



Coveconomics

*Understanding the impact of the COVID-19 pandemic on
the U.S. economy*

Daniel Babalola

Coveconomics

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Prologue

Before we begin, I would like to address a bit of controversy that arises whenever the economics of a pandemic is discussed. By writing this book, I am in no way suggesting that economic stability or financial success is more valuable than the lives saved via a lockdown response. What I aim to do is address the COVID-19 pandemic's impact on important aspects of lives of U.S. residents. Without a doubt economics and finance play a significant role in our lives. They determine what jobs we can get, if we can buy a house, how much things cost, our retirement, and a myriad of other important facets of modern society. In this book, I aim to document developments in several of these facets, and, in doing so, shed light on the pandemic's impact on the American people.

Naturally, different people will be affected in different, and at times unequal, ways. While millions of low-income workers face evictions, billionaire see spike in net-worth. As you read through all these various circumstances, please attempt to set as your personal bias so you may understand these scenarios in a greater context. At times I will play the believing game and attempt to create a narrative that justifies a perspective. Please play along. It is very beneficial to your understanding if you open your mind to narratives you might disagree with. Sometimes I will be purely observational and seemingly indifferent to the issues at hand. When I do this, I don't mean to dismiss the weight of the scenario; I am trying to summarize the issue as efficiently as possible. Finally, unless otherwise stated, my assessments are not endorsements of any social, political, or economic theory, ideology, or course of action.

I hope you enjoy reading this book as much as I enjoyed writing it.

The Situation

On December 31, 2020, the World Health Organization's (WHO) office in the People's Republic of China was alerted to several cases of "viral pneumonia" by the Wuhan Municipal Health Commission (Pneumonia of Unknown, 2020). Over the next few months, these cases of "viral pneumonia" spiraled into an international pandemic. According to the CDC, the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), more commonly referred to as the novel coronavirus or COVID-19, is a new strain of coronavirus that is distinct from previously identified coronaviruses that "commonly circulate among humans and cause mild illnesses, like the common cold". It has a wide range of symptoms, which appear 2-14 days after contraction, such as fever, cough, shortness of breath, and fatigue. Primarily, the virus is transferred person to person via respiratory droplets produced when an infected person sneezes, coughs, or talks (Coronavirus Disease, 2020).

Without a doubt the coronavirus outbreak is a health crisis, and human life should be paramount in the national response of each government. However, it is undeniable that the economy and financial well-being of a nation is an important subject which affects the livelihood of every citizen. Inspired by this premise, in this book I will analyze the effects of the coronavirus pandemic on the US economy and its major financial markets. Through a multifaceted investigation, I will assess and explain the gradual changes in the US economy from December 31, 2019 to December 31, 2020. This book is split into six sections. In the first, I will analyze the US economy & financial markets pre-COVID-19 and summarize what might occur to both during a nationwide pandemic. The next four will observe developments in each US quarter, and in the final section I will create a narrative for the year 2020 and attempt to forecast the future state of the US economy & financial markets.

US Economy: Pre-COVID-19

Before we begin to tackle the impact of the coronavirus, we need to understand the state of the US pre-COVID-19. There are a myriad of factors involved in assessing an economy, so for the sake of brevity, I will limit my analysis to elements that were significantly affected by COVID-19 or that will become a major point of discussion in the growing economic crisis. The primary focus understand how an unforeseen pandemic might affect the US economy and financial markets.



GDP

According to the US Bureau of Economic Analysis (BEA), in 2019 the US saw a 2.9% growth in GDP. This growth was driven by positive contributions in consumer spending (3%), foreign investment (6.4%), and government spending (1.7%). However, it was negatively affect by residential investments (-1.5%) and net exports with exports growing by 3% and imports growing by 4.4%.

