Finance is often regarded as an abstract, mathematical subject that occasionally calls attention to itself by dramatic crises or as a symbol of excess. In fact, finance has been an integral part of the development of human society over the past 5,000 years. Finance played a key role in the development of the first cities, the emergence of classical empires, and the exploration of the world.

The history of finance is an exciting story. For example, writing was invented in the ancient Near East specifically for recording financial contracts. Finance was integral to the first complex models of time and risk. The golden age of Athens owes as much to financial litigation as it does to Socrates. Rome’s legendary wealth could not have sustained itself over the centuries without complex financial organization. Ancient Chinese civilization developed its own financial tradition that enabled rulers to hold together a vast empire.

In modern Europe, finance stimulated a novel mathematical tradition that quantified and analyzed risk and made possible an unprecedented era of exploration and discovery. A new financial structure—the corporation—emerged as a means to aggregate capital for trade with Asia and the Americas. Finance was an important co-factor in the Industrial Revolution. In the twentieth century, capital markets democratized investing and stimulated novel solutions to major social problems: social security, sovereign funds, and personal savings accounts are all mechanisms intended to reduce household economic risk. They have deep roots in the history of finance.

Along with these important contributions to humankind, finance has also created problems: debt, market bubbles, devastating crises and crashes, exploitative corporations, imperialism, income inequality—to name only a few. The story of finance is the story of a technology: a way of doing things. Like other technologies, it developed through innovations that improved efficiency. It is not intrinsically good or bad.
INTRODUCTION

TIME AND MONEY

The power of finance to effect such important transitions in world history is that it moves economic value forward and backward through time. Think about a mortgage. It converts a homebuyer’s promise of thirty years of future monthly payments into a lump sum of money in the present. A mortgage is so commonplace that it is hard to fully appreciate it. A homebuyer can suddenly conjure up a fortune he or she does not have. Where did this great power come from? Why does it work? What can go wrong? These are some of the key issues explored in this book.

A mortgage shifts money to the present, but, for the lender it also moves money into the future. By the same token, a person worried about retirement can actually buy future living money today—usually at a significant discount. The ability to solve the fundamental problem of taking care of your future self is incredibly empowering. It rests on a sophisticated technological structure that is able to express and enforce commitments that extend over decades and in some cases over centuries.

In essence, financial technology is a time machine we have built ourselves. It can’t move people through time, but it can move their money. As a result, it alters the economic position of our current and future selves. It also changes the way we think. Finance has stretched the ability of humans to imagine and calculate the future. It has also demanded a deeper understanding and quantification of the past, because history is the fundamental basis for making future predictions. Finance has increasingly made us creatures of time. Financial architecture exists in—and shapes—the possibilities of the temporal dimension.

This book explores key steps in the evolution of finance in world history. My fundamental premise is that civilizations demand sophisticated tools for managing the economics of time and risk. Finance emerged with the first civilizations of the ancient Near East and since then has played a key role in many cultures we recognize as complex societies. Civilizations over the past 5,000 years have faced a common set of problems, and they have either borrowed or invented a similar set of financial tools to solve them.

China is an important part of this book precisely because it faced civilization’s complex challenges of economic time and space in its own
way. Although certain financial tools and methods diffused across the Eurasian continent by trade and faith, China’s financial development took its own course; China developed its own monetary economy, its own accounting and financial control systems, and the first paper securities—printed money that Marco Polo saw and used in China centuries before printing emerged in Europe. The resonance and dissonance between Chinese and European financial development reflects alternative historical paths. From it we learn what is common in the technologies of finance; how parallel innovations can arise; and how new ideas are adopted, altered, and embedded into broader social, political, and cultural frameworks. The comparison between financial developments in China and Europe reflects my personal research interest over the past two decades. With great regret I’ve left out evidence from many other civilizations.

The extraordinary expansion of humanity and urban society over the five millennia is testimony to the fact that finance has vastly improved our species’ ability to reduce existential risks and to allocate resources through time to foster growth. However, civilization’s growth has engendered its own problems. The biggest of these is whether the intertemporal balance—the trade-off between current and future generations—can be preserved.

This book is a somewhat personal narrative about the people, places, and things that, in my view, shaped the history of finance as a technology of civilization. It does not pretend to be a comprehensive financial history of the world. That is a vast task that, to some extent is currently under way as a result of collective scholarly efforts. The book reflects not only the specific themes that linked finance and civilization but also my personal, idiosyncratic experiences—both as a financial economist and as a former participant in the worlds of archaeology and filmmaking; both of which provided a different frame of reference with respect to the role of finance in society. These prior experiences took me to some extraordinary locations in the history of finance. I hope the reader will forgive me for personalizing some of them. A “place where” frame of reference sometimes evokes a richer context for discovery. Before launching into the story, however, an overview of financial technology, some definitions of civilization, and the logic of the connection between the two are in order.
INTRODUCTION

Finance has four key elements:

1. It reallocates economic value through time;
2. It reallocates risk;
3. It reallocates capital; and
4. It expands the access to, and the complexity of, these reallocations.

Let me explain each of these.

The example of the mortgage above demonstrates the first key element: reallocation of economic value through time. A mortgage is one kind of financial contract, but there are many others. All of them are promises today about a future action. The contract ties the present and future together in a way that can benefit the contracting parties.

