

Introduction

Are there limits to a country's debt and debt growth?

What will happen to interest rates and all that they affect if government debt growth isn't slowed?

Can a big, important country that has a major reserve currency like the US go broke—and, if so, what would that look like?

Is there such a thing as a "Big Debt Cycle" that we can track that will tell us when to worry about debt and what to do about it?

These aren't just academic questions for academic economists. They are questions that investors, policy makers, and most everyone must answer because the answers will have huge effects on all our well-beings and what we should do. But definitive answers don't currently exist.

At this time, some people believe that there isn't any limit to government debt and debt growth, especially if a country has a reserve currency. That's because they believe that the central bank of a reserve currency country that has its money widely accepted around the world can always print the money to service its debts. Others believe that the high levels of debt and rapid debt growth are harbingers of a big debt crisis on the horizon, but they do not know exactly how and when the crisis will come—or what its impacts will be.

And what about the big, long-term debt cycle? While the "business cycle" is widely acknowledged and some people recognize that it is driven by a short-term debt cycle, that is not true for the big, long-term debt cycle. Nobody acknowledges it or talks about it. I couldn't find any good studies or descriptions of it in textbooks, and even the world's leading economists—including those who are now running, or in the past ran, central banks and government Treasuries—didn't have much to say about this critically important subject when I explored it with them. That is why I did this study and am passing it along.

Before I get into all that, I should begin by explaining where I'm coming from. I don't come to this subject as an economist. I come as a global macro investor who for over 50 years has been through many debt cycles in many countries and has had to navigate and understand them well enough to bet on how they would go. I have carefully studied all the big debt cycles over the last 100 years, and superficially studied many more from the past 500 years, so I believe that I understand how to navigate them. Because I am now deeply concerned, I feel a responsibility to pass along this study for others to assess for themselves.

To gain my understanding, I look at many cases like a doctor studies many cases, examining the mechanics behind them to understand the cause/effect relationships that drive their progressions. I also learn from being in these experiences, reflecting on what I learn, writing it up, and having smart people read and challenge it. Then I build systems to place my bets on what I learned and have new experiences. I do that over and over and will do it until I die because I love it. Because my game has been to bet on the markets and because the debt markets drive just about everything, I have been obsessed with studying debt dynamics for decades. I believe that if you understand these dynamics, you can do very well as an investor, businessperson, or policy maker, and if you don't, you ultimately will be hurt by them.

Through my research, I discovered that there are big, long-term debt cycles that have unfailingly led to big debt bubbles and busts. I saw that only about 20% of the roughly 750 currency/debt markets that have existed since 1700 remain and that all these remaining ones have been severely devalued through the mechanistic process I am going to describe in this study. I saw how this big, long-term debt cycle was described in the Old Testament, how it repeatedly played out in Chinese dynasties over thousands of years, and how time and again it has foreshadowed the fall of empires, countries, and provinces.

These Big Debt Cycles have always worked in timeless and universally consistent ways that are not well understood but should be. In this study, I hope to explain how they work with such clarity that my description will

serve as a template that can be used to see what is going on with, and what is likely to happen to, money and debt. While I recognize that the Big Debt Cycle template I will describe has not previously been vetted, I am confident it exists because I have made a lot of money using it to bet on how things would go. I am passing it along because I am now at a stage of life in which I want to share what I have learned that I have found of value. You can do what you like with it.

Why do I think I understand something that others don't? I theorize that this is for a few reasons. First, this dynamic is not widely understood because big, long-term debt cycles typically last about one lifetime—roughly 80 years (give or take 25 years)—so we don't get to learn about them through experience. Second, because we focus so much on what is happening to us at the time it is happening, people overlook the big picture. I also think there are biases against being concerned about too much debt because most people like the spending ability that credit gives them, and it is also true that there have been many warnings about pending debt crises that never happened. Memories of big debt crises like the 2008 global financial crisis and the European debt crisis of the PIIGS countries (Portugal, Italy, Ireland, Greece, and Spain) have faded, and since we have gotten past them, many people assume that policy makers learned how to manage them rather than view these cases as early warnings of bigger crises on the horizon. But whatever the reason, it doesn't matter exactly why these dynamics are overlooked. I am going to paint a picture of what happens and why, and if there is enough interest in what I'm saying, my template will be assessed and will live or die on its merits.

That leads me to a principle:

- **If we don't agree on how things work, we won't be able to agree on what's happening or what is likely to happen.** For that reason, I need to lay out my picture of how the machine works and try to triangulate with you and other knowledgeable people about it before moving on to look at what's happening and what might happen.

At a time when government debt is large and increasing rapidly, it seems to me dangerously negligent to assume that this time will be different from other times without first studying how other cases transpired. It would be like assuming that we will never have a civil war or world war again because they haven't happened before in our lifetimes without studying the mechanics that brought them about in the past. (By the way, I believe that both the civil war and world war dynamics are also going on today.) As in my other books,¹ I will create a description of the archetypical dynamic and then look at how and why different cases transpired differently so that one can track current cases relative to the template and put into context what's happening and what's likely to happen. In that way, you will both see many cases of this happening and get a peek into the future. Comparing what is happening with that template leads me to believe that we are heading into one of those cases in which central governments and central banks will "go broke" in the ways that have happened hundreds of times before and have had big political and geopolitical consequences.

This brings me to an important point. **The Big Debt Cycle is just one of several interrelated forces that together make up what I call the overall Big Cycle. For example, 1) Big Debt Cycles influence and are affected by largely coinciding 2) big cycles of political and social harmony and conflict within countries that are both affected by and affect 3) big cycles of geopolitical harmony and conflict between countries. These cycles in turn are affected by both 4) big acts of nature, like droughts, floods, and pandemics and 5) developments of big new technologies. Combined, these five forces make up the overall Big Cycle of peace and prosperity and conflict and depression.** Because these forces affect each other and practically everything, they must be thought of together. How these

¹ While debt and currency cycles are comprehensively covered in my book *Principles for Navigating Big Debt Crises* (which looked at all of the 48 biggest debt crises in the 100 years between 1918 and 2018, the year I published the book) and in Chapters 3 and 4 of my book *Principles for Dealing with the Changing World Order* (which looked at the rises and declines of the world's reserve currency markets over the last 500 years and 750 currencies since 1700), in this study, I am going to get much more granular in explaining the last and most dramatic breakdown part of the cycle that leads to changes in currency orders.

forces have worked and interacted and are working and interacting now is covered in much greater detail in my book and video titled *Principles for Dealing with the Changing World Order* and to a lesser extent in Chapter 17 of this study, which is the concluding chapter. In this study, I will be mostly focusing on the Big Debt Cycle, though we will see many references to the ways in which the Big Debt Cycle interacts with the other forces to create the path that we are on.

This study consists of four parts and 17 chapters. Part 1 describes the Big Debt Cycle, at first very simply, then in a more complete and mechanical way, and then with some equations that show the mechanics and help with making projections of what is likely to happen. Part 2 shows what has actually happened across 35 Big Debt Cycle cases, laying out in a detailed template the typical sequence of events that signifies how a cycle is transpiring and shows symptoms that can help identify how far the cycle has progressed. Part 3 reviews the most recent Big Debt Cycle, which started when the new monetary and world orders began in 1944 at the end of World War II and brings it up to the present. In that part, in addition to looking at the Big Debt Cycle and the overall Big Cycle with a focus on the US (because it has been the world's major reserve currency country and the world's leading power, thus making it the world's leading shaper of what one might call the American world order since 1944), I also very briefly describe the Big Cycles of both China and Japan, showing them from the 1860s until now. This will give you a more complete picture of what has happened in the world since 1944 and provide two other Big Debt Cycle cases to look at. Finally, in Part 4, I will peek into the future, looking at what my calculations say about what is required for the US to manage its debt burden, and how the five big forces might unfold in the years ahead.

Because I recognize that there are different readers who have different levels of expertise and want to give different amounts of time to this and I want to help you get what you want out of this, **I put the most important points in bold so you can read just the most essential stuff and optionally dive into the details that interest you. Also, I put what I believe are timeless and universal principles in bold maroon.** If you are a professional or aspiring professional who is really into economics and markets, I recommend that you read the whole thing because I believe that it will give you a unique perspective that you will enjoy and will help you to be successful in your job. If you are not, I recommend that you just read what is in bold. Also, because I'd love to have a two-way conversation with you to try to get in sync about what's true and what to do about it, I am working on a few new technologies for doing that, which I will tell you about later.

In the next chapter, I will describe the Big Debt Cycle in just seven pages. If you want to stop there, that's perfectly fine.

I hope that you will find the study's analysis helpful.

Part 1:
Overview of the Big Debt Cycle

Chapter 1: The Big Debt Cycle in a Tiny Nutshell

My goal for this chapter is to convey in seven pages a very brief but complete description of the mechanics of a typical Big Debt Cycle.

How the Machine Works

Credit is the primary vehicle for funding spending and it can easily be created.² Because one person's spending is another's earnings, when there is a lot of credit creation, people spend and earn more, most asset prices go up, and most everyone loves it. Paying back debt is much less enjoyable. As a result, central governments and central banks have a bias toward creating a lot of credit. Credit also creates debt that has to be paid back, which has the opposite effect—i.e., when debts have to be paid back, it creates less spending, lower incomes, and lower asset prices, which people don't like. In other words, when someone (a borrower-debtor) borrows money (called principal) at a cost (an interest rate), the borrower-debtor can spend more money than they have in earnings and savings over the near term. But over the long term, this requires them to pay back (the principal + interest) and when they have to pay it back, it requires them to spend less money than they have. This dynamic is why **the credit/spending/debt-paying-back dynamic is inherently cyclical.**

The Short-Term Debt Cycle

Everyone who has been around long enough to be affected by it several times should be well-acquainted with the short-term debt cycle. It starts with money and credit being provided readily when economic activity and inflation are lower than desired, and when interest rates are low relative to inflation rates and low in relation to the rates of return on other investments. Those conditions encourage borrowing to spend and invest, which causes asset prices, economic activity, and inflation to pick up until they are higher than desired, at which time money and credit are restrained, and interest rates become relatively high in relation to inflation rates and rates of return on other investments. This leads to less borrowing to spend and invest, which leads to lower asset prices, a slowing of economic activity, and lower inflation, which leads interest rates to come down, money and credit to become easier, and the cycle to begin again. These cycles have typically lasted about six years, give or take three years.

Short-Term Debt Cycles Add up to Big, Long-Term Debt Cycles

What isn't paid enough attention is the way in which these short-term debt cycles add up to big, long-term debt cycles. Because credit is a stimulant that creates a high, people want more of it, so there is a bias toward creating it. This leads debt to rise over time, which typically leads to most of the short-term cyclical highs and lows in debt to be higher than the ones before. These add up to create the long-term debt cycle, which ends when it becomes unsustainable. The capacity to take on more debt is different early in the Big Debt Cycle when debt burdens are lower and there is more potential for credit/debt to be able to fund highly profitable endeavors than it is later in the cycle when debt burdens are higher, and lenders have fewer productive options.

In that early part, it is easy to borrow—even to borrow a lot—and pay it back. These early short-term cycles are primarily driven by the previously described availability and economics of borrowing and spending, and also a lingering cautiousness brought about by memories of the pain of the most recent time when money was tight.³ Early in the Big Debt Cycle, when debts and total debt service are relatively low in relation to incomes and other assets, increases and decreases in credit, spending, debt, and debt service are primarily determined by the previously described incentives with less risk. But late in the Big Debt Cycle, when debts and debt service costs get high relative to income and the value of other assets that can be used to meet one's debt service obligations, the risks of default are higher. Also, late in the Big Debt Cycle, when there are a lot of debt assets and liabilities relative to income, the balancing act of trying to keep interest rates high enough to satisfy lender-creditors without having them too high for borrower-debtors becomes more challenging. That's because one person's debts are another's assets and both must be satisfied. So, while short-term debt cycles end because of the previously

² The "fractional reserve banking system" can lend more money than is deposited because the same money can be lent several times.

³ This cautiousness is reflected in market pricing. For example, during the early stages of the cycle the yields and expected returns of "risky assets" are very high relative to those of "low-risk assets."

described economic considerations, long-term debt cycles end because the debt burdens are too great to be sustained. Said differently, because it is more enjoyable to borrow and spend, if one isn't careful, debt and debt service can grow like a cancer, eating up one's buying power and squeezing out other consumption. This is what makes the long-term Big Debt Cycle.

Throughout the millennia and across countries, what has driven the Big Debt Cycle and has created the big market and economic problems that go along with it is the creation of unsustainably large amounts of debt assets and debt liabilities relative to the amounts of money, goods, services, and investment assets in existence.

Said more simply, a debt is a promise to deliver money. A debt crisis occurs when there have been more promises made than there is money to deliver on them. When that happens, the central bank is forced to choose between a) printing a lot of money and devaluing it or b) not printing a lot of money and having a big debt default crisis. In the end, they always print and devalue. Either way—via default or devaluation—the creation of too much debt eventually causes debt assets (e.g., bonds) to be worth less.

While there are variations in how each of these cases plays out, the most important factor is whether the debt is denominated in a currency that the central bank can "print". But no matter the variation we almost always see that it becomes relatively undesirable to hold the debt assets (i.e., bonds) relative to holding the productive capacity of the economy (i.e., equities) and/or owning other, more stable forms of money (e.g., gold).

To me it is interesting and inappropriate that, when credit rating agencies rate the credit of a central government, they don't rate the riskiness of its debt losing value. They only rate the risk of default on the debt, which gives the misimpression that all higher-rated debt is a safe storehold of value. Said differently, because central banks can bail out central governments, the riskiness of central governments' debts are hidden. Creditors would be better served if the rating agencies rated the riskiness of the debt losing value through both default and devaluation. After all, these bonds are supposed to be storeholds of wealth and should be rated as such. As you will see in this study, that is how I look at bonds. For countries with debts denominated in their own currencies (i.e., in a currency they can print), I rate central governments' debts separately from their central banks to show how risky they are, and I rate the risks of central banks' debts by considering the risk of the devaluation of money to be as, if not more, probable than a default on government debt.

Default or devaluation, I don't care. What I care about is losing my storehold of wealth, which inevitably will happen one way or another.

Following the Debt Cycle's Progression

The main difference between a short-term debt cycle and a long-term (big) debt cycle has to do with the central bank's ability to turn them around. For the short-term debt cycle, its contraction phase can be reversed with a heavy dose of money and credit that brings the economy up from a depressed disinflationary state because the economy has the capacity to produce another phase of noninflationary growth. But the long-term debt cycle's contraction phase cannot be reversed by producing more money and credit because existing levels of debt growth and debt assets are unsustainable and holders of debt assets want to get out of them because they believe that, one way or another, they will be poor storeholds of wealth.