	2018	2019
Production		
<i>Percent change at seasonally adjusted annual rate (unless otherwise noted)</i>		
Gross domestic product*	2.9	2.3
Purchases, by type		
Gross domestic purchases*	3.1	2.4
Personal consumption expenditures*	3.0	2.6
Nonresidential fixed investment*	6.4	2.1
Residential investment*	-1.5	-1.5
Exports of goods and services*	3.0	0.0
Imports of goods and services*	4.4	1.0
Government consumption expenditures and gross investment*	1.7	2.3

Figure 1.1: U.S. GDP at a Glance. (Source: U.S. Bureau of Economic Analysis)

To better understand these figures, let's compare them to the growth in previous years.

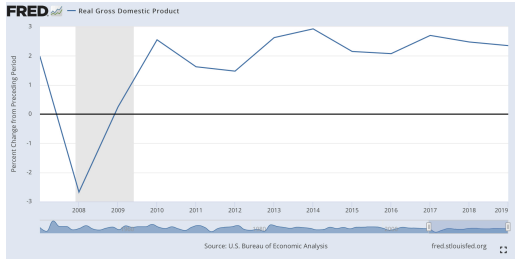


Figure 1.2: Real Annual Growth in GDP from 2007-2019 (Source: FRED Economic Data)

According to the US Council of Economic Advisors, the economic expansion over the last decade “became the longest in U.S. history.” Since the Great Recession (2007-2009), the US saw a consistent growth in the economy, with the last few years seeing over 2% growth. To put some context to these figures, when compared to the average economic growth of G7 (an intergovernmental economic organization that consists of industrialized nations such as France, Canada, Germany, Japan, the UK, Italy, and the US), the US consistently surpasses them in GDP growth since the Great Recession. 2019 was no exception, as the US was the only country, in G7, with an annual GDP growth above 2% (US Council of Economic Advisors, 2019).

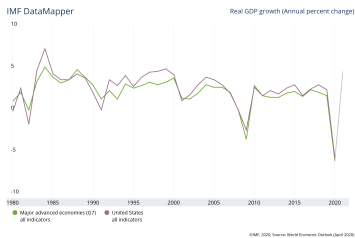


Figure 1.3: Real GDP Growth (Annual Percent Change), US vs G7. (Source: International Monetary Fund Data Mapper)

Even when compared to projections by economists, GDP growth in 2019 surpasses expectations, edging out the 2.4% prediction by the Federal Reserve Bank of Philadelphia and Haver Analytics in 2017 by 0.5%.

Without a doubt, 2019 was a good year for US GDP. Since this book is about analyzing the effects of the coronavirus pandemic, we need to understand how GDP might be affected by a sudden pandemic. For this, we need to break down and analyze the components of GDP (consumer spending, government spending, investments, and net exports) and determine how each would be affected by a pandemic.

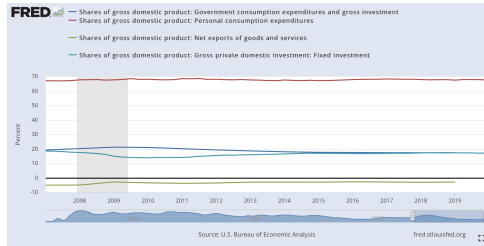


Figure 1.4: Shares of GDP. Consumer Spending, Government Expenditures, Fixed Investments, and Net Exports Compared. (Source: FRED Economic Data)

In 2019, consumer spending accounted for 67.9% of GDP, fixed investments 17.1%, and net exports -2.8% (FRED Economic Data, 2020). Though the contributions by government spending is yet to be calculated, we can rely on 2018 projections to get a sense of what it might be: 36.19% (Statista, 2020). Over the last decade, even during the Great Recession, contributors to GDP have maintained a similar ratio. Since an economic lockdown, that would be required for a pandemic, is akin to an induced recession, I'd imagine that the contributors will maintain a similar ratio. Now that I've made clear the components of US GDP, let's make some speculations on how GDP might be affected by a pandemic. Without a doubt, consumer spending will be the hardest hit. Forcing millions of consumers to stay home would reduce their ability to spend money on goods and, to a greater degree, services. Depending on how long we remain in lockdown, we might see significant unemployment and, as a result, reduced consumption. Presumably, the government would send out stimulus checks¹ for a significant period of time. Most likely the stimulus checks will be unable to cover the loss in consumption caused by unemployment. All these

