callousness of their environment. But if all one hundred thousand people live in daily fear, they give off a collective aura that hangs over the city like a heavy cloud.<sup>8</sup>

It is reasonable to suggest, as Miłosz does, that the fear of losing one's job is less intense than the fear of being deported to Siberia, and that fear at any level relies on the same brain circuitry. Then, in difficult situations with no logical answer or solution—for example, in the decision whether to make a risky investment—the human mind may delegate the decision to some brain circuitry that is similar to rats'. In such cases, memories of bitter past experience, as well as memories of others' experience

transmitted in the form of narratives, may determine the actions taken, and at certain times they may lead to unfortunate economic decisions.

The decline in fear may reflect a gradual process of fear extinction that may be reversed if the narrative experiences a dramatic new development or mutation. Recent narratives about rogue states' possession of nuclear weapons seem possibly intense enough to renew the fear of nuclear annihilation, but apparently they have not done so. Just as it is difficult or impossible to predict which motion picture will be a box office hit, it is difficult to predict which narrative will eventually have economic impact.

### Narratives Have Been “Going Viral” for Millennia

People have been spinning narratives since time immemorial. Contagion was increased by communications at bazaars, religious festivals and fairs, as well as casual encounters. In ancient Rome, for example, people who wanted the news would attend the regular *salutatio* at their patron's home, or they went to the *Forum* where they listened to orators or a *praeco*, who wore a special toga to stand out. The *praeco* announced news and stories to the crowd, read advertisements, and handled auctions. *Rumor* is the ancient Latin word for contagious narrative.

The polymath David Hume (1711–76) wrote in 1742:

When any *causes* beget a particular inclination or passion, at a certain time and among a certain people, though many individuals may escape the contagion, and be ruled by passions peculiar to themselves; yet the multitude will certainly be seized by the common affection, and be governed by it in all their actions.<sup>9</sup>

Hume wrote before the germ theory of disease was established, before bacteria and viruses were identified, but many of his contemporaries understood that both disease and ideas were spread by interpersonal contact.

In 1765, during the economic depression in the American colonies of the United Kingdom following the French and Indian War (Seven Years'

War),<sup>10</sup> a letter to the printer in the *New-London Gazette* (Connecticut) by Alexander Windmill (apparently a pseudonym) identified an epidemic of a narrative that involved the sentence “THERE IS NO MONEY”:

I take it for granted, there is not one of your readers but has heard that most melancholy sentence, repeated times without number, THERE IS NO MONEY: nor scarce one who has not himself frequently joined in this epidemic complaint. Conversation among people of every rank, I have remarked for some months past to run in one invariable channel: and the hackneyed topicks of discourse to be constantly introduced in the same precise order, with admirable uniformity. Benevolent enquiries respecting health, and ingenious observations on the weather, according to the laudable custom of our ancestors, from time immemorial lead the van. As soon as these curious and important articles are discussed; the muscles of the face being previously worked up into a mixt passion of distress and resentment, tempered with a suitable proportion of political sagacity; succeeds the wonderful discovery aforesaid, THERE IS NO MONEY; which is instantly repeated by each party, with every token of astonishment. One would think, by the surprise visible in their countenances, and the vehemence of their expressions, that neither of them had heard of the calamity til that minute, tho', perhaps, it is not two hours since the same persons conversed upon the same subject and, made the same remark.<sup>11</sup>

Windmill goes on to calculate (with some exaggeration perhaps) that the sentence THERE IS NO MONEY was then currently being repeated fifty million times a day by English-speaking inhabitants of the American colonies. He thought it reasonable to assume based on his observations that a million people were saying it every twenty minutes during most of the daylight hours, and some were even sleep-talking it.

Charles Mackay drew attention to the contagious spread of “extraordinary popular delusions” in his 1841 book, *Memoirs of Extraordinary Popular Delusions*. Gustave Le Bon said in his book *Psychologie des foules* (*The Crowd*, 1895), “Ideas, sentiments, emotions, and beliefs possess in crowds a contagious power as intense as that of microbes.”<sup>12</sup> Related

terms are *collective consciousness* (Durkheim, 1897), *collective memory* (Halbwachs, 1925), and *memes* (Dawkins, 1976).

## Of Book Jackets and Company Logos

Those who try to create viral narratives experiment, observe their successes and failures, and try to identify patterns that might suggest further avenues for creation. But the difference between a viral narrative and a nonviral narrative may depend on some aspect of the narrative that is not related to our enthusiasm for the narrative. It may depend, for example, on something hard to observe directly, such as the ability to connect with other topics of conversation, or reminders in other narratives.