Think of the Big Debt Cycle's progression like the progression of a disease or a life cycle through stages that exhibit different symptoms. By identifying these symptoms one can identify approximately where the cycle is in its progression with some expectations of how it is likely to progress from there. Described most simply, the Big Debt Cycle moves from sound/hard money and credit to increasingly loose money and credit to a debt bust that leads to a return to sound/hard money and credit brought about by necessity. More specifically, at first there is healthy borrowing by the private sector that can be paid back; then the private sector overborrows, has losses, and has problems paying it back; then the government sector tries to help, overborrows, has losses, and has problems paying it back; then the central bank tries to help by "printing money" and buying the government debt, and has problems paying it back, which leads it to monetize a lot more debt if it can (i.e., if the debt is denominated in the currency

that it can print). Though not all cases progress in exactly the same way, most cases progress through the following five stages:

1) The Sound Money Stage: When net debt levels are low, money is sound, the country is competitive, and debt growth fuels productivity growth, which creates incomes that are more than enough to pay back the debts. This leads to increases in financial wealth and confidence.

- Credit is the promise to deliver money. Unlike credit which requires a payment of money at a later date, money settles transactions—i.e., if money is given the transaction is complete, whereas if credit is given money is owed. It's easy to create credit. Anyone can create credit but not anyone can create money. For example, I can create credit by accepting your promise to pay me money even if you don't have the money. As a result, credit easily grows so there is much more credit than there is money. The most effective money is both a medium of exchange and a storehold of wealth that is widely accepted around the world. At the early stage of the Big Debt Cycle money is "hard," which means that it is a medium of exchange that is also a storehold of wealth that can't easily be increased in supply, such as gold, sterling silver, and Bitcoin. Cryptocurrency like Bitcoin is now emerging as an accepted hard currency because it is a currency that is widely accepted around the world and is limited in supply. The biggest, most common risk to money becoming an ineffective storehold of wealth is the risk that a lot of it will be created. Imagine having the ability to create money; who wouldn't be tempted to do a lot of that? Those who can always are. That creates the Big Debt Cycle. In the early part of the Big Debt Cycle, a) money is typically hard—e.g., gold—and the paper money that circulates like money is convertible into the "hard money" at a fixed price and b) there isn't a lot of paper money and debt (which is the promise to pay money) outstanding. The Big Debt Cycle consists of the building up of a) "paper money" and debt assets/liabilities relative to b) "hard money" and real assets (e.g., goods and services) and relative to the income that is required to service the debt. Basically, the Big Debt Cycle works like a Ponzi scheme or musical chairs with investors holding an increasing amount of debt assets in the belief that they can convert them into money that will have buying power to get real things, yet as the amount of the debt assets that are held up by that faith increases relative to the real things, that conversion becomes more obviously impossible until that is realized and the process of selling the debt to get the hard money and real assets begins.
 - At the early stage of the debt cycle, private and government debt and debt service ratios are 1) low relative to incomes and/or 2) low relative to liquid assets. For example, government debt and debt service are low relative to government tax revenue and/or low relative to government liquid assets (e.g., reserves and other savings such as sovereign wealth assets) that can easily be converted into money. For example, when the Big Debt Cycle that we are in began in 1944, the ratios of a) US government debt and b) US money supply divided by the amount of gold the US government had were equal to a) 7x and b) 1.3x respectively, whereas now these ratios are a) 37x and b) 6x respectively.
 - During this early stage in the cycle, debt levels, debt growth, economic growth, and inflation are neither too hot nor too cold and finances are both sound.
 - At this stage in the cycle, "risky assets" are relatively inexpensive relative to "safe" assets. That is because the memories of the prior period in which there was great damage done affects psychology and pricing. For example, in the late 1940s and early 1950s stock earning's yields were roughly 4x that of bond yields.
 - During this stage, there is a healthy economy and good investment returns that lead to the next stage.
- 2) The Debt Bubble Stage: When debt and investment growth are greater than can be serviced from the incomes being produced.**

- In this stage, money is readily available and cheap, there is a debt-financed economic expansion and an economic boom. Demands for and prices of goods, services, and investment assets are driven up by a lot of

debt-financed buying, sentiment is very bullish, and, by most conventional measures, the market is overpriced.

- In this stage, there are typically amazing new inventions that are truly transformative that investors invest in without an ability or care to assess whether the present value of their future cash flows will be greater or less than their costs.
- This dynamic eventually produces a bubble that is reflected in the rates of debt and debt service growth to finance speculation being greater than the income growth rates that are needed to service the debts. In this stage, markets and economies seem great, most everyone believes that they will get better, they are financed by a lot of borrowing, and “wealth” is created out of nothing. By wealth being created out of nothing, I mean that there is greater imagined wealth rather than actual existing wealth. For example, bubble periods are identifiable by extensive periods (e.g., three years) of debt growth that is significantly faster than income growth, high asset prices relative to traditional measures of the present values of likely future cash flows, and many other factors that I measure in my bubble indicator. (You can find the indicator [here](#).) A contemporary example is the unicorn that is valued at over \$1 billion that has made the owner a “billionaire” on paper but has only raised \$50 million in capital because speculative venture capitalists put in the money to get option-like chips in case it does well. Bubbles can go on a while before the top is made. However, they inevitably lead to the next stage.

3) The Top Stage: When the bubble pops and there is a credit/debt/market/economic contraction.

- The popping of the bubble occurs due to a combination of a tightening of money and the prior rate of debt growth being unsustainable. It is just that simple.
- When the bubble is popped, a self-reinforcing contraction begins so the debt problems spread very quickly, like an aggressive cancer, so it is very important for policy makers to deal with it quickly, either to reverse it or to guide the deleveraging to its conclusion. In most cases, the debt contraction can be temporarily reversed by giving the system a heavy dose of what caused the debt problem—i.e., by creating more credit and debt. That continues until it can’t continue anymore, at which time a big deleveraging occurs.

4) The Deleveraging Stage: When there is a painful bringing down of debt and debt service levels to be in line with income levels so that the debt levels are sustainable.

At the beginning of this stage in the Big Debt Cycle, the first cracks typically spread from the private sector to the central government and then to the central bank. Net selling of debt assets, especially net selling of government debt assets, is a big red flag. When that happens conditions will deteriorate quickly unless managed very well and very quickly by central governments and central banks. That selling takes the form of runs on banks. By “runs on banks” I mean the turning in of debt assets to get real money, which lenders like banks don’t have enough of. When debt problems become apparent, the holders of the debt assets sell their debt assets, which drives interest rates on the debt up. This makes the debt more difficult to service, hence more risky, which drives interest rates higher.

The selling of the government’s debt leads to a) a free-market-driven tightening of money and credit, which leads to b) a weakening of the economy, c) downward pressure on the currency, and d) declining reserves as the central bank attempts to defend the currency. Classically, these runs accelerate and feed on themselves as holders of debt assets see that, one way or another (through default or through the devaluation of their money), they will lose the buying power that they had believed was stored in these debt assets, causing great shifts in market values and wealth until debts are defaulted on, restructured, and/or monetized. Because this tightening proves too harmful for the economy, the central bank eventually simultaneously eases credit and allows a devaluation of the currency. The devaluation of money can itself be the reason to sell the debt asset because it becomes a poor storehold of wealth. So, whether there is a

tightening of money that leads to debt defaults and a bad economy or an easing of money that produces a devaluation of money and debt assets, it is not good for the debt asset. This dynamic creates what is called a death spiral because it is a self-reinforcing, debt-contraction dynamic in which the rising interest rates cause problems that creditors see, leading them to sell the debt assets, which leads to even higher interest rates or the need to print more money, which devalues the money and leads to even more selling of the debt assets and the currency and so on until the spiral runs its course. When this happens to government debt, the realization that too much debt is the problem naturally leads to the inclination to cut spending and borrowing. However, because one person's spending is another's income, cutting spending at such times typically only contributes to increases in debt-to-income ratios. That is typically when policies are shifted to a mix of debt restructurings and debt monetizations with the mix chosen primarily dependent on how much of the debt is denominated in the country's currency. This defaulting on, restructuring of, and/or monetizing debt reduces the debt burdens relative to incomes until a new equilibrium is reached. The movement to a stable equilibrium typically takes place via a few painful adjustment spasms because borderline financial soundness is achieved before secure financial soundness.

- Classically, the deleveraging process progresses as follows. Early in this recession/depression phase, central banks bring interest rates down and make credit more available. However, when a) debts are large and a debt contraction is underway, b) interest rates can't be lowered any more (i.e., when they fall around 0%), c) there is not enough demand for government debt, and d) the monetary easing is not enough to offset the self-reinforcing depressionary pressures, the central bank is forced to switch to new "tools" to stimulate the economy. Classically, to stimulate the economy the central bank must lower interest rates to below nominal economic growth rates, inflation rates, and bond rates, but that is difficult to do when they approach 0%. At the same time, the central government is typically getting itself into a lot more debt because tax revenues are down and spending is up to support the private sector, yet there is not enough private sector demand to buy that debt. The central government experiences a debt squeeze in which the free-market demand for its debt falls short of the supply of it. If there is net selling of the debt, that creates a much worse problem.
- Often in this deleveraging stage of the cycle there is a "pushing on a string," a phrase coined by policy makers in the 1930s. It occurs late in the long-term debt cycle when central bankers struggle to convert their stimulative policies into increased spending because savers, investors, and businesses fear borrowing and spending and/or there is deflation, so the risk-free interest that they are getting is relatively attractive to them. At such times, it is difficult to get people to stop saving in "cash" even when interest rates go to 0% (or even below 0%). This phase is characterized by the economy entering a deflationary, weak, or negative growth period as people and investors hoard low-risk, typically government-guaranteed cash.
- At this stage, central banks must choose between keeping money "hard," which will lead debtors to default on their debts, which will lead to deflationary depressions, or making money "soft" by printing a lot of it, which will devalue both it and the debt. Because paying off debt with hard money causes such severe market and economic downturns, when faced with this choice central banks always eventually choose to print and devalue money. Of course, each country's central bank can only print that country's money, which brings me to my next big point.
- At this stage, if it has the ability to "print money," the central bank creates a substantial amount of money and credit and throws it aggressively at the markets. It typically buys government debt and private sector debt of systemically important entities that are at risk of defaulting (in order to make up for the private sector's inadequate demand for debt and to keep interest rates artificially low), and it sometimes buys equities and creates incentives for people to buy goods, services, and financial assets. At this stage, it is also typically desirable to devalue the currency because that is stimulative to the economy and raises

inflation rates thus negating the deflationary pressures. If the currency is linked to gold, silver, or something else, that link is typically broken and there is a move to a fiat monetary system. If the currency isn't linked—i.e., if the currency is already a fiat currency—devaluing it relative to other storeholds of wealth and other currencies is helpful. In some cases, the central bank's moves can drive nominal interest rates higher, either because the central bank tightens monetary policy to fight inflation or because it doesn't tighten money to fight inflation and holders of the debt don't want to buy the newly issued government debt and/or they want to sell it because it doesn't provide an adequate return. It is important to watch real and nominal interest rates and the supply and demand for debt to understand what is happening. At such times, extraordinary policies to get money like imposing extraordinary taxes and capital controls become common.

- This deleveraging stage is typically a painful time when debt burdens are reduced by defaults, restructurings, and/or devaluations. This is when an aggressive mix of debt restructurings and debt monetizations inevitably takes place to reduce the debt and debt service burdens relative to incomes. In a typical deleveraging the debt-to-income ratio has to be lowered by roughly 50%, give or take about 20%. It can be done well or poorly. When it is done well, which I call a "beautiful deleveraging," central governments and central banks simultaneously do both debt restructurings and monetary stimulations in a balanced way. The restructurings reduce debt burdens and are deflationary while the monetary stimulations also reduce debt burdens (by providing money and credit to make it easier to buy debt) but are inflationary and stimulative to the economy so, if they get the balance right, positive growth occurs with falling debt burdens and acceptable inflation. Whether done well or poorly, this is the stage of the Big Debt Cycle that reduces a lot of the debt burden and establishes the bottom that can be built on to begin the next Big Debt Cycle.

5) **The Big Debt Crisis Recedes: When a new equilibrium is reached, and a new cycle begins.**

- **In order to have a viable money/credit/debt system, it is imperative that a) money/debt is sound enough to be a viable storehold of wealth, b) debt and debt service burdens are in line with the incomes to service them so that debt growth is sustainable, c) creditors and debtors both believe that those things will exist, and d) the availability of money and credit and real interest rates begin to fall in line with that which is needed by both lender-creditors and borrower-debtors.** This late phase of the Big Cycle is when there is a movement to those things happening. It requires both psychological and fundamental adjustments. After a big deleveraging, it is typically difficult to convince lender-creditors to lend because the devaluations/restructurings they experienced in the deleveraging make them risk-averse, so it is imperative that the central government and the central bank take credibility-restoring actions. These generally involve bringing their finances in order by a) the central government earning more money than it spends and/or b) the central bank making money hard again by offering high real yields, raising reserves, and/or linking the currency to something hard like gold or a strong currency. Typically, in this stage, interest rates need to be relatively high in relation to inflation rates and more than high enough to compensate for currency weakness, so it pays to be a lender and is costly to be a borrower. This stage of the cycle can be very attractive for lender-creditors.

The stage that the Big Debt Cycle is in is also reflected in the types of monetary policies being used. As the Big Debt Cycle progresses, central banks have to change how they run monetary policy in order to keep the credit/debt/economic expansion going, so by observing what type of monetary policy they are using, one can surmise about what stage the Big Debt Cycle is in. **The phases in monetary policy and the conditions that lead to them are as follows:**⁴

⁴ This explanation of the phases differs slightly from how I have described them in my earlier writings and books, with the main difference being that I have separated linked monetary systems from fiat ones, which were previously both described as being part of MP1. I've made this change

Phase 1: A Linked (i.e., Hard) Monetary System (MP1). This is the type of monetary policy that existed from 1944 until 1971. This type of monetary policy ends when the debt bubble bursts, and there is the previously described “run on the bank” dynamic, which is a run from credit assets to the hard money, and the limited amount of hard money causes massive defaults. This creates a compelling desire to print money rather than leave the supply of it limited by the supply of the gold or hard money that exists to be exchanged at the promised price.

Phase 2: A Fiat Money, Interest-Rate-Driven Monetary Policy (MP2). During this phase, interest rates, bank reserves, and capital requirements are also controllers of the amounts of credit/debt growth. This fiat monetary policy phase both allows more flexibility and provides less assurance that money printing won’t be so large that it will devalue money and debt assets. The US was in this phase from 1971 until 2008. It ends when interest rate changes no longer work (e.g., interest rates hit 0% and there is a need to ease monetary policy) and/or the private market demand for the debt being created falls short of the supply being sold so that, if the central bank did not print the money and buy the debt, money and credit would be tighter and interest rates would be higher than desired.