Second, finance reallocates risk. Reallocation through time means that financial contracts must cross the barrier of uncertainty that separates present and future. Some risks we must simply live with—such as the risk of a meteorite striking the earth. Other risks we can take steps to reduce or to restructure. Financial contracts take the exposure to risk that is inherent in the dimension of time, and they allocate it among various parties. For example, life insurance contracts can shift the risk of mortality from a single household to a large institution, which, in turn, can diversify by pooling it together with many other contracts.

Third, finance reallocates capital. The stock market, for example, allows the flow of investment into productive enterprises. Banks, for example, make loans to businesses with the potential for profits. In this way finance is a technology for facilitating economic growth.

Fourth, finance expands the access to and complexity of these reallocations. As it developed through history, finance provided an increasingly richer set of intertemporal contracting possibilities. This richness and complexity mirrored the complexity of the society that engendered it. At times, this complexity challenged the very boundaries of written language’s ability to specify them. A modern mortgage-backed securitization contract, for example, can be 900 pages long and can detail an enormous variety of conditions, rights, and responsibilities. The virtue of such complexity is that it expands the contracting “space” between parties—that is, the number of dimensions along which they can negotiate. When you do this, you are able to arrive at agreements that simpler systems might not. The very richness and complexity of the intertemporal-
r.al agreements finance allows is itself an important contribution of the
technology. Without this multidimensional freedom, some fundamen-
tal activities of civilization would not be possible.

REALLOCATION THROUGH TIME

Financial contracts are typically struck between someone who wants to
shift value to the present and someone who wants to shift value to the
future. There are two broad reasons for shifting money to the present:
consumption and production. The consumption motive is the need for
cash to cover current expenses, to buy food, to pay medical bills, or to
deal with some other unforeseen cost.

Consumption loans can be used to reduce risk. In an uncertain
world, sudden expenses arise. Financial contracts allow you to borrow
or pledge against the future to mitigate negative shocks today. In ex-
treme circumstances, such as crop failure or a sudden illness, an emer-
gency loan is a way to put food on the table and provide medicine to the
sick—it smooths out the difference between good times and bad times.
Financial contracts can be essential tools for survival. They provide
the same potential benefits to governments, by the way. Governments bor-
row to pay for military defense or a sudden calamity, and then repay
the loan with future tax revenues. The economic term for this financial
function is “intertemporal smoothing of consumption.”

Productive loans are different from consumption loans. They play
a special role in the economy, because they are based on the notion of
growth. They do not simply smooth economic shocks between the pres-
ent and future; they make a different kind of future possible. Finance
can bring capital together to create an enterprise that will generate
higher future value. For example, a farmer can borrow to buy seeds to
plant, and the harvest can yield a bounty well beyond the original cost
of the seeds. If a farmer could not borrow, the land would not be used
productively.

By the same token, finance allows productive use of human ingenu-
ity. Without finance, the only people who could start a business would
be those who already had money to do so. Finance removes the prereq-
usit e of wealth from entrepreneurship. It feeds capital to potentially
productive projects regardless of whether or not the entrepreneur is
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rich. In this sense, finance broadly disseminates the economic advantages of wealth—it democratizes access to productive capital and removes the natural constraints to funding productive projects. This is the basic logic connecting finance and economic growth.

The use of finance for consumption and production also has potential problems. Consumption loans have been criticized as promoting profligate behavior and exploiting desperate borrowers. Productive loans can lead capital astray; easy money can fuel foolish projects just as it can fund profitable enterprise.

Shifting money to the present for reasons of consumption and production can be done through different kinds of financial contracts. The simplest is the loan, but there are other kinds of financial promises. A share of stock or a partnership share offers an ownership stake in an enterprise rather than a fixed future payment. Insurance and option contracts offer a future payment depending on the occurrence of a particular event or condition. Throughout history, people have come up with various forms of contracts that allow for broader participation in productive enterprise. We will explore some of these in detail in this book.

INVESTMENT

Consumption and production use current capital; investment provides that capital. It is the basic technology for saving for the future. That is why pension funds hold stocks and bonds and other financial assets.

Investing money rather than spending it requires delaying gratification. No one likes to delay gratification without a good reason. For investors, a key incentive is the expectation of higher future consumption. In the simplest form of a financial contract—a loan—the lender expects to get back the money lent plus some extra amount: interest. The longer the loan is made for, the longer the investor delays personal consumption and thus, typically, the more interest is promised in compensation.

The rate of return on the investment can be thought of as the price of time. It equilibrates the intertemporal supply and demand for money. It balances the needs of investors against those of consumers and producers. For example, if the interest rate is too low, investors may prefer
to spend their cash now rather than save it. If the interest rate is too high, producers may forgo projects, because their expected return on borrowed capital is insufficient to repay the loan.

While these trade-offs seem simple, they have global implications. The productivity of capital investment intermediates between the world’s consumers, producers, and investors. Investors are connected to today’s consumers and producers through financial institutions and markets. The balance is a delicate one. When financial markets crash, investors can curtail the flow of capital to enterprise. Demographics are fundamental to the equation. As the world’s life expectancy grows, the need to save grows as well. As the world population ages, the ratio of producers to consumers declines. Finance not only intermediates the present and the future, it also intermediates between the young and the old.