The contagion rate is often natural, closely related to an event that launched an epidemic, but it is sometimes engineered by marketers. Their engineering may be almost invisible to us because it happens so frequently that we get used to it, and because we find it difficult to imagine all the thought and research that went into the design of marketing campaigns. For example, consider the modern book jacket, the paper cover that publishers place over their hardcover books and that usually includes endorsements, eye-catching fonts, author photos, and colorful artwork. The modern book jacket was invented during the advertising and marketing revolution around the 1920s, replacing some earlier plain-paper book jackets that were there merely to prevent the book from becoming shopworn.

It is important to note that the jacket looks like the work of the publisher, not the author, so it does not make the author look pandering or boastful. Book jackets permitted an immense step-up in contagion rates for books, despite their sometimes vulgar tone. It may be hard to understand the initial public resistance to book jackets at the time of their introduction. The poet Dorothea Lawrence Mann commented in 1921 on this new phenomenon, noting that it prompted many readers to:

asseverate with indignation that far from reading or looking at or being influenced by such a blatant advertising scheme as the book-jacket, they throw it away with the greatest celerity and never, never read a book until its jacket has been safely disposed of and forgotten.<sup>13</sup>

Despite such buyer resistance, the modern book jacket flourished because it increased contagion. Most people would never have seen the endorsements that were placed on the book jackets, and soon bookstores learned to place the latest book jackets on display in their shop windows to catch the attention of passersby on the sidewalk. The book jacket was a brilliant marketing innovation precisely because readers made the final decision: they could take the jacket off and throw it away, or they might leave it on and place the book on their coffee table, thus passing along its contagion to people who visited. Once it became established that even dignified authors would allow their publishers to cover their books with a glitzy dust jacket, it became a permanent fixture. In fact, publishers who want to survive in a highly competitive business where others use book jackets have had no choice, for the book jacket is part of what George Akerlof and I called a *phishing equilibrium*. In a competitive market in which competitors manipulate customers, and in which profit margins are competed away to normal levels, no one company can choose not to engage in similar manipulations. If they tried, they might be forced into bankruptcy. A phishing equilibrium with a certain acceptable level of dishonesty in narrative is therefore established.<sup>14</sup> Phishing equilibria may not be all that bad. In the case of the book cover, there has developed an art of book jackets that sometimes have significant value.

Another example of marketing-driven contagion is “the news”: the harvest of new information that news publishers hope will grab people’s attention on a given day. “Phools,” as George Akerlof and I call them, who do not think about the marketing efforts, are apt to think that events exogenously give us the news by jumping out at us. But, in fact, the news media are choosing the news because their financial success depends on their stories’ viral impact. A recent example occurred in the United States in 2017 during a total eclipse of the sun that found many people traveling within the country to see the eclipse in its totality. The popular news media were relentless in covering the story, because, no doubt, they recognized its contagion as an experience shared by so many people. Some reporting took on a mystic-patriotic tone, as if God had granted this extremely rare event to the United States. Though the

US media frequently used the phrase “once in a lifetime,” they did not mention that another total eclipse of the sun would occur again in the US just seven years later, in 2024. In fact, there was nothing genuinely newsworthy about the 2017 eclipse; eclipses have been studied and understood for centuries.

We also see engineered contagion in company logos on clothing and shoes, especially athletic or work clothing and shoes. The word *logo*, meaning a symbol representing a company or product line, dates back only to the 1930s. An example is the Lacoste clothing line, which displays its crocodile logo on its sportswear, casual clothing, and other products. Jean René Lacoste, the company’s founder, was a widely admired tennis star in the 1920s and early 1930s. His nickname was “The Crocodile.” Initial contagion for the clothing line, launched in 1933, benefited from his fame. Today, Lacoste the tennis star is mostly forgotten. Still the memory continues, and the logo persists. Those who do not reflect on the imperatives of marketing may imagine that people wear logo-branded clothing because they want to associate themselves with a prestigious clothing designer. But perhaps logo marketing works *because* it increases contagion. Customers may absently reach for the logo product because it is familiar and safe, and because so many others are wearing clothes with the same logo.

The construction of narratives by news media, promoters, and marketers can also help lower the forgetting rate. Narratives can be associated with symbols or rituals that remind people of basic elements of the narrative. A symbol can be incorporated into building architecture, letterheads, email messages, and a million other items, and a narrative can be incorporated into regular rituals, such as traditional parades on national holidays. Experts do not fully understand the role of ritual and symbols in aiding memory, but they do understand that they are associated with success.