Phase 3: A Fiat Monetary System with Debt Monetization (MP3). This type of monetary policy is implemented by the central bank using its ability to create money and credit to buy investment assets. It is the go-to alternative when interest rates can no longer be lowered and when private market demand for debt assets (mostly bonds and mortgages though it can also include other financial assets like equities) is not large enough to buy the supply at an acceptable interest rate. It is good for financial asset prices, so it tends to benefit disproportionately those who have financial assets. It won’t effectively deliver money into the hands of those who are financially most stressed, and it won’t be very targeted. The US was in this phase from 2008 until 2020.

Phase 4: A Fiat Money System with Coordinated Big Fiscal Deficit and Big Debt Monetization Policy (MP4). This type of monetary policy is used when, in order to make the system work well, central government fiscal policy and central bank monetary policy have to be coordinated in order to get money and credit into the hands of people and entities that need it most. While creating money and credit typically temporarily alleviates the debt problem, it does not rectify the problem.

Phase 5: A Big Deleveraging (MP5). This is when there must be a big reduction in debt and debt service payments through a debt restructuring and/or a debt monetization. When managed in the best possible way—what I call a beautiful deleveraging—the deflationary ways of reducing debt burdens (e.g., through debt restructurings) are balanced with the inflationary ways of reducing debt burdens (e.g., by monetizing them), so that the deleveraging occurs without having unacceptable amounts of either deflation or inflation. The Big Debt Cycle sequence to keep in mind is: first the private sector overborrows, has losses, and has problems paying it back (i.e., a debt crisis); then, to help, the government overborrows, has losses, and has problems paying it back; then, to help out, the central bank buys the government debt and takes losses. To fund those purchases and to fund other debtors in trouble (because it is the “lender of last resort”), the central bank prints a lot of money and buys a lot of debt. Then, at its worst, the central bank loses a lot of money on the debt it bought.

- While it is said that modern central bank “prints” money to buy the debt, the central bank doesn’t literally “print money.” Instead, it borrows money (reserves) from commercial banks that it pays a very short-term interest rate on. At its most extreme, the central bank can lose money because the interest earnings it gets on the debt it bought are less than the interest that it has to pay out

because I think it is important to draw a distinction between linked and fiat systems. The definitions of the other monetary policies (debt monetization, fiscal-monetary coordination) have remained the same, but the numbering is now different (i.e., MP2 has become MP3 and MP3 has become MP4).

on the money it borrowed, so when these amounts become large it can find itself in a self-reinforcing spiral of having to buy debt, which leads it to have losses and negative cash flows which leads it to need to print more money to service its debt and to need to buy more debt which ends up having more losses which requires it to do more of the same. This is the “death spiral” I mentioned earlier. When done in large amounts, the “printing” devalues the money and creates inflationary recessions or depressions. **If interest rates rise, the central bank loses money on its bond holdings because the interest rate that it has to pay on its liabilities is greater than the interest rate it receives on the debt assets it bought. This is notable but not a big red flag until the central bank has a very large negative net worth and is forced to “print” more money to cover the negative cash flow that it experiences due to less money coming in on its assets than has to go out to service its liabilities. That is what I mean when I say the central bank goes broke:** while the central bank doesn’t default on its debts, it can’t make its debt service payments without printing money.

- Eventually the debt restructurings and debt monetizations reduce the size of the debts relative to incomes and the debt cycle runs its course.

Phase 6: The Return to Hard Money (MP6). In this phase the central government takes actions to restore the soundness of its money and credit/debt. This type of monetary policy occurs after the debt has been written down through debt defaults/restructurings and debt monetizations so the debt levels relative to the incomes and amounts of money that are available to service the debts can be brought back into alignment. As previously described, it comes after those who held the debt assets were burned by the defaults and/or inflationary periods, so confidence in holding debt assets has to be rebuilt. At this stage, countries typically go back to MP1 (i.e., a hard-asset-backing monetary policy) or MP2 (an interest rate/money supply-targeted monetary policy) that is beneficial to lender-creditors via high real interest rates.

- **For great countries with great empires, the end of the Big Debt Cycle has meant the end of their prominence.**

A Few Concluding Observations

- **It pays to build up savings in the good times so there are savings to draw on in the bad times. There are costs to having too much savings as well as too little savings, and no one gets the balance exactly right.**
- **Big debt crises are inevitable.** Throughout history only a very few well-disciplined countries have avoided them. That is because lending is never done perfectly relative to the incomes that are needed to service it. And it is often done badly because people always want more credit and that turns into debt. Debt levels get beyond that which is sustainable which leads to the need to bring the debt burdens down which typically leads to a mixture of debt defaults/restructurings and the creating of money and credit, leading a debt crisis to occur. And people’s psychology reinforces the cycle: the bubble period makes people more optimistic causing them to borrow more, and the bust causes people to be more pessimistic causing them to cut spending. Even though this progression has happened many times in history, most policy makers and investors think their current circumstances and monetary system won’t change. The change is unthinkable—and then it happens suddenly.
- **The best way to anticipate a debt crisis happening is not by focusing on a single influence or number like debt as a percent of GDP; it is by understanding and focusing on a number of interrelated dynamics that we will get into, especially in the next two chapters.**
- **If debts are denominated in a country’s own currency, its central bank can and will “print” the money to alleviate the debt crisis.** This allows them to manage it better than if they couldn’t print

the money, but of course it also reduces the value of the money. If the debt is not denominated in currencies that their central banks can print, then they will have debt defaults and deflationary depressions measured in the currency that they owe and can't print.

- **All debt crises, even big ones, can be managed well by economic policy makers restructuring and monetizing them so that the deflationary ways of reducing the debt burdens (i.e., writing off and restructuring debt) and the inflationary ways of reducing debt burdens (creating money and credit and giving it to the debtors to make it easier for them to service their debts) balance each other. The key is to spread the paying back over time. For example, if the debt-to-income ratio needs to fall by about 50% to make it sustainable, a debt restructuring that spreads it out to be at a rate of 3% or 4% per year would be much less traumatic than one that is about 50% in one year.**
- **Debt crises provide great risks and opportunities that have been shown to both destroy empires and provide great investment opportunities for investors if they understand how they work and have good principles for navigating them well.**
- **If you try to focus on debt cycles precisely or focus your attention on the short term you won't see them.** It's like comparing two snowflakes and missing that they are pretty much the same because they're not exactly the same.

That's it in a nutshell.

In the rest of this study I will get into the mechanics in greater depth, show the actual archetypical sequences that have played out over 35 cases, look at how the Big Debt Cycle and Big Cycle that includes the other big cycles (for instance, cycles of internal and external order) that started in 1944 and that we are currently in the late stages of have transpired relative to this template, and briefly look at the Chinese and Japanese Big Cycles and a number of other cases. The Japanese case is interesting because Japan is further along in its Big Debt Cycle. Notably its large debt and debt monetizations have led to the depreciation of its currency and debt, which led holders of its bonds to have losses of 45% relative to holding US dollar debt since 2013 and losses of 60% relative to holding gold since 2013. **In the final chapters, I will share how I am processing the US today relative to this template, how the US could reduce the risk of an acute debt crisis, and how I read the Five Big Forces today.**

Chapter 2: The Mechanics in Words and Concepts

Note: This chapter gives unconventional concepts about the mechanics of how markets work that I believe would be valuable for professionals and aspiring professionals but are probably beyond the interests of others. I suggest that you give it a try to see whether or not it's the sort of thing you'd like to get into.

Because everything that happens has reasons that make it happen, it appears to me that everything changes like a perpetual motion machine. To understand this machine, one needs to understand its mechanics, and because everything affects everything else, these mechanics are very complex. As a result of breakthroughs in artificial intelligence, I believe that we are on the brink of almost understanding it all, but for now we have to labor along the old-fashioned way, with people studying what happened using contemporary computers to aid them. That's how I created this description of the mechanics of the debt/credit/money/economic dynamic, which is, of course, only one big part of the greater dynamic. In my feeble attempts to understand and describe the most important mechanics that change the world as we know it, I do these in-depth studies and then try to create more simplified explanations of them.⁵ Keep in mind that this is a very simplified picture.

- Zooming out to the highest level, **the five most important drivers of change that are important to understand are:**
 - **The debt/credit/money/economic cycle**
 - **The internal political order/disorder cycle**
 - **The external geopolitical order/disorder cycle**
 - **Acts of nature (droughts, floods, and pandemics)**
 - **Human inventiveness, most importantly of new technologies**

These are the biggest forces that affect each other to shape the biggest things that happen. If you want to understand what I learned from experiencing and studying them in a more complete way than I can cover in this study, you can read about them in my book *Principles for Dealing with the Changing World Order*.

In this study, we are going to examine the first of those—the credit/debt/money/economic dynamic—focusing most intensely on the late part of the longer-term debt cycle when central governments and central banks go broke. I will start by a) walking you through some mechanics of how market prices are determined and then b) looking at how the long-term debt cycle works. With that as a background, I will then turn to c) the archetypical sequence that leads to a country hitting the limits of debt and money and central banks and central governments “going broke.” At the same time, we will be exploring the other four forces because the interactions of these five forces cannot be overlooked in observing the resulting overall Big Cycle. From what I can see, we are likely entering the very turbulent stage in the overall Big Cycle driven by the interactions of these five big forces, and the resulting changes in the world order will be big. I hope this study can contribute to a better understanding of the dynamics and better decision making to produce the best outcome possible.

⁵ For example, in my book *Principles for Dealing with the Changing World Order*, I measured and looked at the most important cause/effect relationships that changed the world over the last 500 years and simplified my description of how I see them to consist of the five big forces.

How the Machine Works

To me, money and credit are the lifeblood of the economy. They circulate nutrients (i.e., spending power) from the parts of the system that have excess amounts of it to the parts of the system that can best use it. The central government is like the brain that directs how the system works while also taking in and using some of the money and credit (typically about 15-30% of it)⁶ to perform its functions (e.g., providing for social programs, defense, etc.). The central bank is like the heart that produces and pumps money and credit through the system. If the exchanges go well, and those who get capital use it productively, then the providers of capital, the users of it, and the economic system as a whole all prosper. If they don't, the system will become ill and experience trauma.

To be clear, viewing the debt dynamic as a cyclical, perpetual motion machine working in essentially the same way through time and across countries **doesn't mean that there are not changes over time and differences between countries**. It's just that these changes are comparatively unimportant in relation to the timeless and universal mechanics and principles that are far less well understood than they should be. To me, it's invaluable to first see these timeless and universal principles of how the machine works and then focus on the differences and what they are due to because this approach provides a richer understanding of the cause/effect relationships. For that reason, I will start with these most important timeless and universal mechanics and principles. To convey them in brief, I will explain just the major ones in a big-picture, simplified way rather than a detailed and precise way. In this big-picture, simplified model, the following describes the major parts and major players and how they operate together to make the machine work.

⁶ Typically, 35-55% of all spending (if you include state and local governments) in developed countries comes from government spending.

The Five Major Parts and How They Work

There are five major parts of the economic system that make up my simplified model of the machine. They are:

- goods, services, and investment assets,
- money used to buy these things,
- credit issued to buy these things,
- debt liabilities that are created when purchases are made with credit, and
- debt assets (i.e., deposits and bonds), which, since one person's liabilities are another's assets, are the other side of the debt liabilities.

If you can understand the transactions that occur as being made up of these five major parts, you can pretty much understand why there are big debt and economic cycles. To start, I will walk through how I think about transactions, and some other important baseline mechanics.

As mentioned, goods, services, and investment assets can be bought with either money or credit.

Money, unlike credit, settles transactions. For example, if you buy a car with money, after the transaction, you're both done. What has constituted money has changed throughout history and across currencies. For long periods of history, money was a promise to deliver a certain amount of gold or other hard asset. In fiat monetary systems, which we've been in since the US left the gold standard in 1971, money is what central banks print and is more like a form of credit in that it is a promise to deliver buying power, not an actual hard asset. But **money is different from credit as, at this time, it can only be created by central banks⁷ and can be created in whatever amounts the central banks choose to create.**

Credit, unlike money, leaves a lingering obligation to pay, and it can be created by mutual agreement of any willing parties. Credit produces buying power that didn't exist before, without necessarily creating money. It allows borrowers to spend more than they earn, which pushes up the demand and prices for what is being bought over the near term while creating debt that, over the longer term, requires the borrowers, who are now debtors, to spend less than they earn as they pay back their debts. This reduces demand and prices in the future, which contributes to the cyclical nature of the system. Because debt is the promise to deliver money and central banks determine the amount of money in existence, central banks have a lot of power. Though not exactly proportional, the more money that is in existence, the more credit and spending there can be; the less money in existence, the less credit and spending there can be.

Now let's look at how prices are set.

To explain my approach for understanding how prices are set, which is different from the conventional economist's approach, I need to start at the most basic building block for understanding all markets and economics, which is the transaction. All markets and all economics are simply the aggregates of the transactions that make them up, and a transaction is simply the buyer giving money (or credit) to a seller and the seller giving a good, a service, or a financial asset to the buyer in exchange. The price in a transaction equals the amount of money/credit the buyer gives divided by the quantity of whatever the seller gives in that transaction, and a market is the aggregate of those transactions. For example, a transaction to buy wheat occurs when a buyer gives a certain amount of total money to a seller in exchange for a certain quantity of wheat, and a market consists of all the buyers and sellers making exchanges for the same things—e.g., the wheat market consists of different people making different transactions for different reasons over time—and these many exchanges are what determine the price. So...

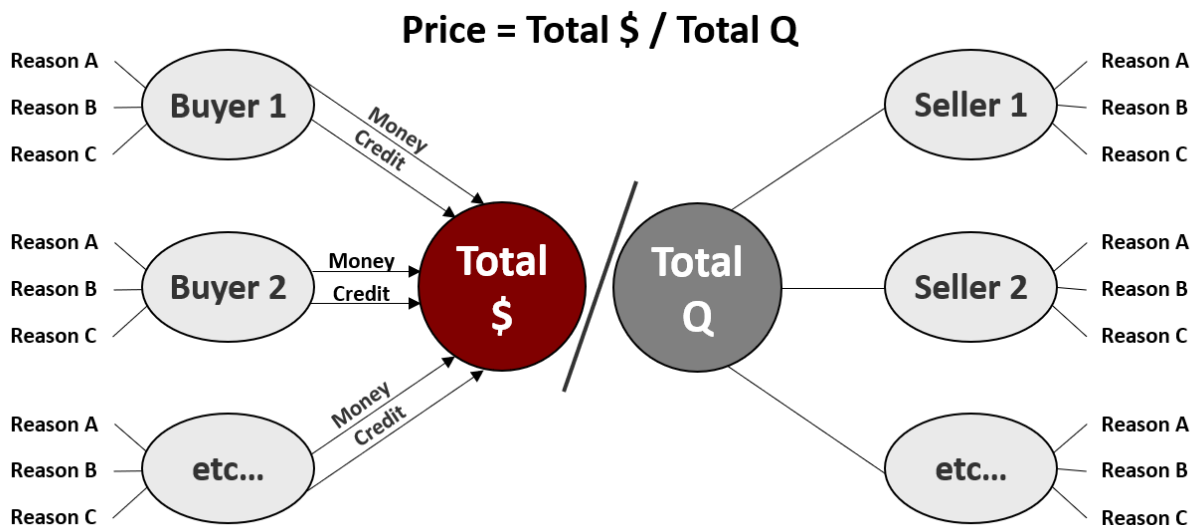
⁷ Bitcoin is an example of an attempt to create a private version of money using blockchain, a distributed ledger technology.