By the same token, the financial equation between the present and the future only works if there is genuine economic growth. This is fine in a world of low-hanging entrepreneurial opportunities, but as the growth of emerging economies slows down to the pace of mature economies, the question of where future growth will come from looms large. The specter of the limits to growth—and the consequent breakdown between present and future economic value—has long concerned economists and planners.

**CULTURE VERSUS FINANCE**

It is easy to think about finance as an abstraction—after all, the notion of transcending time is fundamentally abstract. However, finance is embedded in human culture and behavior. Society has long struggled with placing finance in a moral and cultural context. While finance can solve great problems, it also can threaten the status quo. It changes who turns to whom in an emergency. It reallocates wealth; it creates the potential for social mobility and social disruption.

In some sense, the most basic intertemporal economic institution is the family. A social compact in which children take care of aging parents, for example, is a retirement plan. Likewise, a reciprocal gifting commitment among family, friends, or members of a community fulfills the same function as a financial loan. Unlike a loan, however,
the compensation is a future social obligation rather than interest payments—tightening a social network rather than loosening it.

These arrangements long preceded formal financial contracts. Finance emerged in a cultural context that already addressed intertemporal problems to some extent. In this sense, financial contracts were not entirely new. Rather they substituted for, and often improved upon, traditional intertemporal mechanisms. As such they represented a challenge to the status quo.

At times, culture has lashed back at finance—particularly around financial crises. This response may in part be due to the threat finance poses to tradition social, economic, and political institutions. For example, some of the earliest ad hominem attacks on financiers were by Babylonian political leaders consolidating authority. The first stock market boom in eighteenth-century Britain was criticized in part because female investors were making money in a traditionally male-dominated realm.

Because finance is a potentially destabilizing force, society has often sought to place bounds on it. These constraints are sometimes couched in moral terms. Usury laws were introduced under the guise of protecting borrowers. Britain’s Bubble Act restricted the creation of business corporations under the guise of stopping immoral speculation. The Securities and Exchange Commission was created in the 1930s in the United States to regulate the potential misuse of financial techniques and tools. Behind these and other restrictions on financial contracting is the implicit—and reasonable—supposition that rules are needed to prevent the financially adept from exploiting those less sophisticated—and underlying this is the fact that finance reorganizes power. A financially adept mind that can think through trade-offs between present and future is an extraordinary asset in a world with financial instruments and markets—but it can also represent a danger. Finance has the potential for great social change, which is inherently risky.

**FINANCE AND CIVILIZATION**

Finance offers a rich variety of ways to reconfigure human relationships, particularly because it expands the domain of interaction through time. It can focus economic power, shifting it quickly from place to place. It
can be both a weapon of war and an instrument of peace. This complexity and potentiality makes finance a particular tool of civilization. In this book I argue that there are reasons finance emerged in the first civilizations; reasons complex financial instruments are less frequently part of the toolkit of traditional cultures.

The hallmarks of civilization are urbanism; social specialization; sophisticated symbol systems; and complex, multidimensional interactions. Civilizations are also open systems that absorb and synthesize knowledge. As my father, the late historian W. H. Goetzmann once put it:

Cultures are structures of interrelated institutions, language, ideas, values, myths and symbols. They tend to be exclusive, even tribal. Civilizations, on the other hand, are open to new customs and ideas. They are syncretistic, chaotic, and often confusing societal information systems. They continue to grow in the richness, variety and complexity of societal experience.¹

Financial systems expand the scope and nature of these social relationships into the realm of time and across both great and very close distances. A dense, urban society creates relationships of all kinds. In a city you not only interact with family and long-term acquaintances. You also interact with people for whom traditional reciprocal relationships do not work. Urban life may demand one-off interactions with foreign visitors or repeated interactions with tradespeople who cannot reciprocate in ways you require.

Such financial tools as coins, loans, and partnership agreements expanded the set of economic interactions to people who may not willingly interact otherwise. Financial markets allow strangers to exchange value through time more efficiently than traditional reciprocity arrangements do. They do not require shared belief systems or cultural norms, simply a structure for documentation and enforcement. Financial instruments expanded the dimensions over which individuals could come to agreements, and this expansion uniquely fits the needs of a complex, multidimensional urban society.

Civilization not only requires contracting among many different types of economic agents, but it also requires flexibility to respond to complex, multidimensional problems. Financial contracts allow
an enormous variety of novel payoffs and promises. Even the very first financiers operated in a sophisticated nexus of institutions and commitments; they had deals with institutions such as temples and palaces; with farmers and other producers; and with long-distance traders, who in turn interacted economically with other cultures and civilizations. These first financiers depended on a variety of outcomes and events: political decisions, agricultural output, the fortunes of overseas trade ventures, the fluctuating price of commodities, and the honesty of employees. Complicated lives require interaction, planning, and commitment in many different dimensions over a variety of unknown future outcomes. The development of finance was driven by the demands of civilization’s social and economic complexity.

FINANCE AND KNOWLEDGE

Finance also played a role in another key aspect of civilization: the development of knowledge. One important way that humankind learned about the boundaries of the world was through merchant voyages requiring money and time—underwritten by investors hopeful of a future profit. In this way, finance has been a cofactor in civilization’s expansion and outreach. Trade routes linked societies from distant parts of the world. These distant connections were not only spatial, they were also temporal. From the outset, long-distance trade created long gaps of time: intervals between investment and return separated by the veil of uncertainty. Columbus had to wait patiently for the funding of his first transatlantic voyage, and then he had to promise the future unknown profits to his benefactors. His contract with the Spanish crown was extraordinarily complex: he received not only political favors but also 10% of future revenues from transatlantic trade. He also negotiated an option to invest up to 1/8 share of any commercial enterprise organized to exploit his discoveries. Without this intertemporal contracting, he might never have set sail.