All these examples illustrate a fundamental error that people tend to make: phools think that the popularity of a story or of a brand is evidence of its quality and deep importance, when in fact it rarely is. On the contrary, growing evidence in recent years has shown that many consumers detest logos and aggressive marketing.<sup>15</sup> Narrative contagion is often the

result of arbitrary details, such as the frequency of meetings among people (many people see a logo on a shirt) and natural links to other contagious narratives (Lacoste's onetime fame as a tennis player).

## **Beauty Contests and Tail Feathers: How the Theory of Mind Feeds Economic Narratives**

Psychologists have noted that the human species is unique in the advanced development of its *theory of mind*—that is, humans' strong tendency to form a model in their own minds of the activities in others' minds. We are thinking about what others are thinking, about their individual thoughts. We observe their actions, their facial expressions, and their vocal intonation, which we then relate to their beliefs and intentions.

The contagion of specific narratives may be related to storytellers' impressions regarding what other people will think. People like to hear stories that they can retell to others who will like the same story, and so storytellers like to tell such stories.

In 1936, Keynes introduced what we now call theory of mind into economic theory with his "beauty contest" metaphor,<sup>16</sup> which he put forth to explain speculative markets, such as the stock market. Keynes thought that people deciding which investments to make were basing their decisions on observations of what other investors were thinking or what they were about to do with their investments (which might cause future price changes). In the case of stock market investments, investors look at what other people whom they randomly encounter are saying and emoting, and they look at patterns in stock prices that offer clues regarding what other people are doing or will soon be doing. They are usually not looking at real evidence based on the firm's technology or management style.

Keynes said he had seen a newspaper contest that displayed a hundred photos, each of a pretty face. But the women in the photos were not the contestants in this unusual form of beauty contest; the readers of the newspaper were. They were asked to mail to the newspaper their list of the six prettiest faces. The person whose list most closely matched the



most popular faces as revealed by all the lists together would win the contest prize.<sup>17</sup>

Keynes pointed out that the optimal strategy is not to pick the six prettiest faces based on one's own opinion. Instead, it makes more sense to pick the six that one thinks other people would find prettiest. But this strategy is not optimal either, if we carry the model of mind to the next step in the chain. One should pick the faces that one thinks that others think that others find the prettiest. So, in a rational world, one might suppose that investors, trying to gauge what other investors think other investors are thinking, will try to determine the right thing to think about the speculative investments. However, investors do not necessarily follow this strategy, even if all investors are rational and know that all investors are rational.<sup>18</sup> In addition, we have to account for the investors' less-than-perfect rationality and the investor irrationality expected by other investors.

In our 2009 book *Animal Spirits*, which was in many ways an expansion and elaboration of Keynes's ideas, George Akerlof and I used the beauty contest metaphor to construct a theory of the emotional foundation of business fluctuations in general. The beauty contest metaphor also applies to the contagion of narratives. When we choose to tell a story to others, we base that choice on our perceptions of how people will react to that story in their own minds. We will likely spread a story, whether it is a story about boom-time thinking or about economic despair, if we think that others will like the story enough to want to spread it further. Even if we are spreading an economic narrative for no other reason than trying to amuse ourselves, we are likely to engineer our story to spread based on our model of others' minds.

The stories that go viral are essentially random, just as mutations in evolutionary biology are random. Traditional evolutionary theory suggests that the mutations that survive and spread are those few out of many that are in themselves advantageous for survival. But there is another branch to Darwin's theory, that of sexual selection, and it suggests that the winning mutations may be just as random as the original mutation. Something like this randomness may affect economic narratives going viral as well.



In his 2017 book *The Evolution of Beauty*, ornithologist Richard O. Prum argues that sexual selection gives rise to fluctuations in the animal kingdom that resemble speculative bubbles in economics. Perhaps the most famous example of sexual selection in biology is the male peacock, which has very heavy tail feathers that inhibit his activities. But these feathers are much favored by the female of the species, which facilitates mating and the reproduction of more beautiful tail feathers. Thus the female sexual choice may create an evolutionary advantage for some useless characteristic in a process called a Fisherian runaway, after theorist R. A. Fisher.<sup>19</sup> The mechanism does not even require two distinct sexes, as there is evidence for such sexual selection processes among hermaphrodite species in which each individual has both male and female organs.<sup>20</sup> In both evolutionary biology and narrative economics, some kind of ornament or display can become popular for no more reason than the fact that it randomly began to be popular.

### **Irrational Impulses Inform Economic Narratives**

Psychologist Jerome Bruner, who has stressed the importance of narratives in understanding human culture, wrote that we should not assume that human actions are driven in response to purely objective facts:

I do not believe that facts ever quite stare anybody in the face. From a psychologist's point of view, that is not how facts behave, as we well know from our studies of perception, memory, and thinking. Our factual worlds are more like cabinetry carefully carpentered than like a virgin forest inadvertently stumbled upon.<sup>21</sup>

That is, narratives are human constructs that are mixtures of fact, emotion, human interest, and other extraneous details that form an impression on the human mind.