Price (P) = the amount spent on something (\$) / the total quantity of it that is sold (Q)

Or, more simply

$$P = \$/Q$$

In other words, since the price of any good, service, or financial asset equals the total amount spent by buyers (\$) divided by the total quantity sold by sellers (Q), if you know total spending (total \$) and you know the total quantity sold (total Q), you will know the price and everything else you need to know. That is indisputably how it is, so it is indisputable that the best way to estimate the price is to estimate the total spending and divide it by the total quantity sold. And what is the best way to estimate these things? It is to understand the motivations of the buyers and sellers. All buyers have their own reasons for spending the amounts of money that they are spending to get the quantity they are buying, and all sellers have their own reasons for selling the quantity they are selling to get the money they're getting. What I'm saying is conveyed in the conceptual diagram below.



While this might look and sound complicated, it's really not. For each product, the buyers and sellers have their reasons for making those purchases and sales, and it's pretty easy to determine who the main buyers and sellers are and what motivates them. If you can figure out major buyers' reasons for spending and you know the major sellers' reasons for selling, you can pretty accurately predict their actions, and thus the price.

This way of looking at price determination is very different from how most economists look at it. The traditional way measures both demand and supply in terms of quantity (i.e., quantity bought and quantity sold), where my approach looks at *amount spent to buy* instead of quantity bought. This leads to different ways of explaining why prices change. The conventional approach describes price changes as occurring because the quantity demanded and/or the quantity supplied changes. How these changes occur is called price elasticity. This way of looking at

the market implies that there is one elasticity of demand and one elasticity of supply, and different theories emerge about how the market digests information.

I don't think that approach makes sense because it assumes that a change in supply will always have the same effect on price (i.e., elasticity), which isn't true. For example, if more money is spent on a product because buyers have more money to spend, the price of that product will be higher. Ultimately, if your goal is to understand and predict price movements, you are much better off trying to connect who is doing what in the market with how prices are changing. I started doing this as a commodities trader back in the 1970s and found that, not only did this approach work better for me than more conventional approaches, it could also apply to all kinds of products and assets, including financial ones. In fact, I use this template to model not just how specific markets work but entire economies, but that's a subject for another time.

If you play with the previously shown formula/model a bit, you will see that **prices change when there are changes in the rates of spending and/or quantities sold**. For example, if the rate of buying goes from (X) to (X minus 10%), and all else stays the same, the price will fall by 10%. **So, if you identify rates of unsustainable buying and/or rates of unsustainable selling, you can identify price and economic reversals ahead of them occurring. And if you calculate what a return to a more normal level of buying/selling is, you can calculate the approximate price change that is needed and likely.**

There are a number of other implications for how this different approach leads to unique perspectives on how economies and markets work. But the most important one for understanding short-term market and economic cycles is that it shows how these cycles are driven more by creations of money and credit that lead to changes in spending (S) than by the changes in the quantity sold (Q) because most goods, services, and investment assets are produced to satisfy demand (i.e., in response to S). I also see that:

When a) more money and credit are created (so there is more spending) and b) producers have the capacity to produce more quantity, then c) there can be more non-inflationary growth because both spending (\$) and the quantity (Q) sold increase.

whereas

When a) more money and credit are created (so there is more spending), but b) there is little or no capacity so producers can't produce much more, then c) there is little real growth and a lot more inflation.

These principles explain why the early cycle (when there is plenty of excess capacity and central banks are stimulative) is characterized by strong growth and little inflation and the late cycle typically has weak growth and big price rises. That is what cyclical inflation and growth look like. Later in this study, we will go through this in more detail and explore what monetary inflations and inflationary depressions look like.

How does productivity fit into the above? If productivity growth is high, producers can produce more quantity (Q) as more money and credit are produced, so it allows non-inflationary growth to continue for longer. Of course, productivity can be hard to measure directly, as productivity can also show up as products improving in quality, or the marginal cost of producing something falling all the way to zero (as has happened for producing photos and electronic books).

Now let's look more closely at the reasons buyers spend and sellers sell the quantities they sell. Instead of doing that for all the individual items, I will look at the big categories to convey the principles that affect them all.

- **People buy goods and services to use, and they buy investments to make money (i.e., as storeholds of wealth).** How much they spend on goods and services versus investments depends on **what the goods and services they want to use cost relative to the amount of money and credit they have to spend, and the relative appeal of spending on goods and services to that of spending on financial assets.**

And of course, they have their own reasons for choosing which goods and services and which financial assets they buy.

- **What people choose to spend their money and credit on is based on the relative appeal of the items.** People are constantly making comparisons in two dimensions: 1) one item for another (e.g., money for corn, gold, currency, just about everything else) and 2) the same item for delivery at different points in time (e.g., corn, gold, currency for delivery today versus for delivery a year in the future) based on their preferences. As a result, there is an enormous array of relative-appeal assessments to be made. Arbitrages and relatively sure bets are the most powerful types of bets in determining relative pricing.
- **Currencies are mediums of exchange and storeholds of wealth (in debt assets). In other words, they facilitate both transactions and investing.**
- **Investments are exchanges of money and credit today for money and credit in the future.**
- **All investment markets derive their value by providing money in two ways: through their yields and through their price changes. Together they make the total return. So, for all investments, total return = yield + price change.**
- **By and large, all investment markets compete with each other on the basis of the total returns they provide.** That is because a) most investors care more about the total returns they get than they care about whether it comes in the form of yield or price appreciation⁸ and b) there is an ability to arbitrage investments based on their total returns.⁹

To show how that works, let's look at how investing in bonds would be compared with investing in gold to determine the price relationship. Because gold has no yield and a US Treasury bond has a yield of X% (e.g., 5%), it would be illogical for anyone to buy gold unless the price is expected to go up by more than X% per year (e.g., 5% per year). Said differently, the market is priced for the gold price to rise by 5% relative to the price of Treasuries. Investors form their views about what will determine the gold price change (e.g., one big factor is the amount of inflation based on the amount of money and credit that is produced), and they look at the relative attractiveness of the 5% yield that the bonds are offering and the extent the gold price would appreciate due to the depreciation in the value of money. If they think that gold will rise by less than 5%, they can buy bonds and sell gold, and if they think gold will go up more than 5%, they can do the reverse. In either case, they'll make money if they're right. On top of this simple price analysis, there is a lot of financial engineering (e.g., leveraging and hedging) that turns one thing into the equivalent of another to make relative value bets and arbitrages that create a whole matrix of market prices.

An enormous amount of money is allocated in this way, and it would be easy to make a lot of money if the choices between options were easy. But because we know it's not easy to make money in the markets, we can assume that the markets do a pretty good job of making these estimates and pricing assets correctly. At the same time, because I and others who have been successful at investing couldn't have been successful at investing if the markets were perfect, we can assume that it's not perfectly done and there are opportunities to make money in the markets if you have a better understanding than others. Anyway, my main point is that this is how to determine how markets are priced, which you will soon see is helpful in understanding the debt/credit/money/economic dynamic.

⁸ While it's by and large true that all investments compete on just a total return basis, it's not totally true because different investors have different objectives and considerations so that at some times these different objectives and the differences in the supplies of investments to meet the demands can lead to some investments having more attractive returns than others. However, because there is a profit to be made by shorting the asset that has the lower risk-adjusted return to fund the one that has the higher risk-adjusted return, there is a strong tendency for these differences to shrink to be rather small.

⁹ I can make money by buying an investment that has a higher total return while selling an investment that has a lower total return.

- ***The expected rates of return on investment assets relative to the rate of inflation (i.e., the expected real returns of investments) will influence how much money goes into each of these. By and large an investment's inflation-adjusted ("real") returns are more important than its non-inflation (i.e., nominal) returns because a) investments are made to be storeholds of wealth so buying power matters most, and b) there are arbitrages and relative value bets between real assets and financial assets that drive their relative prices.*** In other words, the expected returns of putting money into financial investments are compared with the expected returns of putting money into real stuff (e.g., real estate, precious metals, commodities, art, etc.), so the returns of all investments, especially the returns of government bonds (because their returns are so well known since the yield is set and there is virtually no risk of default for bonds denominated in a country's own currency), are compared with the inflation rate, so when bond yields are low relative to inflation, bonds will be sold and inflation assets will be bought, and vice versa. Also, because the decline in the value of money and credit that arises from central banks creating lots of both causes the prices of goods, services, and most financial assets to rise, when central banks create a lot of money and credit, that tends to lead investors to favor inflation-hedge assets.
- ***Prices are linked by certain determinants that one must understand to understand relative pricing.*** When most non-professional investors think about the price, they usually think about the price for delivery of the item today, which is called the spot price. Most markets also have prices for deliveries sometime in the future, which are called forward (or futures) prices, and there are arbitrages or relative value bets that one can take that determine the price relationship of the same items at different delivery dates.¹⁰ The same sort of analysis of the relative appeal of the same financial assets (e.g., short-term government debt and long-term government debt) takes place (e.g., a big factor determining that is the projected pace at which the central bank will increase or decrease interest rates).

Debt Is Currency and Currency Is Debt

Since a debt asset is the promise to receive a specified amount of currency at a future date, debt and currency are essentially the same things. If you don't like the currency, you must not like the debt asset (e.g., bonds), and if you don't like the bonds, you must not like the currency, if you take into consideration their relative yields. (In other words, if you don't like one you must not like the other.) Remember the gold/bond price comparison process described earlier of looking at *the relative yields + the expected price changes = the relative total returns*. This sets the spot and futures prices for bonds and gold, and it works the same for assessing the value of different currencies and different debt assets of different countries. That assessment drives capital flows in important ways that are very relevant to the debt issue at hand.

More specifically:

Let's say the government interest rate (which is widely considered default-risk-free because government central banks can print money to make payments) in one country (e.g., Japan) is below that in another country by X% per year. If that's the case, then the expected appreciation in that currency must be at the same percentage rate. Otherwise, it would be easy to make virtually risk-free profits (by owning the bonds with the higher interest rate). Instead, the difference in the interest rates is expected to be eaten up by the higher interest rate currency falling compared to the lower interest rate currency.

But what if that currency change is not expected to offset the interest rate difference? For example, if the 10-year interest rate in Country A is lower (e.g., 3% lower) than that in Country B's currency-denominated bond, you'd ordinarily expect Country A's currency to rise (to eat up the difference from the higher interest rate). What if, instead, Country A's currency is expected to fall (e.g., by 2% per year)? In that case, there is virtually risk-free profit to be

¹⁰ For example, for items that can be stored, the price premium of the forward (or futures) price over the spot price won't be more than the cost of storing it (including the interest expense on the money tied up with it in inventory). For items that will be stored (e.g., gold), the spot price will be determined by the expected future price minus the storage cost, rather than the future price being determined by the spot price plus the storage cost.

made. Investors will flock into the trade, selling the lower-yielding currency/debt. That will produce one of two adjustments (or a combination):

- A) the spot currency will have to fall (by 40% in this example¹¹), or
- B) the 10-year interest rate will have to rise by 5%, which will send the bond prices down by about 40%.¹²

Or if those adjustments can't happen (say there are capital controls or the like)—if the interest stays 3% less and the currency falls by 2%—then the loss relative to holding Country B's bonds will be 5% per year, which over the 10 years will compound to 40%.

Any way you cut it, the bond return in Country A's currency will be very bad.¹³ If the nominal bond returns are not bad (i.e., the bonds do not depreciate and debt burdens are not reduced in nominal terms) because neither a) the price of the bonds falls in the local currency because the interest rates rise to provide an appropriate return in light of the declining value of the currency, nor b) the currency declines to a level that makes it cheap enough to provide adequate price appreciation to make up for the interest rates being too low, then the bad return of the bond will come about because c) the annual interest rate and weakness in the currency will not compensate for the inflation.¹⁴

Now that we understand how the mechanics of these major parts work, and how transactions are driven by the motivations of players in dealing with those parts, you will understand how the machine works and what is likely to happen next, so let's get into that.

¹¹ Here's the math: If a currency is expected to depreciate by 2% per year, that means the forward price is 82% of the current price (2% depreciation compounded for 10 years). The spot needs to be priced to appreciate by 3% each year until it reaches the current 10-year forward price of 82%. A spot price of $0.61 \times 1.03^{10} = 0.82$. So, the spot must fall from 1 to 0.61 (which is a ~40% move).

¹² Here's the (somewhat simpler) math: The price impact of an interest rate move on bonds is the change in yield x the duration. The duration of 10-year government bonds is 7-8 years, depending on the country: $8 \times 5\% = 40\%$.

¹³ From a central banker's perspective, the currency weakness and inflation can be good because they reduce the debt burden, which happens when the nominal interest rate is below the nominal growth rate, and especially when the nominal interest rate is below the inflation rate (i.e., when real interest rates are negative).

¹⁴ Keep in mind that the different inflation rates in the different countries are typically more due to the differences in the rates of changes in the values of their money/currencies (which are more due to the changing supplies of money and credit) than they are due to the changing values of the items being bought and sold when measured in a common currency.

The Major Types of Players and How They Behave to Drive What Happens

Five major types of players drive money and debt cycles. They are:

- those that borrow and become debtors that I call borrower-debtors, which can be private or government entities,
- those that lend and become creditors that I call lender-creditors, which can be private or government entities,
- those that intermediate the money and credit transactions between the lender-creditors and the borrower-debtors, which are commonly called banks,
- central governments, and
- government-controlled central banks, which can create money and credit in the country's currency and influence the cost of money and credit.

Credit/debt expansions can only take place when both borrower-debtors and lender-creditors are willing to borrow and lend, so the deal must be good for both. Said differently, because one person's debts are another's assets, for the system to work, it takes both borrower-debtors and lender-creditors to want to enter into these transactions. **However, what is good for one is quite often bad for the other.** For example, for borrower-debtors to do well, interest rates can't be too high, while for lender-creditors to do well, interest rates can't be too low. **If interest rates are too high for borrower-debtors, they will have to slash spending or sell assets to service their debts, or they might not be able to pay them back, which will lead markets and the economy to fall. At the same time, if interest rates are too low to compensate lender-creditors, they won't lend and will sell their debt assets, causing interest rates to rise or central banks to print a lot of money and buy debt in an attempt to hold interest rates down. This printing of money/buying of debt will create inflation, causing a contraction in wealth and economic activity.**

Over time, environments shift between those that are good and bad for lender-creditors and borrower-debtors. To be effective, it is critical that anyone who is involved in any way in markets and economies knows how to tell the difference. This balancing act and the swings between the two environments take place naturally, and sometimes conditions make it impossible to achieve a good balance. That causes big debt, market, and economic risks. Before I describe the conditions that produce these risks, I want to first explain the other players' motivations and how they try to act on them.