I will also show how finance has changed the tools humanity uses to develop and preserve knowledge. Financial problems stimulated the development of writing, recording, calculation, and printing. It also directly spurred some of humanity’s most important mathematical in-
Novations, including the discovery of logarithms, the mathematics of probability and uncertainty, and the ability of mathematics to express an infinitely long series and to divide time and the process of change into infinitesimally small intervals.

Finance stimulated the development of quantitative models of the future and the maintenance of deep records about the past. Markets taught people about such things as the limitations of the capacity for reason and the dangers of miscalculation. These complex conceptual frameworks augmented and stimulated the development of problem solving, but they also set up a conflict between traditional and quantitative modes of thought. This conflict is heightened during periods of financial innovation and financial disaster. Not only did financial architecture challenge traditional institutions, it also challenged traditional conceptual frameworks for dealing with the unknown. Cultural notions of chance and fortune are embedded in a rich set of symbols, myths, and moral valences. Understanding and managing this conflict remain important challenges to modern society.

**Hardware and Software**

Finance has two different dimensions—what might be thought of as hardware and software. The hardware is constituted by such things as financial contracts, corporations, banks, markets, and monetary and legal systems. I generally refer to this as financial architecture. Finance is also a system of analysis that incorporates counting; recording; algorithmic calculation; and advanced mathematical methods, such as calculus and probability theory. On an even deeper level, finance is a system of thought; a means of framing and solving complex problems about money, time, and value. In essence, this is the software of the technology.

This book highlights historical episodes in the development of both financial hardware and software. Both dimensions are embedded in the broader structures of society. As they evolved, not only did they draw from other fields of work and other technologies, but other technologies also have drawn from finance.
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THE OTHER SIDE OF THE COIN

With each advance in the hardware or software of finance, a problem was solved, but new problems appeared. Financial solutions improved the capability of humankind to create cities, to explore new worlds, to expand and equalize economic opportunity, to control risk, and to provide for an uncertain future. But at times financial innovation has created serious disequilibria in and across societies; disruptions that have defined the fundamental conflicts in the modern world and that will continue to shape the development of the world to come. I hope to explore both faces of finance: its capacity to solve problems and its tendency to create them.

PERSPECTIVES

This book is told from a number of perspectives. The first is that of the inventors and users of financial tools. Sometimes we know these people, but often they are anonymous. The invention of the first loan was a great idea, but no one knows who had it. Financiers are not historians; capital markets are not libraries—financial techniques were invented to make money, not to make their inventors famous. In fact, usually when we know a lot about financial innovators, it is due to a disaster. For example, the visionary banker John Law is still known for the collapse of his innovative Mississippi Company designed to rescue France from bankruptcy in the years leading up to the bubble of 1720. However famous, anonymous, or infamous its inventors, keep in mind that finance is by, for, and about people’s lives. Each shareholder in John Law’s Mississippi Company bought shares for personal reasons—maybe to take a flyer on a risky venture, maybe he or she trusted John Law’s scheme, or perhaps just because others were doing it. Whatever the reason, the only way to figure out how a financial tool works is to ask why someone might need it in the first place. Ultimately, finance is personal and concrete, not abstract and theoretical. It is not only about money but also about people and how they use money.

The second perspective is that of the researcher. History is discovery, and historians are explorers. Much of this book unfolds from research by archaeologists, classicists, historians, economists, and mathematicians.
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Just as important, however, are those who are devoted to preserving the past—librarians, collectors, and dealers—all of whom treasure the documentary evidence of history. I hope to convey the excitement of all their quests. Some of their views are sparks of insight mixed with years of careful research. For example, we would not understand the birth of finance in the ancient Near East without Professor Denise Schmandt-Besserat of the University of Texas, who discovered the origins of cuneiform writing—along with the origins of financial contracts. We owe a lot to the Shanghai financier and monetary historian Peng Xinwei 彭信威, who devoted his life to Chinese financial history before disappearing in the Cultural Revolution. We might never understand the first inflation-indexed security if not for economist Robert Shiller’s personal mission to help people insure themselves against everyday economic risks.

A third perspective is empirical: the world of things and places. Technology requires actual tools and locations. For finance, this means coins, documents, correspondence, and places where these things were made and exchanged. Objects like coins and stock certificates functioned as tools, because they solved such problems as the storing and conveyance of value and the transmission of value through time. They have been made of many different things—clay, metal, and papyrus—and printed on vellum, bark, or paper. It is important to understand the material culture of finance to appreciate how it worked as a technology.

Yet another perspective is cultural. Although this book is not a cultural history of finance—in many instances, artists, writers, moral philosophers, dramatists, and even comedians have interpreted financial markets, and this in turn has influenced the course of these markets’ development. The criticism of finance as a tool of exploitation on moral grounds goes back to Babylonian times. The discomfort that society has felt with the complexity and abstraction of financial tools has stimulated rich artistic interpretations that in turn shaped cultural attitudes. We sometimes turn to art for a perspective, and artists’ views on finance—from seventeenth-century tulip mania prints to the twentieth-century murals about commerce in New York’s Rockefeller Center—depict finance in the context of familiar cultural symbols. The artist’s vision is an integral part of the narrative of this book.