Psychiatrists and psychologists recognize that mental illness is often an extreme form of normal behavior or a narrow disruption of normal human mental faculties. So we can learn about the complexities of normal human narrative brain processing by studying *dysnarrativia*, or abnormal narrative phenomena. Neuroscientists Kay Young and Jeffrey

Saver (2001) listed some of its varied forms: arrested narration (the ability to tell only stories learned before a brain injury), underrnarration (the telling of vacillating, impulsive stories), denarration (failure to organize a story in terms of an action-generating temporal frame), and confabulation (the fabrication of stories that have little or no relation to reality). Each form of dynarrativia is related to injury in a specific part of the brain.

Schizophrenia is a serious mental illness that can manifest as a disorder of narrative, as it often involves hearing imaginary voices delivering a fantastic and jumbled narrative.<sup>22</sup> Hearing voices as a symptom of schizophrenia is correlated with volume deficits in specific brain areas.<sup>23</sup> The narrative disruption found in autism spectrum disorder also is related to brain anomalies.<sup>24</sup>

### **Framing, the Representativeness Heuristic, and the Affect Heuristic**

Narrative psychology also relates to the psychological concept of *framing*.<sup>25</sup> If we can create an amusing story that will get retold, it can establish a point of view, a reference point, that will influence decisions. Framing is related to the Daniel Kahneman and Amos Tversky *representativeness heuristic* (1973), whereby people form their expectations based on some idealized story or model, judging these expectations based on the prominence of the idealized story rather than estimated probabilities. For example, we may judge the danger of an emerging economic crisis by its similarity to a remembered story of a previous crisis, rather than by any logic.

George Katona, one of the founders of behavioral economics and author of the 1975 book *Psychological Economics*, noted an odd phenomenon: when he interviewed common people and asked them about their expectations of key economic variables, he had the feeling that they had no clear expectations, and that they made up numbers on the spot to please him. But I would argue that these ordinary people were thinking about narratives that involved people and prices. If asked in an interview about their expectations for inflation, for example, they might

not answer the question directly but rather offer a dramatic story with human interest and with clear moralizing, about politicians' or labor unions' activities that might be related to inflation.

Psychologists have also noted an *affect heuristic*, whereby people who are experiencing strong emotions, such as fear, tend to extend those feelings to unrelated events.<sup>26</sup> Sometimes people note strong emotions or fears about possibilities that they know logically are not real, suggesting that the brain has multiple systems for assessing risk. This "risk as feelings" hypothesis holds that some primitive brain system more connected to palpable emotions has its own heuristic for assessing risk.<sup>27</sup>

In joint work with William Goetzmann and Dasol Kim, George Akerlof and I examined data from a questionnaire survey of investors and high-income Americans since 1989. We found that people have exaggerated assessments of the risk of a stock market crash, and that these assessments are influenced by the news stories, especially front-page stories, that they read. One intriguing finding was that a natural event such as an earthquake could influence estimations of the likelihood of a stock market crash. The respondents in our survey assigned statistically significantly higher probabilities to a stock market crash if there had been an earthquake within thirty miles of their zip code within thirty days, triggering the affect heuristic. It seems reasonable to hypothesize that local earthquakes start local narratives with negative emotional valence. Analogous evidence has indicated that seemingly irrelevant events with strong narrative potential can affect economic or political outcomes: the World Cup competition can affect economic confidence,<sup>28</sup> shark attacks at local beaches can affect votes for local incumbents,<sup>29</sup> and background music in advertisements can have a strong effect on consumers.<sup>30</sup> Wine stores find buyers purchasing more expensive wines if the background music is classical versus Top 40.<sup>31</sup>

An affect heuristic also operates in generating activity by Internet trolls (people who send nasty or obscene comments on the Internet).<sup>32</sup> Trolling behavior appears to be contagious: an experimental group randomly selected from the general population was primed with nasty examples of trolling. Members of that group were then much more likely to post similar comments.

## Going Forward

The tantalizing evidence about the impact of narratives from neuroscience and related observations suggests some entirely different explanations of the severity of major economic events. In part II of this book we consider some organizing principles for narrative economics. A key issue is assigning the direction of causality from dispersed and ill-defined narrative constellations to actual economic activity, a topic to which we turn in the next chapter. The chapter after that offers key foundations of narrative economics. Part III then presents a list of nine important perennial narrative constellations, one (or a pair) per chapter.