Private sector banks¹⁵ are the intermediaries between lender-creditors and borrower-debtors, so their motivations and how they work are important too. In all countries for thousands of years, banks have done essentially the same thing, which is to try to make profits by borrowing money from some and lending it to others, earning money on the spread. How they do this creates the money/credit/debt cycles, most importantly the unsustainable bubbles and big debt crises. How are these bubbles and crises created? **By the banks lending out a lot more money than they have, which they do by repeatedly borrowing at a cost that is lower than the return they take in from lending. That works well for the society and is profitable for the banks when those who are lent money use it productively enough to pay back their loans—and when those the banks borrowed from don't want their money back in amounts that are greater than what the banks actually have. But debt crises happen when the loans aren't adequately paid back or when the banks' creditors want to get more of the money they lent to the banks than the banks are able to give them.**

Over the long run, debts can't rise faster than the incomes that are needed to service them, and interest rates can't be too high for borrower-debtors or too low for lender-creditors for very long. If debts keep rising faster than incomes and/or interest rates are too high for borrower-debtors or too low for lender-creditors for too long, the imbalance will cause a big market and economic crisis. **For that reason, it pays to watch these ratios.**

¹⁵ For simplicity I am using the word "banks" to describe all financial intermediaries that take on financial liabilities to get higher returns in financial assets.

Big debt crises come about when the amounts of debt assets and debt liabilities become too large relative to the amount of money in existence and/or the amounts of goods and services in existence.

Central banks either directly or indirectly create money and credit, which is “buying power.” Buying power determines the total amount of spending on goods, services, and investment assets. Whatever amount of money and credit is created must be put into goods, services, and/or financial assets (i.e., investments). So, **the total amount of money and credit created determines the total amount of spending on goods, services, and financial assets.** As a result, goods, services, and financial assets tend to rise and decline together with the ebbs and flows of money and credit, like all boats tend to rise and fall with the ebbs and flows of the sea. **What this money and credit go into and the quantities of goods, services, and financial assets that are produced are mostly determined by the choices made by thousands or millions of market participants.**

Central banks came into existence to smooth these cycles, most importantly by handling big debt crises. Until relatively recently (e.g., 1913 in the United States), there weren't central banks in most countries, and money that was in private banks was typically either physical gold or silver or paper certificates to get gold and silver. Throughout these times, there were boom-bust cycles because borrower-debtors, lender-creditors, and banks went through the credit/debt cycles I just described. **These cycles turned into big debt and economic busts when too many debt assets and liabilities led to lender-creditor “runs” to get money from borrower-debtors, most importantly the banks. These runs produced debt/market/economic collapses that eventually led governments to create central banks to lend money to banks and others when these big debt crises happened. Central banks can also smooth the cycles by varying interest rates and the amount of money and credit in the system to change the behaviors of borrower-debtors and lender-creditors.** Where do central banks get their money from? They “print” it (literally and digitally), which, when done in large amounts, alleviates the debt problems because it provides money and credit to those who desperately need it and wouldn't have had it otherwise. But doing so also reduces the buying power of money and debt assets and raises inflation from what it would have been.

Central banks want to keep debt and economic growth and inflation at acceptable levels. In other words, they don't want debt and demand to grow much faster or slower than is sustainable and they don't want inflation to be so high or so low that it is harmful. To influence these things, they raise interest rates and tighten the availability of money or they lower interest rates and ease the availability of money, which influences lender-creditors and borrower-debtors who are striving to be profitable.

Central governments are political organizations with those who run them serving at the pleasure of the people, so they want to give the people what they want. This is typically done without paying for it, which typically leads to central government borrowing, which reinforces the cycle of creating greater amounts of credit stimulation early and debt depressants later. When central governments do their jobs well, they tax and spend in ways that make broad-based productivity and prosperity, sometimes borrowing more than they are earning and sometimes paying it back, and when central banks do their jobs well, they keep the credit, debt, and capital markets in relative balance, which produces less disruptive big swings. However, for the previously mentioned reasons, the bias to create more ups in the economies and markets through credit stimulation leads to long-term uptrends in debt and debt service relative to incomes until they become too large a percentage of income to be sustainable.

The greater the size of the debt assets and debt liabilities relative to the real incomes being produced, the more difficult the balancing act is, so the greater the likelihood of a debt-caused downturn in the markets and economy.

Because **borrower-debtors, lender-creditors, banks, central governments, and central banks** are the biggest players and drivers of these cycles, and because they each have obvious incentives affecting their behaviors, it is pretty easy to anticipate what they are likely to do and what is likely to happen next. When debt growth is slow, economies are weak, and inflation is low, central bankers will lower interest rates and create more money and credit which will incentivize more borrowing and spending on goods, services, and investment assets which will drive the markets for these things and the economy up. At such times, it is good to be a borrower-debtor and bad to be a lender-creditor. When debt growth and economic growth are unsustainably fast and inflation is unacceptably high, central bankers will raise interest rates and limit money and credit which will incentivize more

saving and less spending on goods, services, and investment assets. This will drive the markets and economy down because it's then better to be a lender-creditor-saver than a borrower-debtor-spender. This dynamic leads to two interrelated cycles—a short-term one that has averaged about six years in length give or take three years and a long-term one that has averaged about 80 years give or take 25 years—which evolve around an upward trend line in productivity that is due to humanity's inventiveness.

I'll now briefly review how these cycles transpire:

The Short- and Long-Term (Big) Debt Cycles

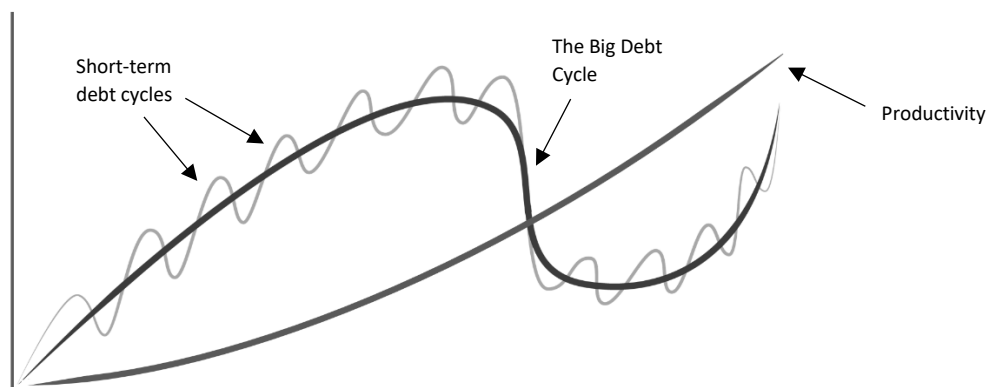
By "short-term debt cycle," I mean the cycle of 1) recessions that lead to 2) central banks providing a lot of credit cheaply, which creates a lot of debt that initially leads to 3) market and economic booms that lead to 4) bubbles and inflations, which lead to 5) central bankers tightening credit, which leads to 6) market and economic weakening. This cycle typically lasts about six years, give or take about three. As of this writing, there have been 12.5 of these in the US since 1945—i.e., at the time of my writing this we are about halfway through the 13th. Each short-term debt cycle typically ends with higher levels of debt than the previous cycle because policy makers try to end recessions by lowering interest rates enough to get borrowing going again.

By "long-term (big) debt cycle," I mean the cycle of building up debt assets and debt liabilities over long periods of time (i.e., successive short-term debt cycles) to amounts that eventually become unmanageable. This leads to a combination of big debt restructurings and big debt monetizations that produce a period of big market and economic turbulence.

The short-term debt cycles add up to the long-term (big) debt cycles, which I will henceforth call the Big Debt Cycle.

These cycles move markets and economies around an upward-sloping trend line of rising living standards that is due to people's inventiveness and the increases in productivity that come from it. The incline of its upward slope in productivity is primarily driven by the inventiveness of practical people (e.g., entrepreneurs) who are given adequate resources (e.g., capital) and work well with others (their coworkers, government officials, lawyers, etc.) to make productivity improvements.

Over a short period of time (i.e., 1-10 years) the short-term debt cycle is dominant. Over a long period of time (i.e., 10 years and beyond) the long-term debt cycle and the upward-sloping trend line in productivity have much bigger effects. Conceptually, the way this dynamic transpires looks like this to me:



What separates a sustainable debt cycle from an unsustainable one is whether the debt creates enough income or more to pay for the debt service. If incomes fail to grow as quickly as debt and debt service, the ratio of debts

to incomes will mechanically grow, which will require increased borrowing to serve debt as well as to spend. The cycle goes from low to high to unsustainably high debt and debt service relative to incomes. A sure sign of moving toward a debt crisis is when there is a large and rising amount of borrowing that is being used to pay for the debt service.

Why don't central bankers do a better job than they have been doing in smoothing out these debt cycles by better containing debt so it doesn't reach dangerous levels? There are four reasons:

- 1) Most everyone, including central bankers, wants the markets and economy to go up because that's rewarding and they don't worry much about the pain of paying back debts, so they push the limits, including becoming leveraged to long assets until that can't continue because they have reached the point that debts are so burdensome they have to be restructured to be reduced relative to incomes.
- 2) It is not clear exactly what risky debt levels are because it's not clear what will happen that will determine future incomes.
- 3) There are opportunity costs and risks to not providing credit that creates debt.
- 4) Debt crises, even big ones, can usually be managed to reduce the pain they cause to acceptable levels.

Debt isn't always bad, even when it's not economic. Too little credit/debt growth can create economic problems as bad or worse than too much, with the costs coming in the form of foregone opportunities. That is because 1) credit can be used to create great improvements that aren't profitable that would have been foregone without it and 2) the losses from the debt problems can be spread out to be not intolerably painful if the government is in control of the debt restructuring process and the debt is in the currency that the central bank can print. However, to avoid a debt crisis, debt must raise incomes to service the debts.

Over time, from one cycle to the next, debt liabilities and debt assets have virtually always increased to make the long-term debt cycle expansion. In virtually all cases that has continued until the debt burdens have become unsustainably large or the debt assets have become intolerably low-returning.

When there are a lot of debt assets and debt liabilities relative to incomes, it is difficult for central bankers to keep interest rates high enough to satisfy lender-creditors without having them so high that they unacceptably hurt borrower-debtors, and it is difficult for central banks to run monetary policy to balance growth and inflation well. And because holders of debt assets want to sell the debt, one way or another debt is going to have a bad return. That puts central bankers in the position of having to choose between:

1. **Not printing money and buying debt (i.e., not monetizing debt)** and letting interest rates rise enough to cut credit demand and economic activity enough to reach the indifference-equilibrium level that will balance the buying and selling of the bonds. This will make cash very valuable, devalue most other assets like stocks and hard assets, cause deflation, lead to debt defaults and restructurings, and depress economic activity. This typically happens first and is intolerable, which leads to central banks to start...
2. **Printing money and buying debt (i.e., monetizing debt) to make up for the shortfall in demand**, which will make money readily available and reduce its value thus raising inflation, raise the value of most other assets like stocks and hard assets, minimize debt defaults, and stimulate economic activity. This typically eventually happens.

At that part of the Big Debt Cycle, there need to be big reductions in debt liabilities and debt assets. These are the big debt crisis periods. These big debt restructurings and debt monetizations end the prior Big Debt Cycle by reducing debt burdens and eliminating the prior monetary order, leading to the next new Big Debt Cycle and monetary order. They take place much like big changes in domestic political orders and big changes in world orders—like seismic shifts due to the old orders breaking down. There are four types of levers that policy makers can pull to reduce the debt burdens:

- 1) austerity (i.e., spending less),
- 2) debt defaults/restructurings,

- 3) the central bank “printing money” and making purchases (or providing guarantees), and
- 4) transfers of money and credit from those who have more than they need to those who have less.

Policy makers typically try austerity first because that’s the obvious thing to do, and it’s natural to want to let those who got themselves and others into trouble bear the costs. This is a big mistake. Austerity doesn’t bring debt and income back into balance because one person’s debts are another person’s assets. Cutting debts cuts investors’ assets and makes them “poorer,” and because one person’s spending is another person’s income, cutting spending cuts incomes. For that reason, cuts in debts and spending cause a commensurate cut in net worths and incomes, which is very painful. Also, as the economy contracts, government revenues typically fall at the same time as demands on the government increase, which leads deficits to increase. Seeking to be fiscally responsible at this point, governments tend to raise taxes, which is also a mistake because it further squeezes people and companies. More simply said, when there is spending that’s greater than revenues and liquid liabilities that are greater than liquid assets, that produces the need to borrow and sell debt assets, which, if there’s not enough demand, will produce one kind of crisis (e.g., deflationary) or another (e.g., inflationary).

As touched on earlier, the best way for policy makers to reduce debt burdens without causing a big economic crisis is to engineer what I call a beautiful deleveraging, which is when policy makers both 1) restructure the debts so debt service payments are spread out over more time or disposed of (which is deflationary and depressing) and 2) have central banks print money and buy debt (which is inflationary and stimulating). Doing these two things in balanced amounts spreads out and reduces debt burdens and produces nominal economic growth (inflation plus real growth) that is greater than nominal interest rates, so debt burdens fall relative to incomes.

If done well, there is a balance between the deflationary and depressing reduction of debt payments and the inflationary and stimulating printing of money and buying of debt by the central banks. In the countries I studied, most big debt crises that occurred with the debts denominated in a country’s own currency were restructured quickly, typically in one to three years. These restructuring periods are periods of great risk and opportunity. If you want to learn more about these periods and processes, they are explained more completely in *Principles for Navigating Big Debt Crises*.

The Big Debt Cycle, Its Risks, and How to Deal with It Need to Be Better Understood

Because the really big debt crises that take the form of debt restructurings and devaluations that come at the ends of Big Debt Cycles happen roughly once in a lifetime, they are not well understood relative to the short-term cycles. That is why I did this study. Said differently, what ends long-term debt cycles is different from what ends short-term debt cycles, so most people don’t know about or acknowledge long-term debt cycles or worry about long-term debt cycles ending even though they’re much bigger deals than short-term debt cycles ending. That’s dangerous. It’s like eating fatty foods and having cholesterol accumulate in the heart as plaque and saying that it doesn’t seem to be causing trouble while it is increasing the probability of a heart attack.

Let’s remember what is healthy, which is 1) having private sector lenders give their credit in exchange for debt that works well for them and creditors because the uses of the funds were profitable and 2) for government borrowings to be used in ways that produce productivity gains (e.g., in better infrastructure, education, etc.) that can be paid for via tax revenue, or for the government to sometimes borrow and spend more than it takes in when the economy needs stimulation that is followed by paying it back when conditions are strong. And let’s remember what isn’t healthy, which is 1) the central bank chronically printing money and buying debt to make up for the shortage in demand for the debt and 2) the central government chronically having large deficits that result in debt and debt service levels rising faster than the incomes (in the government’s case, tax revenue) that are required to service them.