Much of my research in finance has been directed toward a scholarly audience; however, one motivation for writing this book is the hope
that a broader audience will be curious about the origins of a toolkit that we all share and a mindset that seems at times difficult and perhaps unnatural. As important as it is to live every day in the present, finance challenges us to think hard about the future.

My personal view is that the trajectory of technological innovation has been mostly upward and will continue to be so. The financial solutions we have in the world today are generally life improving. The problems they created have been serious at times, but as a global society, we seem to make progress in dealing with them. Would the world have been a better place without the discovery of loans, banks, bonds, stocks, options, capital markets, insurance, and corporations? Perhaps, but I doubt it. The argument in this book is that financial technology allowed for more complex political institutions, enhanced social mobility, and greater economic growth—in short, all the major indicators of complex society we call civilization. Ultimately, financial relationships have become important means by which economies are knit together into a complex global civilization. As a global civilization, we must continue to face the basic problem posed by finance: how to equilibrate between the needs of the present and those of the future; and how to make the benefits of finance broadly available to everyone in society, wealthy and poor. The historical trajectory of financial innovation may just provide a useful guide.
Finance began with the first cities—and vice versa. This first section focuses on the parallel emergence of urban civilization and finance. The joint emergence of finance and civilization in the ancient Near East teaches an important lesson. Higher levels of political and social development demand complex economic organization and technology. Financial infrastructure made many of the advances of urban society possible—and it still does. Humanity gave up a certain measure of economic innocence on the developmental path to urbanism, but at the same time it began a process of discovery and invention that fundamentally changed human experience.

The first four chapters trace the extraordinary arc of financial development in the ancient Near East. I argue that the invention of a way to express the exchange of value through time created a novel model of thought: a capacity to forecast economic outcomes and to treat past, present, and future values as equally concrete. With the invention of finance, people lived their economic lives in an exquisitely articulated framework of time. Stepping into this quantified temporal framework opened up many new possibilities. Some were ways of mitigating risk. For example, financial thinking was embedded in the earliest agricultural civilizations because of the need to plan farming and husbandry operations, and to record promises of future commodity deliveries. However, financial tools were also part of waging war. The earliest record of a boundary dispute in antiquity includes a demand for reparations with punitive compound interest.

Neither finance nor urban society remained stationary through the first two millennia of their coexistence, and the chapters on the ancient Near East emphasize the way in which financial tools were adapted to trade as well as to agricultural production. Finance became a mecha-
nism for facilitating complex mercantile operations stretching from Anatolia to the Indus.

The chapters on Athens and Rome show how two different cultures adopted and transformed the Near Eastern financial legacy. I argue that financialization in fact made both the Athenian and Roman economies possible. Both were reliant on imported grain. Their financial systems developed, in part, to allocate investment capital to support the commodity trade and to allocate the risk of this trade.

Two aspects of Greek civilization are highlighted: law and money. The simple existence of courts in Athens created enforceable property rights and attracted investors. I claim that the courts also had an important intellectual and perhaps cognitive effect. Trade disputes were regularly argued before juries of hundreds of citizens, and this must have created an intensely financially literate society. The monetization of the Athenian economy was an equally important step. Recently, scholars have argued that it played a central role in the transition to the political phenomenon for which Athens is most famous: democracy. Money became both a tool for sharing the Athenian economic success and an instrument for aligning personal loyalties to the state.

This section finishes with a chapter on Rome and a picture of a fully financialized ancient economy—like Athens, an import society that sustained one of the largest cities in the world via commodity trade. Personal wealth in Rome played a key role in political power, and fortunes were sustained through a variety of direct and indirect investment opportunities. Debt played an important role in the Roman financial system, and it left its trace in a series of financial crises.

One of the Rome’s most innovative contributions to finance was the creation of shareholder companies that supplied services to the growing needs of the state. Investors in these companies, called publican societies, participated in profits from tax-farming, public works construction, and provisioning Rome’s armies. Publican societies were the world’s first large-scale publicly held companies—something like modern corporations. Their shares fluctuated in value and were held broadly by citizens of Rome. I argue that these financial instruments played a crucial role in the political structure of Rome at a certain juncture in its history, because they provided a means to reallocate the economic benefits of Rome’s expansion and conquest among key political constituents.
In this section, I argue that the course of financial development in civilizations does not follow an inevitable path toward the same institutions and contracts. The Chinese experience demonstrates that varieties of solutions are possible to the fundamental problems of time and value. While some tools (like loans) are ubiquitous, others (like government bonds) are not. I propose that these differences in financial technologies shaped a particular relationship between the individual and the state over stretches of Chinese history and set up an encounter between European and Chinese financial systems in the nineteenth century that resulted in an innovative Chinese governance structure for enterprise.

“China would of herself have developed slowly into a capitalist society even without the impact of foreign capitalism,” proclaimed Mao Zedong [毛澤東] in 1939. Was Mao correct? Left to its own, without the incursion of Western powers in the nineteenth century, would China ever have become a capitalist power? China has a long history of financial innovation. The Chinese invented metallic coinage, paper money, bills of exchange, transferable rights certificates, sophisticated accounting and management systems, and securitized lending. Examples of wealthy entrepreneurs, financial institutions, private partnerships, and business organizations can be found throughout China’s history. Given all these financial innovations, why were the first global corporations European in origin, not Chinese? I argue in Part II of this book that the answer is rooted fundamentally in the relationship between government and private enterprise in Chinese history.

China developed a financial technology that solved many of the same problems encountered in the ancient Mediterranean and the Middle East, including economic contracting and planning through time and space. China was (and remains) a great empire, with vast and complex
cities, a vigorous trade economy, and a long history of mathematical thought and application. The financial development of China helps us understand what tools are necessary or unnecessary. For all the similarities in the financial development that this part documents, the differences between East and West are most revealing. While China also created debt instruments and mathematical tools for the calculation of interest, it was distinct in three specific ways.

The first is in its monetary development. The great, unifying financial theme of Chinese finance is money. In the same way that financial technology led, in Mesopotamian civilization, to abstract notions of time, growth, and interest rates, the early emergence of money in China evolved into an extremely sophisticated and abstract technology that touched nearly every aspect of economic life. Just as the existence of financial tools influenced modes of thought in the ancient Near Eastern and Mediterranean worlds, so too did the highly developed tools and theories about money influence Chinese thought and philosophy. China's remarkable contribution to finance was the invention of paper money, but this innovation appeared only after nearly two millennia of experimentation with various forms of payment systems embedded in a network of political and economic obligations that constituted Chinese society.

The second distinctively Chinese financial technology is sophisticated bureaucracy. The vast Chinese empire, first unified in 221 BCE, expanded and contracted through two millennia. China sometimes broke into smaller states or was conquered by its Asian neighbors, but through long stretches of history, China's major challenge was how to manage a political entity of great size and varied cultures. Simple problems like how to collect taxes from distant provinces loomed large and required organizational capabilities that, for the most part, were not needed in other parts of the ancient world. We saw, for example, how a banking system arose in Hellenistic Egypt to deal with this kind of challenge, but the scale of the Chinese empire was much greater. Getting money from the province to the capital and vice versa was a major financial problem. Even bigger problems were managing, motivating, and controlling the vast human bureaucracy necessary to run such a state. This required recognizing and dealing with the dark side of human nature: corruption.

Scale was not the only problem of the Chinese empire. An entity that large inevitably encompasses many and varied regional economies—
some of which may be doing well and others poorly at any given time. Even today, one of the macroeconomic challenges of the European Union is how to manage the ebb and flow of prosperity among very different regional cultures and economies. Without a technology for doing so, China would inevitably have fractured into regional polities. As we shall see, from earliest times, this problem of economic equilibration stimulated creative thinking, a deeper understanding of economic principles, and recognition of the crucial role of money and finance.

The third distinctively Chinese financial development is the role of government in enterprise. When financial innovations occurred in China, they were often appropriated for the benefit of the government, not the individual. Through the lens of modern capitalism, China is a classic example of the grabbing state. However, from the perspective of Chinese history, this expropriation is consistent with the idea of a providing state, in which individualism is subordinated to collectivism. The providing state is a large, powerful, and complex state. The intricate bureaucratic structure that made China the world’s longest-lived continuous civilization survived by regularly seizing commercial opportunities from private entrepreneurs and crowding out private enterprise with state-supported monopolies. Even when the state sought to fund private businesses, government officials could not keep themselves out of them. This environment created an additional source of entrepreneurial risk—the risk of success as well as failure.

Besides this crowding-out factor, there is one additional reason China did not develop earlier into a capitalist society (at least in the modern European sense): because of the power of the state, rather than its weakness. It is telling that one key financial innovation appeared in the West long before it appeared in China: government bonds. Weak city-states in Europe, constantly at odds with one another, learned how to borrow from investors by offering them promises of future repayments. Government bonds appeared in Italy in the twelfth century, and full-scale bond markets appeared in the thirteenth century.

China in this same time period had paper money but no bonds. This was not an accident of discovery. Before the unification of China under the Qin [秦] emperor in 221 BCE, individual Chinese states likewise occasionally financed warfare by borrowing. An established technology for a wide variety of financial contracts has long existed in China. Commercial claims and financial property rights were being adjudicated
before the turn of the last millennium. Thus, China had the technical capacity for government debt markets. However, up until the nineteenth century, the Chinese state did not issue debt. Indeed, periodically throughout Chinese history, the government provided credit. If anything, it competed with private credit institutions rather than using them to finance government enterprise.

What is so good about a state having to borrow? Doesn’t this create long-term problems for its subjects? Aren’t government bonds simply claims on future taxes rather than past taxes? Yes, but they are more than this. Financial markets do two things. First, they trade promises about the future. This allows entrepreneurs as well as states to capitalize future anticipated cash flows. Second, they provide a mechanism for individual savings and financial planning. Investors like bonds because this allows them to transfer current wealth into an uncertain future. This technology feeds on itself. Early European government markets, once institutionalized, provided a ready mechanism and built-in demand for future promises of private enterprise.

Only with the opening up of China’s treaty ports in the nineteenth century through semi-colonial aggression by Great Britain and other countries did China resort to state debt. It is telling that the first Chinese government bonds were floated on international debt markets rather than in China itself. The domestic demand for debt did not yet exist. China’s financial modernization in the nineteenth century was a mixed blessing. Chinese government borrowings not only financed the country’s international indemnities, they also helped create a vast rail transportation system, which, in turn, helped modernize the Chinese economy.