In Summary and to Reiterate:

- **Goods, services, and investment assets can be produced, bought, and sold with money and credit.**
- **Central banks can produce money and can influence the amount of credit in whatever quantities they want.**

- Borrower-debtors ultimately require enough money and low enough interest rates for them to be able to borrow and service their debts.
- Lender-creditors require high enough interest rates and low enough default rates from the debtors in order for them to get adequate returns to lend and be creditors.
- This balancing act becomes progressively more difficult as the sizes of the debt assets and debt liabilities both increase relative to the incomes. Eventually they need to be reduced, so a deleveraging happens.
- The best type of deleveraging is what I call a beautiful deleveraging, which can be engineered by central governments and central banks to reduce debt burdens if the debt is in their own currencies. If the debts are denominated in a foreign currency the deleveraging is quite ugly. I will explain these later.
- Over the long term, being productive and having healthy income statements (i.e., earning more than one is spending) and healthy balance sheets (i.e., having more assets than liabilities) are the markers of financial health.
- If you know where in the credit/debt cycle each country is and how the players are likely to behave, you should be able to navigate these cycles well.
- The past is prologue.

Important Takeaways:

- Debt crises are inevitable. Throughout history only a very few well-disciplined countries have avoided debt crises. That's because lending is never done perfectly and is often done badly due to how the cycle affects people's psychology to produce bubbles and busts.
- Most debt crises, even big ones, can be managed well by economic policy makers if they are well spread-out.
- All debt crises provide investment opportunities for investors if they understand how they work and have good principles for navigating them well.
- Inevitably, at the beginning of the end of the Big Debt Cycle when there is a lot of debt, it is difficult to keep real interest rates high enough to satisfy lender-creditors without them being too high for borrower-debtors, and central banks try to navigate between these choices. Typically, during these times, both the tight-money economic contraction and the loose-money inflation occur, and the only question is in what order. In any case, owning the debt/currency of overly indebted governments at such times is a bad investment.
- Central banks have to choose between keeping money "hard," which will lead debtors to default on their debts, which will lead to deflationary depressions, or making money "soft" by printing a lot of it, which will devalue both it and the debt. Because paying off debt with hard money causes such severe market and economic downturns, when faced with this choice central banks always eventually choose to print and devalue money. For the case studies, see Part 2 of *Principles for Navigating Big Debt Crises*. Of course, each country's central bank can only print that country's money, which brings me to my next big point.
- If debts are denominated in a country's own currency, its central bank can and will "print" the money to alleviate the debt crisis. This allows them to manage it better than if they couldn't print the money, but of course it also reduces the value of the money.

The Other Four Big Forces Affect How This Debt Cycle Transpires Just as This Debt Cycle Affects How the Other Four Forces Transpire Together

Thus far, I have just spoken about debt cycles because that is the subject of this study. However, many factors interact to determine what happens, so I couldn't ignore them and do my job well. They were covered extensively in my book *Principles for Dealing with the Changing World Order*. While I showed 18 measures of the major drivers of conditions in the book, the big five that explain almost everything are: 1) the money/credit/debt/markets/economic cycles, 2) the cycle of social and political order and disorder that takes place within countries, 3) the cycle of order and disorder that is manifest in the peace and war cycle that takes place between countries, and 4) acts-of-nature shocks such as droughts, floods, and pandemics, and 5) human inventiveness, especially of new technologies that increase productivity. The interactions between these forces drive how conditions change. They tend to reinforce each other both upwardly and downwardly. For example, periods of financial and economic crisis raise the odds of having periods of internal conflict, and periods of internal conflict worsen financial and economic conditions. Similarly, periods of internal financial problems and internal political conflicts both weaken the country that they are happening in and, if they are global, increase the likelihood of international conflicts. Together these forces create the Big Cycles of ups and downs, peace and wars, that occur in countries and between countries, that lead to big changes in domestic and world orders.

These big rises and declines are easy to see by monitoring the 18 forces (particularly the big five) that I'm sharing with you. For example, **you can see the big evolutionary decline of great powers and their monies reflected in 1) the unwavering rises of indebtedness accompanied by the steady weakening of the types of monetary systems used to restrain credit-and-debt-growth-motivated attempts to raise credit and economic growth and 2) the decline of many indicators of health, such as the quality of education, infrastructure, law and order, civility, government effectiveness, relative to those other world powers.**

I won't now delve into how all these work—both because doing that would be too much of a digression and because it's better explained in my book or even in my relatively brief [video](#), both titled *Principles for Dealing with the Changing World Order*. I will now delve into a description of the mechanics of the Big Debt Cycle in numbers and equations, which I will try to describe in an easy-to-understand way.

Chapter 3: The Mechanics in Numbers and Equations

Warning: This chapter gets into debt mechanics including some simple equations that are helpful in calculating what is likely to happen related to the limitations of debt. I believe this material will be valuable for professionals and aspiring professionals and probably beyond the interests of others. I suggest that you give it a scan to grab the important concepts and then decide if you want to delve deeper into this material.

While in Chapter 2, I described in words how central governments and central banks typically get into financial trouble, in this chapter I will show numbers and equations that can be used to anticipate these financial troubles, including a few formulaic examples to illustrate how high debt burdens compound and create problems.

I will start by showing you the key drivers of debt sustainability and how they interact. Before I do, I will lay out what an “unsustainable” debt burden is. Ultimately, it’s simple: **an “unsustainable” debt burden exists when the amount of money that comes in is less than the money that goes out, either because a) the amount in storage (i.e., savings) goes down and/or b) the amount borrowed goes up until one runs out of savings and/or one can’t borrow any more, at which time a debt failure occurs.** Think of this money flow as being like a blood flow and think of income statements and balance sheets as the reports that show it. A healthy condition is when the amount that comes in from earning is equal to or greater than the amount that goes out from spending and debts don’t build up faster than incomes. This isn’t to say that debt growth is necessarily bad. If debts build up, but the money borrowed leads to incomes rising faster than the rate of debt service rises, that will lead to more money coming in than going out, which will be healthy. When debts grow faster than incomes, think of it like plaque building up in the arteries because it reduces the amount of income flow that can be used for spending or savings. That is because it leads to increased debt service payments that reduce the amount of income that can go toward spending. If the money flow is constrained too much, there is a default, which is the economic equivalent to a heart attack. Interest rates matter a lot because they influence the amounts that have to be paid a lot. They also influence the willingness of lender-creditors to hold and buy the debt assets and liabilities. As debt service becomes large relative to the amount of income and savings, a squeeze develops, which is when a debt problem occurs.

We can measure debt burdens in the following ways, and we know that as they become high and/or rise quickly, the risks of defaults and/or devaluations also become high. While there are about 35 indicators that I look at to assess debt risks, the four most important indicators are:

- 1. Debts relative to income.** As debts get larger relative to incomes, all else being equal, the debtor will have higher interest and rollover payments each year, which will increasingly squeeze down the money that is left for other spending. There are two problems with high debts relative to income: 1) there is a greater risk that the large amount of existing debt won’t be rolled over by creditors and 2) it creates higher debt service payments as a percent of income, which reduces the amount of money that can go to spending, all else being equal. That brings me to the next measure.
- 2. Debt service relative to income.** Debt service is the amount a debtor must pay in interest and principal payments to not default on its debts each year. As total debt service gets higher and higher relative to income, it will either squeeze out spending or require more borrowing, which will further increase debt service expenditures. As this happens, it leads investors to expect credit problems ahead and choose not to lend more and/or to sell the debt assets they already own, which causes credit problems to come about. To help estimate how debts and debt service will build up, I look at the rate of interest relative to the rate of income growth.
- 3. Nominal interest rates relative to a) inflation rates and b) nominal income growth rates (i.e., inflation plus real growth).** I look at these for two reasons:
 - a) They show me how debt and debt service are likely to grow relative to incomes. For example, if someone has debts of 100% of income, the nominal interest rate is 5%, and the nominal income

growth rate is 3%, they will owe about 102% of income next year (assuming their spending is equal to their income).¹⁶

- b) They show me how attractive credit conditions are for lenders relative to borrowers. If nominal interest rates are high relative to nominal growth rates and inflation rates that is an indicator that conditions are relatively favorable for lenders and unfavorable for borrowers, which will encourage lending and discourage borrowing/spending (i.e., it reflects greater risk of debt problems among more indebted debtors that can't print money to pay debt). If the reverse is true, conditions are relatively unfavorable for lender-creditors and favorable for borrower-debtors, which will encourage borrowing and discourage lending.

- 4. **Debts and debt service relative to savings (e.g., reserves).** If all of the above are not financially healthy but one has large savings to draw on and draw down, one won't have a high risk of default because one can draw on the savings (e.g., reserves) to make debt and spending payments.

Inevitably, equilibrium levels of 1) debts relative to incomes, 2) debt service relative to incomes, 3) nominal interest rates relative to inflation rates (i.e., real interest rates) and nominal growth rates, and 4) debts and debt service relative to savings will be approached. If you watch these ratios over time, you will see them go to extreme levels and return to more normal levels one way or another. If you understand the cause/effect relationships that drive these changes, you can understand how to navigate them and how they can be best managed. Most importantly, if you understand the painful deleveraging part, you will understand that it can be handled well (to be less painful) or handled poorly (and be very painful).

These four indicators are not the only ones that matter. In Chapter 4, I'll show you how a broader set of indicators evolve through the end of the Big Debt Cycle, and in Chapter 15, I'll show you what my indicators suggest for the US today. However, the previously mentioned four are the most important ones to watch. They give us valuable information about how likely a debt squeeze is and how severe it will be when it happens. However, they cannot tell us exactly when the debt problem will occur because different conditions and different people's reactions to them lead to different lead times for the selling of debt assets and other actions that precipitate a crisis. Still, we can measure the level of risk because **countries with very high debt levels, very large deficits, low savings, and very high and very fast rising interest rates have a very high risk of a debt default or debt devaluation crisis.**

The rest of this section goes through a few formulaic examples to illustrate how high debt burdens compound and create problems.

¹⁶ If the amount earned is greater than the amount spent excluding the interest payments that is called a primary surplus, and if it is less that is called a primary deficit.

Measuring Debt Burdens in Numbers

What follows are the mathematical relationships for measuring these indicators. These are just the commonsense constraints on the amount of debt an entity can have, expressed in equations which are the same constraints that you can have expressed in words. To help you understand them, you might relate to them the same way you relate to your own debt constraints. I will explain the rules and include a few helpful rules of thumb. **The pages that follow will explain each of these with examples. Not only can these relationships help one to identify debt problems, but they can be used to help policy makers see how to fix them and help market participants position themselves well. Feel free to skip this and come back if it's more helpful to see examples first and then the math.**

- 1) **Future debts relative to future income.** The formula to estimate this is:

$$\frac{\text{Future Debt}}{\text{Future Revenue}} =$$

$$\frac{(\text{Future Expenses Excluding Interest} - \text{Future Revenue}) + \text{Current Debt} * (1 + \text{Interest Rate})}{\text{Current Revenue} * (1 + \text{Growth Rate})}$$

In words: Future debt relative to revenue is a function of 1) spending more or less than one makes in revenue, 2) the “compounding” of one’s existing debts, and 3) revenue growth. As one’s expenses grow relative to one’s revenue, one is forced to borrow more to finance the spending, which increases new borrowing (first numerator term). As interest rates rise, existing debts grow faster (second numerator term). As revenues grow, incomes grow relative to debts, so the ratio of debt to revenue falls (denominator term).

Debt/income is a good indicator of risk because the larger it is, the riskier and the more burdensome the debt is, all else being equal. For example, the more debt there is, the more risk there is that the debt won’t be rolled over and the more difficult it is for the central bank to keep interest rates low enough to satisfy the borrower-debtors without having them too high for the lender-creditor. You can probably already see that, in addition to the level of debt/income mattering, the interest rate, income growth rate, and primary deficit (expenses excluding interest versus revenue) matter a lot to how debt burdens evolve.

We can also reconfigure this formula to solve for ways to keep the debt-to-income ratio the same. We will show a few different examples of this at the end of this chapter.

- 2) **Future debt service relative to future income.** The formula to estimate this is:

$$\frac{\text{Future Debt Service}}{\text{Future Revenue}} = \frac{(\text{Future Interest Costs} + \text{Future Principal Payments})}{\text{Current Revenue} * (1 + \text{Growth Rate})}$$

$$\text{Future Interest Costs} = \text{Future Debt Level} * \text{Average Effective Interest Rate on Debt}$$

$$\text{Future Principal Payments} = \text{Future Debt Level} * \text{Share of Debts Coming Due}$$

In words: Future debt service relative to revenue is a function of future interest costs and principal payments, relative to how much revenue grows. If revenue grows a lot, debt service will fall relative to incomes, all else equal.

Future interest costs are a function of the debt level and the average interest rate on debt. If interest rates shoot up, it generally will not immediately make the interest costs for a debtor go up, because on their longer-term bonds, the interest rate will be locked at the interest rate at the time of issuance. As the bonds “roll”—i.e., come due and are reissued at the new interest rate, the bonds will gradually get to have higher interest rates on them, and interest costs will rise.

Principal payments are the amount of debt that is coming due each year that must be paid back, typically via issuing new debt to pay back the old debt that comes due. A rough way to estimate principal payments is by calculating the average maturity—or time until debts must be paid back—on existing debts. When debtors are stressed, creditors typically will not want to lend to them for as long, so we often see the maturity of debts falling as creditors become more stressed, which means principal payments go up for the same level of debts.

- 3) **Nominal interest rates relative to a) inflation rates and b) nominal income growth rates (i.e., inflation plus real growth):**

The expected level of nominal interest rates relative to nominal growth rates tells us how debt and debt service is likely to grow or shrink. Below, we show the formula for the interest rate that would keep debt levels and interest debt service flat relative to revenue. Note that this is based on the first formula, just reconfiguring that formula to give us the required interest rate to keep debts flat relative to revenue.

$$\text{Interest Rate Required to Keep Debt Flat} = \text{Revenue Growth Rate} - \frac{(\text{Future Expenses Excluding Interest} - \text{Future Revenue})}{\text{Starting Debt Level}}$$

To walk through this in words, if the primary deficit is zero (i.e., current expenses before interest = current revenue), debts will stay flat if the interest rate is equal to the revenue growth rate. If the primary deficit is 5% of the current debt level, interest rates would need to be 5% below the revenue growth rate.

The intuition here is that if the interest rates are equal to revenue growth, debts will compound at the same rate that income is growing. If the government is also borrowing, debts need to compound slower than income, so interest rates need to be below revenue growth rates.