The forced encounter with the West in the nineteenth century also introduced share capitalism and fostered an explosion of entrepreneurial growth. By the 1870s, several Chinese corporations had formed on a blended East/West model with private owners and government participation and sponsorship. Despite the social tumult and revolution that created the Chinese Republic in 1912, this number grew into the hundreds. At its apex in the 1920s, Shanghai was one of the great banking centers in the world and had a stock market to rival many in Europe. In fact, these early twentieth-century foundations are the basis on which modern China is rebuilding its financial future. Before speculating about the future, however, there is still much to be learned from China’s past.
In this section we track the early history of financial innovation in Europe, up to the beginning of modern globalization. We return from China, where we studied the role of financial technology in maintaining a vast, unified empire. We shift west, where a very different financial system emerged from a fragmented and competitive patchwork of cities and states that only rarely organized themselves into a unified polity. Europe after the year 1000 became the crucible for a financial system that completely reconfigured society’s relationship with time and money. There have been countless theories about how and why this happened.

In Part III I argue that the fragmentation of European states was the stimulus for a variety of creative, somewhat independent financial experiments. The fragmented political economy of Europe fostered the development of investment markets; the reinvention of the corporation; extra-governmental banking institutions; complex insurance contracts on lives, property, and trading ventures; and a sophisticated tradition of financial mathematics, reasoning, and analysis. These innovations, in turn, changed human behavior. I argue that they altered attitudes toward risk and chance, leading on the one hand to probabilistic thought and calculation and on the other hand to unbridled speculation that fueled the world’s first stock market bubbles. Europeans ultimately turned themselves and the rest of the world into investors.

The key stages in Europe’s development are first, the emergence of financial institutions; second, the development of securities markets; third, the emergence of companies; fourth, the sudden explosion of stock markets; fifth, the quantification of risk; and finally, the spillover of this system to the rest of the world. This radical reconfiguration of the financial architecture of Europe following the year 1000 solved...
many economic problems in stunningly novel ways, but the solutions were subtly challenging and occasionally socially disruptive. As a result, they engendered further innovation and change. Over the course of the second millennium, Europe became a vast laboratory for financial experimentation. As we shall see, the development of modern financial technology was anything but linear. Some new ideas worked well, and some failed spectacularly.
This part of the book narrates the final act in a story in which the technology of finance has so far played both hero and villain—or more aptly perhaps, a protagonist uncertain of moral valence. In the modern era, the problems and possibilities inherent in finance led to a dramatic conflict over the direction of civilization itself. In Part I we saw from the earliest urban city-states that finance enabled the emergence of complex political organizations—but not without the costs inherent in contracting about an uncertain future. Default on a loan, for instance, could lead to enslavement. In this structure lay the seeds of global conflict and political rupture.

In Part III, with the first appearance of financial instruments and financial thinking in Europe in the Middle Ages, we saw a reaction that led to proscriptions against usury and the defining of financial technology as inherently immoral. We then saw the emergence of financial ways of thinking—from mathematical techniques for analyzing uncertainty to projec-
tors’ dreams about the potential of corporations to do everything from risk sharing to colonizing the world. In Part IV we will see the reassertion of earlier amoral characterizations of finance and a seductive argument against the fundamental principles that support financial technology, including private property and entrepreneurial freedom. This reinvigorated dialectic over the role of finance in society comes to a crescendo in the early twentieth century and literally breaks the world in two.

The ultimate implication of the discovery in Venice of municipal bonds led, over the centuries, to situations in which the bonds of one nation could be held by citizens of another. Colonialization was a consequence of this financial structure. When the borrower is a nation-
state and the lenders are bondholders from countries with big, modern armies, this creates a major problem. In this part we shall explore how this problem defined relationships among nation-states in the modern era. In particular, we will see how nations like Great Britain used debt and the power of its capital markets as an instrument to weaken sovereign control. The reparations claims we saw in the dispute between Umma and Lagash in the third millennium BCE appear again and again in the nineteenth and twentieth centuries.

The world ultimately managed to address some of the worst issues raised by sovereign debt. The modern international institutions of the International Monetary Fund and the World Bank, for example, were designed in part to defuse the political problems caused by finance. They attempt to eliminate military enforcement of sovereign debt contracts by nation-states. The process of political negotiation within the Eurozone is a prime example. The modern story of global debt is a major theme of Part IV.

GLOBALIZATION OF EQUITY

A second major theme in this final part of the book is the opening up of investment to all levels of society. The year 1720 released a strange genius. It revealed the amazing power of the stock market to capture the imagination and open the wallet. As investment markets emerged all over the world in the nineteenth century, they allowed more and more people to save and speculate—to plan for their economic future and to trade on hopes and dreams of instant riches.

This new configuration of social assets had a number of consequences, institutional as well as intellectual. The opening of investment markets spurred a quest by investors for greater returns and greater diversification—and this led inexorably to cross-border investing. European capital worked its way to every corner of the globe chasing returns, but it also spread risk, resulting in the globalization of equity.