As interest rates rise relative to revenue growth rates, debts will grow relative to incomes because existing debts will compound faster than revenue is growing, and interest debt service costs will grow even faster because both the debt level will grow and the interest rate will be rising, and interest costs are the product of these two inputs. Similarly, as interest rates fall, debt levels will grow less quickly and interest debt service costs will grow even less or shrink. (This is, for instance, what has happened in Japan over the last 20 years. I will show this in more detail in Chapter 14).

You can probably see that, just as you can solve for the interest rate required to keep debts flat, you can also solve for the deficit or surplus required, revenue growth required, and so on. If you flip to the end of this chapter, I show you what these numbers look like for the US and Japan today.

- 4) **Debts and debt service relative to savings (e.g., reserves):** Just as we can estimate debt burdens relative to income, we can estimate them relative to savings—simply by looking at the level and change in savings rather than the level and change in incomes. The formula to estimate this is as follows:

$$\frac{\text{Future Debt}}{\text{Future Savings}} =$$

$$\frac{(\text{Current Expenses Excluding Interest} - \text{Current Revenue}) + \text{Current Debt} * (1 + \text{Interest Rate})}{\text{Current Savings} + \text{Expected Savings}}^{17}$$

$$\frac{\text{Future Debt Service}}{\text{Future Savings}} = \frac{(\text{Future Interest Costs} + \text{Future Principal Payments})}{\text{Current Savings} + \text{Expected Savings}}$$

These formulas are very similar to (1) and (2), so I will not fully walk through them in words. The difference is that we are looking at debts and debt service relative to savings. If one has large debts but very large savings, it is less likely that the debt burdens are concerning, because one can pay the debt service and pay back part of the debts using the savings. It creates a buffer.

If one is consistently running deficits, and the expected surplus is negative, you can see that debts and debt service will quickly grow relative to savings, creating a more concerning setup.

A few rules of thumb that help to convey how these equations play out:

- **If nominal interest rates are at the same level as nominal income growth and a government is running no primary deficit (i.e., revenue = spending excluding interest), the debts will stay the same relative to the incomes. But if interest rates are higher than income growth, then the debt burdens of existing debts will increase. This is probably the single most important variable in our calculation. For example, a bad but plausible period of nominal interest rates to nominal growth would be interest rates being higher than income growth by 2%. This would cause the debt-to-income ratio to increase by around 50% over 20 years, even without primary deficits, leading to more borrowing and debt. This means that if you start with debts of 50% of income, they'll go to 75%, but if you start with debts of 400%, they'll go to 600%.**
- **Debt service expenses accumulating is like plaque in the arteries accumulating in that it squeezes out the desired flow of nutrients to the economy.**
- **The main effect of high debt levels is making the debtor vulnerable to not being able to roll it forward.**

These mathematical relationships can provide us with good estimates of the magnitudes of debt service squeezes that will occur if the existing levels of debt are rolled over. However, they don't show the dynamic that happens when holders of debt assets want to sell the debt they are holding. In this next section I will explain all these things.

Now I will go through a few examples to illustrate how these drivers work and interact with one another.

¹⁷ This equation is inexact because a government could use a surplus to either accumulate reserves/savings or to pay down existing debts, which would show up via expenses being lower than revenue. Depending on what choice a government made, the surplus could show up as future debt falling or as future savings increasing. Either way the ratio would improve but the effect would be slightly different based on the choices of the government.

Example 1: Debts Relative to Incomes (Levels and Changes)

As starting debt levels grow, and as deficits (i.e., borrowings) grow, future debt levels, debt service, and interest costs all grow. The table below shows a range of outcomes. The debt-to-GDP ratio, which is more commonly quoted, is not as relevant to the government’s debt service picture as its own debt-to-income ratio. That is because for any debtor, including central governments, what matters most is the amount of money that goes out (in this case, in debt service) relative to the amount of money that comes in, because that is what creates the debt squeeze; the size of GDP is only partially related.¹⁸ Both are only rough indicators of the capacity of the economy to bear the debt burden.

For reference, the US government’s debt to money coming in (mostly tax income) is, as of this writing, about 580%. Expenditures excluding interest are projected to average ~115% of income over the next decade, so the primary deficit—the difference between these—is ~15% of income.¹⁹ The US is also borrowing ~20% of its income each year to cover interest expenses on the existing debt.

If we assume that interest rates equal income growth but use the actual projected primary deficit for the US (i.e., the actual gap between non-interest expenses and income), the US government’s debt-to-income is projected to rise by about 150%, from 580% to 730% over the next 10 years. This would also lead to a proportional increase in the interest expense and debt service burden.

The table below shows debt levels 10 years forward for various starting debt levels and deficits. The second table shows the change relative to the starting debt level. You can see that as the starting debt level rises, and as deficits become larger, the expected debt level at the end gets higher.

Debt-to-Income after 10 yrs
Assuming Nominal Interest Rate = Nominal Growth

		Government Primary Deficit (% Govt Revenue)						
		0%	5%	10%	15%	20%	25%	30%
Starting Debt-to-Income	0%	0%	50%	100%	150%	200%	250%	300%
	100%	100%	150%	200%	250%	300%	350%	400%
	200%	200%	250%	300%	350%	400%	450%	500%
	300%	300%	350%	400%	450%	500%	550%	600%
	400%	400%	450%	500%	550%	600%	650%	700%
	500%	500%	550%	600%	650%	700%	750%	800%
	600%	600%	650%	700%	750%	800%	850%	900%
	700%	700%	750%	800%	850%	900%	950%	1000%

US trajectory today

10-Year Change in Debt (%Income)
Assuming Nominal Interest Rate = Nominal Growth

		Government Primary Deficit (% Govt Revenue)						
		0%	5%	10%	15%	20%	25%	30%
Starting Debt-to-Income	0%	0%	50%	100%	150%	200%	250%	300%
	100%	0%	50%	100%	150%	200%	250%	300%
	200%	0%	50%	100%	150%	200%	250%	300%
	300%	0%	50%	100%	150%	200%	250%	300%
	400%	0%	50%	100%	150%	200%	250%	300%
	500%	0%	50%	100%	150%	200%	250%	300%
	600%	0%	50%	100%	150%	200%	250%	300%
	700%	0%	50%	100%	150%	200%	250%	300%

¹⁸ GDP can be an indicator of the size of the economy that can be taxed by governments to make debt payments.

¹⁹ Throughout this study, I am using the CBO’s projections where possible as a baseline estimate. These projections are based on settled law so they assume that expiring fiscal measures (i.e., the Trump tax cuts) roll off as implemented in current law. If these tax cuts are extended, the CBO estimates it would represent additional annual spending of 1.3% of GDP or 10.6% of government revenue, which would substantially worsen the fiscal trajectory versus the CBO’s baseline projection.

When going through these numbers, you might keep in mind that at the time of this writing, the US, Japanese, Chinese, French, German, and UK numbers are approximately as follows.

	Central Government Debt Levels		Central Government Deficit		Central Govt Revenue
	% GDP	% Govt Revenue	% GDP	% Govt Revenue	% GDP
USA	99%	576%	7%	39%	17%
JPN	215%	1376%	4%	26%	16%
CHN	90%	321%	5%	16%	28%
FRA	86%	478%	6%	31%	18%
DEU	44%	340%	2%	17%	13%
GBR	92%	256%	6%	16%	36%

China extensively uses local governments and local government financing vehicles to fund government spending, so we are including these entities in our government debt figure and including local government spending in our revenue and deficit figures.

Example 2: The Effects of Nominal Interest Rates Minus Nominal Income Growth Rates on Debt-to-Income Ratios

When interest rates are higher than income growth rates, the existing debt grows relative to incomes because the debt compounds faster than incomes grow.

The tables below illustrate how this works. Previously, we showed how debt grows for different starting debt levels and deficits. This time, we are assuming a starting deficit of 35% of income (using the CBO’s projected primary deficit over the next decade).²⁰ The rows below are still different starting debt levels. The columns now show the nominal interest rate minus the nominal income growth rate. The CBO projects that, over the next decade, effective interest rates will average 3.4% and the US will have 3.8% nominal growth. The difference is -0.4%, so this would leave the US around the red-boxed area below.

The first table below shows the levels of debt to income 10 years from now based on these assumptions, and the second table shows the change in debt to income over the 10 years. As interest rates get higher than growth, debt levels grow faster. Also, as debts get higher, the impact of high interest rates gets worse much faster.

Debt-to-Income after 10 yrs
Assuming Constant Primary Deficit of 15% (CBO projection over next 10 years)

		Nominal Interest Rate - Nominal Growth						
		-3%	-2%	-1%	0%	1%	2%	3%
Starting Debt-to-Income	0%	132%	138%	144%	150%	157%	164%	172%
	100%	207%	220%	235%	250%	267%	286%	306%
	200%	283%	303%	325%	350%	377%	407%	440%
	300%	358%	386%	416%	450%	487%	529%	575%
	400%	433%	468%	507%	550%	598%	650%	709%
	500%	508%	551%	598%	650%	708%	772%	843%
	600%	583%	633%	689%	750%	818%	893%	977%
	700%	658%	716%	779%	850%	928%	1015%	1112%

US trajectory today

10 yr Change in Debt (%Income)
Assuming Constant Primary Deficit of 15% (CBO projection over next 10 years)

		Nominal Interest Rate - Nominal Growth						
		-3%	-2%	-1%	0%	1%	2%	3%
Starting Debt-to-Income	0%	132%	138%	144%	150%	157%	164%	172%
	100%	107%	120%	135%	150%	167%	186%	206%
	200%	83%	103%	125%	150%	177%	207%	240%
	300%	58%	86%	116%	150%	187%	229%	275%
	400%	33%	68%	107%	150%	198%	250%	309%
	500%	8%	51%	98%	150%	208%	272%	343%
	600%	-17%	33%	89%	150%	218%	293%	377%
	700%	-42%	16%	79%	150%	228%	315%	412%

Previously, we forecast that with current debts and deficits, US debt levels will rise from 580% to 730% of income. If we also incorporate projected interest rates relative to nominal growth, we’d expect US debt levels to rise to 679% of income (assuming taxes stay a constant share of GDP). You get the idea.

Since interest rates are projected to be slightly below nominal growth, this adjustment doesn’t change our debt outlook much for the US today. But you can see that if the central bank wanted to help the central government keep

²⁰ As noted previously, the CBO projections use settled law so they assume that expiring fiscal measures (i.e., the Trump tax cuts) roll off as implemented in current law. If these tax cuts are extended, the CBO estimates it would represent additional annual spending of 1.3% of GDP or 10.6% of government revenue.

its debt burdens more manageable, it could push interest rates to further below nominal growth by buying the government bonds, which would cause debt burdens to grow much slower, all else equal. Of course, that wouldn't be good for the lender-creditors holding the debt assets because they would get a lower nominal interest rate and a lower real interest rate than they would have gotten. I suspect that you are beginning to get the picture of how this dynamic works and has worked in the past—e.g., why central banks created such low nominal rates (near 0%) and such negative real interest rates by printing money and buying government debt—and what is most likely to take place in the future if the current path isn't altered. More specifically, if debt growth remains as projected, central banks will have to push real interest rates lower, which will make debt assets less attractive for lender-creditors.

In an economy, there are many interrelated drivers that change interdependently. It's like a Rubik's Cube, in which changing one part of the cube—one driver in the grids shown previously—causes changes to the other parts. It gets complicated to understand how these drivers interrelate and to project scenarios. To help illustrate this, we created a simple model to walk through one scenario for the next decade.

Let's start by considering Example 3 below, with a government that has numbers similar to the US government now. Let's say nominal income is growing at 3.8% a year, interest rates are 3.4%, and debt levels start at 580% of government income. In this example, we'll assume that the government spends 35% more than it collects in income, including interest payments.

Example 3: Interest Rates Spiral Upward to Keep Buyers in the Debt Assets

Since this government is running a 15% primary deficit (i.e., excluding interest payments), it collects \$5.2 trillion in revenue and spends \$6 trillion in Year 1. It must pay \$1.1 trillion in interest, because it started with debts at 580% of government income, and interest rates are about 4%. Let's assume that about 35% of the existing debt is coming due this year (which is about how much US government debt matures every year) and will need to be rolled over—so \$10.3 trillion of existing debt will come due this year and will need to be paid back. **In total, this government needs to sell \$12.2 trillion of debt in Year 1. What happens if the public is no longer willing to buy this debt, or is a seller at current interest rates?**

Markets must clear, so this means that interest rates will go up until someone is willing to buy these bonds. But as the interest rates go up, that makes the government's borrowing even more expensive, meaning the problems get even worse, creating a greater desire to sell the bonds, which creates even more upward pressure on interest rates. **A spiral of rising interest rates leading to worsening credit risk, leading to less demand for the debt, leading to higher interest rates is a classic "debt death spiral."** In the table below you can see how this works. In this example, I show interest rates going up by 0.5% a year while nominal growth stays flat.

If interest rates stayed flat, the government would have ended Year 10 with debts at 679% of income and interest at 22% of income. Here, relative to income, we end with debts at 898%, interest at 68%, and total debt service (including principal payments) of 353%. **Of course, if interest rates are going up because the debts are unsustainable, they'll only go up more as debts rise and become even more unsustainable.** And at the same time, the high interest rates are likely constricting income growth, increasing the challenge of debt sustainability. Of course, the worst-case scenario is one where a significant additional amount of debt assets is sold (i.e., to fund a war or social benefits in a recession), which would drive interest rates up a lot more.