We shall trace the process of stock market investing and the cultural response as it spread around the world. We look at Britain, Russia, China, and the United States as different case studies in equity market development in the modern era.
PART IV

John Maynard Keynes famously asserted that the fundamental driver of economic growth is animal spirits—of the kind we saw in abundance in 1720. We shall see the pattern of hope and despair—or even anger—about the financial markets play out again and again in this part. A rush of optimism about investing in new markets and new technologies can just as suddenly reverse. When stock values crash, people lose faith in markets, and the ability to tap investor wallets ebbs with stock prices. The key lesson is that belief in the power of the stock market is vital to sustaining it.

One of the most important financial developments in the modern era is the science of diversification, a discovery that came from the mathematics of probability. The science of diversification makes some important predictions about the behavior of the world’s investors once global markets are broadly accessible to them. It predicts that all assets in the world will be held in equal proportion by all of its investors. That is, given a frictionless investment market, a family in France will hold essentially the same stocks as a giant pension fund in California. And that this portfolio would hold a little bit of every stock—actually every security—in the world. Theory says that, as a global society, we would share equally in the benefits of finance. It was not until the modern era that smaller investors could begin to hold such well-diversified investment portfolios. How the theory developed—and how investors have moved toward holding this strange, egalitarian portfolio—is another key theme in this part of the book.

Finally, I will argue that globalization of equity investing leads to cross-border conflicts of interest. It enflames nationalistic passions. It erodes domestic political influence and control over corporations. These conflicts between equity investors and the nation-state are real and have yet to satisfactorily resolved. The final portion of this part explores the future of such conflicts, and I offer some conjectures about how we might solve them.
CONCLUSION

This book has been a broad inquiry into the development of finance as a technology and why it matters. From the first chapters it should be clear that roots of financial techniques are ancient and widespread. They are embedded not only in the economics of culture, but in its social and intellectual structures as well. The joint development of financial tools and complex society was a process of give and take on many levels. Discoveries of various financial solutions led to some of civilization’s most important achievements: writing, the mathematics of probability, mechanisms for savings and investment, and the harmonization of global relations. Financial technology also created serious problems. The invention of debt was connected to slavery, reparations payments, imperialism, and financial crises. A long-term historical perspective on this duality in the nature of finance is important. At a minimum, it can guide our thinking about the design of financial institutions in the future.

Another argument in the book is that financial thinking is difficult. Although many of the complex techniques used by financiers today can be traced back a millennium or more, finance has often been regarded as foreign or contrary to tradition. Crashes and bubbles seem to always take people by surprise. Tools like options, futures, bonds, and mutual funds, and institutions like money markets, corporations, and banks seem to many of us impossibly complex. I argue that this is due at least in part to the relatively recent development of financial thinking and its reliance on specialized analytical tools—from the complex legal arguments of Demosthenes to the advanced mathematics of modern portfolio theory.

Like any technology, as finance became more sophisticated, it demanded increased specialization to understand and implement. By the same token, when finance failed, it had major economic implications
for everyone—not just financiers. In times of financial crises, society has tended to express a collective nostalgia for a pre-financial world. However, the many examples in this book demonstrate that civilization has always depended on financial tools to move value through time and restructure myriad economic risks. Occasionally such thinkers as Karl Marx have dreamed of eradicating financial institutions like money or corporations. Despite the visceral appeal of such suggestions, rolling back the clock on financial tools would mean reversion to a way of life before the first cities and large-scale nation-states.

Another argument in the book is that there are different ways to solve financial problems. Chinese financial history provides the opportunity to study comparative development; particularly how political context can determine technical solutions. The development of money and coinage in China, for example, followed a pathway quite distinct from that in the Greek and Roman worlds. Yet ultimately there was a convergence in both East and West of money as a key tool of the state.

Cross-cultural comparison also shows the extent to which the corporation—in some sense the most important unit of enterprise in the modern global economy—is an unusual phenomenon. Chinese civilization flourished for millennia without the corporate form. This may or may not explain the differential industrial development in the late eighteenth and early nineteenth centuries between Europe and China—the Needham problem discussed in Chapter 10. However, the rapid adoption and repurposing of the corporate structure in late-nineteenth-century China shows a self-conscious flexibility and ingenuity—a clear understanding that finance is a tool that could be learned and adapted to solving China's problems. The history of the corporation over the long durée suggests that it is a very stable equilibrium—a kind of complex economic “game” that can be applied to many different kinds of enterprises and allows for many different players. I suspect it will be robust enough to survive even as the global financial system moves toward large-scale collective investments like sovereign funds.

In the larger context of global financial development, Europe's intense reliance on capital markets sets it apart. I argue that the roots of this distinct tradition lie in the fragmentation and weakness of medieval European states. A broader implication of this is that perhaps the global financial market system is a substitute for strong, centralized political
organization with an organized bureaucracy. Financial markets and governments today coexist and complement each other, but at times they collide. Financial history provides a framework for understanding this dynamic.

History is interesting in its own right, but it is also important as a measure of the present and a guide for the future. As the world moves toward a collective global civilization with a greater proportion of its population participating in complex society, financial tools need to keep up. The lessons from our collective financial past take on more relevance. History has shown us financial mechanisms for risk sharing and intertemporal transfers and how variations in these tools can be adapted to different kinds of societies. We are free to repurpose past successes and learn from past failures about what to avoid. The experience of five millennia of financial innovation, however, suggests that finance and civilization will forever be intertwined.