A Toy Model: Interest Rates Spiral Higher

Interest Rates Rise By 50 bps / Year

Income Growth Rate	3.8%
Spending excl Interest (% Inc)	115%
Starting Debt	29.3
Starting Interest Rate	3.4%
Share of Debt Maturing Each Year	35%

Year	0	1	2	3	4	5	6	7	8	9	10
Government											
Nominal Income (USD, tln)	5.1	5.2	5.4	5.7	5.9	6.1	6.3	6.6	6.8	7.1	7.3
Nominal Spending (USD, tln)	-	6.0	6.3	6.5	6.7	7.0	7.3	7.5	7.8	8.1	8.4
Debt Service	-	11.4	12.3	13.3	14.5	15.8	17.4	19.1	21.1	23.3	25.9
Principal	-	10.3	10.9	11.7	12.6	13.6	14.7	15.9	17.4	19.0	20.9
Interest	-	1.1	1.4	1.6	1.9	2.3	2.7	3.1	3.7	4.3	5.0
memo: Interest Rates	-	3.9%	4.4%	4.9%	5.4%	5.9%	6.4%	6.9%	7.4%	7.9%	8.4%
Borrowing	-	12.2	13.1	14.2	15.4	16.8	18.3	20.1	22.1	24.4	27.0
Ending Debt Level	29.3	31.2	33.4	35.9	38.7	41.9	45.6	49.7	54.4	59.7	65.8
Sustainability Ratios											
Debt / Income	580%	596%	614%	635%	660%	689%	721%	757%	799%	845%	898%
Debt Service / Income	-	217%	226%	236%	247%	260%	275%	291%	309%	330%	353%
Interest / Income	-	21.8%	25.2%	29.0%	33.1%	37.5%	42.5%	47.9%	54.0%	60.8%	68.4%

A government can prevent this spiral of rising rates by reducing its debt burdens. I laid this out in more detail in my book *Principles for Navigating Big Debt Crises*, but, to reiterate, there are four ways to reduce debt burdens for a government:

- **Austerity** (i.e., spending less), which doesn't work because one person's spending is another's person's earnings, so austerity causes a self-reinforcing deflationary contraction.
- **Debt defaults/restructurings**, which reduce debt burdens and are deflationary because one person's debts are another's assets.
- **The central bank printing money and making purchases of debt**, which reduces debt burdens because it provides the money to pay the debts and is inflationary.
- **Transfers of money and credit from private market players who have money to the government via taxes, which is then transferred to other private market players.**

When I looked at historical cases of private debt problems, I typically saw a mix of these levers being pulled, with a strong bias to print money and buy debt (i.e., monetize debt) when the debt squeeze is big. I also saw the fight over increased taxes as well as big conflicts between those of the left and those of the right. That all occurs for logical reasons. When central governments are squeezed, it's a big deal because central governments are typically the largest part of the economy and the only part of the economy to pay for large amounts of non-economic social expenses, which are critically important at such times, when economic conditions are bad. If governments are slow in providing spending and financial support, it's likely that that will create a larger economic downturn, which counterintuitively worsens debt burdens by reducing income growth and net worths and could lead to social turmoil. As a result, for overly indebted governments to cut their spending to deal with their debt problems at such times is self-damagingly painful. Then the question is: where does the government get its money from?

The easiest path, though not the best path for the long-term health of the system, is for governments to resolve their debt problems and spend as they would like to spend by having the central bank print money and purchase the bonds, thereby holding interest rates down at tolerable levels and putting money into the system. As a result, that is what they will unfailingly do when the debts are denominated in their own currencies. Let's look at an example of how this works.

Example 4: Central Bank Steps in Because Private Players Are Unwilling to Hold the Desired Amount of Government Bonds to Keep Interest Rates at the Desired Level for Acceptable Economic Growth

Thus far, we looked at how the starting debt-to-income ratio, the income growth rate, the spending growth rate, the interest rate, and the maturity of the government debt affects future debt burdens. Also, as mentioned, the demand for the debt matters a lot, and the central bank can, and typically does, print money and buy (i.e., monetize) debt. Let's now look at how this last piece works.

There are many factors that determine the private market's demand for government debt. As previously explained, these include the expected real return of bonds relative to the projected real returns of other assets, the total amount of money and credit in the system, the sense of impending risk of a debt/currency crisis, etc.

While these factors are measurable, they are much harder to project than the previously described determinants. However, they are observable most importantly in the form of either a) interest rates going up while the economy and the currency are weak (due to the supply/demand imbalance worsening) or b) central banks spending reserves and/or printing money and creating debt to buy government debt to try to lower real and nominal interest rates by increasing the demand to eliminate the imbalance. In the next chapter, you will see how this typically happens, and signals for the transition to the debt/currency crisis.

Before we move on, I wanted to show you how it works for the central bank to step in and absorb excess debt supply in order to maintain interest rates and liquidity at a desired level. Let's start with our previous example and modify it slightly. Let's assume that in Year 1, the government has \$10.3 trillion of debt expiring and is issuing \$12 trillion of new debt to replace the expiring bonds, pay interest, and cover spending.

Rather than allowing interest rates to spiral upward to generate sufficient demand for these debt assets, let's assume the central bank steps in and buys all the excess issuance, so that the private sector continues to hold no more than 600% of government income in debt, and interest rates stay flat at 3.4%. In this example, in Year 2, the central bank will have to buy \$0.3 trillion of those debt assets. In subsequent years, these purchases get larger and larger.

Mechanically, to purchase these debt assets—i.e., monetize the government debt—the central bank prints money (by creating new reserves/cash) and gives private players that money in exchange for the bonds. This increases the money supply (M0). In this example, let's assume that the money supply starts at \$5.6 trillion—so 110% of the starting government income—roughly where it is today in the United States. **In our example, as the central bank prints more and more to cover government shortfalls, the money supply balloons.**

The Central Bank Steps In

Central Bank Buys Bonds

Income Growth Rate	3.8%
Spending (% Inc.)	115%
Starting Debt	29.3
Interest Rate	3.4%
Share Of Debt Maturing Each Year	35%

Year	0	1	2	3	4	5	6	7	8	9	10
Government											
Nominal Income (USD, Tln)	5.1	5.2	5.4	5.6	5.9	6.1	6.3	6.6	6.8	7.1	7.3
Nominal Spending (USD, Tln)	-	6.0	6.3	6.5	6.7	7.0	7.3	7.5	7.8	8.1	8.4
Debt Service	-	11.3	11.9	12.7	13.4	14.2	15.0	15.9	16.8	17.8	18.8
<i>Principal</i>	-	10.3	10.9	11.5	12.2	12.9	13.7	14.5	15.3	16.2	17.1
<i>Interest</i>	-	1.0	1.1	1.1	1.2	1.3	1.3	1.4	1.5	1.6	1.7
Borrowing	-	12.0	12.8	13.5	14.3	15.1	16.0	16.9	17.9	18.9	19.9
Ending Debt Level	29.3	31.1	33.0	34.9	37.0	39.2	41.4	43.8	46.3	49.0	51.7
Bond Holdings & Money Stock											
Central Bank Bond Purchases	-	-	0.3	0.7	0.8	0.8	0.9	1.0	1.0	1.1	1.2
Bonds Held by Central Bank	-	-	0.3	1.0	1.8	2.6	3.5	4.5	5.5	6.6	7.7
Money0 Stock	5.6	5.8	6.1	6.8	7.6	8.4	9.3	10.2	11.3	12.3	13.5
Bonds Held by Pvt Sector	29.3	31.1	32.7	33.9	35.2	36.5	37.9	39.4	40.8	42.4	44.0
Sustainability Ratios											
Debt / Income	580%	593%	605%	618%	631%	643%	656%	668%	681%	693%	705%
Debt Service / Income	-	215%	219%	224%	229%	233%	238%	243%	247%	252%	256%
Interest / Income	-	19.0%	19.4%	19.8%	20.2%	20.7%	21.1%	21.5%	21.9%	22.3%	22.7%

This is a rough example, but you can see the general contours of how this works for real economies. As an economy needs lower and lower interest rates to keep debt burdens manageable, there is less and less private demand for the debt at those lower interest rates, which requires the central bank to step in. The more the central bank steps in, the more it is forced to increase the money supply, which devalues money and makes holding debt less desirable.

That is because, all else being equal, central bank money and credit creation lowers the value of money, which increases inflation and currency weakness. The relationship is not precise and depends on how exactly the printed money is transmitted through the economy. Lowering interest rates and increasing the supply of money lowers the attractiveness of the currency, which makes holding the debt denominated in that currency unattractive.

In the tables below, I wanted to give you a sense of how much money gets printed and how it affects the currency.

In the first table, the rows represent different starting debt-to-income levels for a government, and the columns represent how many bonds private players are willing to purchase at current interest rates. As a government has more of a debt problem, and as private players are willing to hold less of the debt, the money stock increases more. The red box reflects the scenario laid out above, where the central bank buys \$7.7 trillion of bonds, increasing the money stock from \$5.6 trillion to \$13.5 trillion.

10yr Change in Money Stock (% Govt Income)
Assuming Primary Deficit: 15%; Starting M0 = 110% of Govt Income

	Max Private Bond Holdings (% Govt Income)						
	700%	600%	500%	400%	300%	200%	100%
0%	-	-	-	-	-	-	32%
100%	-	-	-	-	-	28%	109%
200%	-	-	-	-	28%	106%	206%
300%	-	-	-	24%	102%	202%	302%
400%	-	-	21%	98%	198%	298%	398%
500%	-	17%	94%	194%	294%	394%	494%
600%	13%	90%	190%	290%	390%	490%	590%
700%	87%	187%	287%	387%	487%	587%	687%

This range corresponds to the example above

Starting Debt-to-Income

Buying up bonds and increasing the money supply is stimulative and puts downward pressure on the currency in two ways:

Mechanically, pushing down interest rates usually causes the currency to sell off. Why? To spell out the mechanics:

- Usually, all else equal, lowering an interest rate won't change investors' long-term expectations of the value of a currency. The 10-year forward currency doesn't move as much.
- If you are getting less interest in the meantime because interest rates fell, the new deal is strictly worse.
- The way to make the new deal fair again is for the spot currency to fall. That way, you'll earn more through currency appreciation (as it reaches the same expected 10-year forward point) to make up for less in interest.

My next point will be too technical for some and helpfully technical for others, so if you want to skip the technical stuff, skip it. Mechanically, pushing down interest rates pushes up the currency forward—e.g., a rise in one country's 10-year sovereign, risk-free bond yield relative to another country's 10-year risk-free bond yield will raise the 10-year forward currency—so if the value to investors of the currency in the 10-year future were to stay the same, the spot currency would have to sell off by the present value of the 10-year interest rate differences to keep the 10-year currency forward flat. Said more precisely and more simply: as explained in Chapter 1, the difference in sovereign interest rates in two countries will be offset by the forward currency premium—e.g., if the interest rate in Country A is 2% above the interest rate in Country B, then the forward currency of Country A will be at a 2% per year annual discount to Country B, so if interest rates in Country A were lowered by 1% from that level and the forward currency stays the same, the currency would weaken by a corresponding amount.

Also, the printed money can directly flow out of the currency, creating a selling pressure in the currency. That is, as a central bank buys bonds and gives other players cash, there is a chance that they use that cash to buy other currencies, rather than holding it or buying assets/spending in the same economy.

In the next table, we show a range of outcomes for how this might work. The columns again reflect different willingness to lend by private players (as you go to the right, private players are less willing to lend to the government). The rows reflect how sensitive the currency is to the money supply. As the market sees a currency as a worse and worse store of value, we'd expect the currency to become more sensitive to the money supply, because other players will be less willing to hold it. For example, let's assume that printing 1% of GDP in money led to ~1% currency weakness, then in the example above, we'd expect a ~15% currency depreciation. **As the currency becomes more sensitive to the amount of money (i.e., M0), and as the private sector becomes less willing to lend, we'd expect to see more and more currency weakness.**

10 yr Expected Change in FX
Assuming Primary Deficit = 15%; Starting M0 = 110% of Govt Income; Starting Debt-to-Income of 6x

		Max Private Bond Holdings (% Govt Income)						
		700%	600%	500%	400%	300%	200%	100%
Expected Move in FX for 1% Increase in M0 (%GDP)	0.0%	0%	0%	0%	0%	0%	0%	0%
	0.5%	-1%	-8%	-16%	-23%	-30%	-36%	-42%
	1.0%	-2%	-15%	-29%	-42%	-52%	-60%	-67%
	1.5%	-3%	-22%	-41%	-56%	-67%	-76%	-82%
	2.0%	-5%	-28%	-51%	-67%	-78%	-86%	-91%

What level of interest rates can make debt burdens affordable for a country?

In these examples, we looked at how debts can compound to become unsustainable. I also wanted to show you the numbers around how debts can be managed sustainably.

In countries that have a lot of debt and high deficits, debts and debt service costs will be a big issue and how much they will increase over time will be determined by the interest rate relative to income growth and inflation, as shown in our calculations. A central bank can prevent debt service costs from rising or cause them to decrease relative to inflation and incomes by pushing down nominal interest rates below nominal growth rates. What I am referring to are the impacts these things will have on the central governments and the central bank's financial conditions. Of course, they will also have a ripple effect on all parts of the economy, but let's skip that for now.

Given that, we can look at a government's debt level and projected deficit and calculate what interest rate will be needed to produce any specified level of debt and debt service relative to incomes—e.g., to keep the debt burden the same, to have it decline, etc.—given estimates of future revenue and expenses.

If I were setting policy for the Fed, I would want to look at what the deficit and debt levels are and likely will be and set an interest rate so that debt burdens won't become too great over time. For example, I would probably want to look at what interest rate would keep debt service payments the same. That would affect my interest rate policy.

I would also want to calculate what level of interest rate would be needed for my central bank not to have big losses on my balance sheet.

Let's look at these things and also look at how they would have worked in the past.

Formula For Determining Future Debt Burdens

As a reminder, the equation below shows the drivers of future levels of debt and debt service relative to incomes. This is more fully explained at the start of this chapter.

$$\frac{\text{Future Debt}}{\text{Future Revenue}} =$$

$$\frac{(\text{Future Expenses Excluding Interest} - \text{Future Revenue}) + \text{Current Debt} \times (1 + \text{Interest Rate})}{\text{Current Revenue} \times (1 + \text{Growth Rate})}$$

In the table below, I use this formula to estimate what interest rates would stabilize debt burdens relative to incomes for the US today. We also show how each of the other available “levers” would have to change in order to stabilize debt burdens. You can see that to stabilize government debt burdens, the US would either need to see nominal interest fall to about 1%, see nominal economic growth average about 6% (2.5% additional inflation above the 3.8% nominal growth projected by the CBO), or raise government revenue (i.e., raising taxes) by 11%. Of course, each one of these paths would be intolerably too large so it will take the right combination of lesser amounts of these to successfully achieve the goal. In Chapter 16, “My 3% Solution: How the US Could Stabilize Its Debt Burden,” I show what I believe the best combinations would be to achieve the goal of limiting debt burdens and risks in a very tolerable way.

How Can the US Stabilize Debt-to-Income in the Next 10 Years?

Central Government Debt Today (%GDP)	99%
Central Government Debt Today (%Revenue)	576%
Proj. Debt in 2034 (%GDP, CBO)	122%
Proj. Debt in 2034 (%Revenue, CBO)	679%
Proj. Nominal Growth Rate (CBO)	3.8%
<i>Proj. Real Growth</i>	1.8%
<i>Proj. Inflation</i>	2.0%
Proj. Effective Nom. Interest Rates (CBO)	3.4%
Current Interest Rate (Avg 3m and 10yr)	4.5%

If Lower Interest Rates Was the Only Lever...

Interest Rate Required To Stabilize Debt	1.0%
<i>Change in Interest Rates vs. Current Interest Rate</i>	-3.5%
Change in Interest Rates vs. CBO's Projected Avg Interest Rate	-2.4%

If Higher Inflation Was the Only Lever...

Required Inflation Rate to Stabilize Debt	4.5%
Change in Inflation Required (vs. Current Proj. Inflation)	2.5%

If Cutting Expenses Was the Only Lever...

% Spending Cut Required to Stabilize Debt	12%
<i>% of Discretionary Spending</i>	47%

If Raising Tax Revenue Was the Only Lever...

% Revenue Increase Required to Stabilize Debt	11%
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