¹ Issuing stimulus checks do not count towards government spending because they are a form of transfer payments.

factors will contribute to a significant decline in GDP. The question becomes: will the other contributors to GDP make up for the decline in consumer spending? Naturally, the answer is, of course not. Even if the government had the capacity to purchase the goods and services needed to maintain projections, it would be poor policy to accrue debt for goods that will go to waste and services that will not be used. The only option for the government is to make a series of transfer payments in the form of stimulus checks, bailouts, and subsidies. Investment is a more interesting idea to tackle. On one hand, in times of uncertainty, private investors are more reserved with their loans. However, in troubled times, if the Great Recession is any indicator, the government is far more generous with low interest loans. Though government loans are considered forms of government expenditures, the degree to which government loans might make up for private investment is an intriguing idea. As usual, net exports will be in the negatives and actively work against the national GDP. That being said, this will most likely be to a lesser degree since consumer spending will decline.

Businesses & Unemployment

In 2019, the US saw a marked drop in unemployment, from 3.9% in December of 2018 to 3.5% a year later. Such an statistic meant the addition of over 2 million jobs (FRED Economic Data, 2020) and the reduction of unemployed workers from 6.3 million to 5.8 million (U.S. Bureau of Labor Statistics, 2020). Additionally, the employment-population ratio, the number of employed workers divided by the number of working-age citizens, rose to 61.0% which was a 0.4% increase from 2018 (U.S. Bureau of Labor Statistics, 2020). Since 2009, the U.S. has seen a gradual decline in unemployment rates, and the numbers of 2019 follow the trend-line of the previous years. That being said, historically speaking, 2019 saw the lowest unemployment rate in US history.

While this information provides great context, to better understand the possible effects of a pandemic it's more insightful to analyze the distribution of employees between each sector. Below, figure 1.5 breaks down the total employed persons by industry; in 2019, 78.85% of those

people worked in the service sector (Statista, 2020). Fortunately, in the service sector, an alteration of individual business models can allow a business to adapt in a lockdown scenario, but in the industrial sector

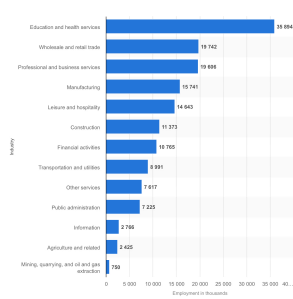


Figure 1.5: Total Employed Persons in the United States in 2019, by industry. (Source: Statista)

things become more complicated. Whereas financial advisors can be consulted via video chat, construction workers need to operate machinery in person. Because of a reliance on more in-person productivity, businesses in the industrial sector may be more susceptible to outbreaks. As a result, such business might find themselves in more severe financial situations than their service sector counterparts. This division between the two main sectors might factor into political decisions made at the time of crisis².

More important than the difference between the industrial and service sector is the dichotomy between businesses that can operate during a lockdown and those that cannot. Naturally, businesses that can maintain productivity with less in-person interaction have an edge over those that cannot. Since the U.S. government would like to limit the detriment to the economy, lockdown measures will most likely accommodate those that can meet a high standard of social distancing. However, a quick look at figure 1.5 will show that a large portion of jobs might not be able to meet that standard. Unlike teachers who can shift towards video lectures and online courses, convenience store clerks cannot maintain their shop without manning

² The relationship between politics and the economics of a pandemic will be discussed in more detail later in this book.

the cash register and restocking the shelves. A dilemma arises when we realize that society relies on many business that cannot operate remotely; shutting down certain segments of the economy would lead to worse scenarios than a pandemic (such as mass starvation). Therefore, the government would need to decide which businesses are necessary to maintain a baseline of stability and allow them to remain open despite the risks of spreading the virus. According to *Business Insider*, these “essential businesses” include: grocery stores, convenience stores, garbage collection, healthcare related services, daycare centers, gas stations, banks, agriculture and food processing, storage related businesses, and transportation. As you can see, the title “essential business” can be applied to businesses in both the industrial and service sector.

Aside from service vs industrial and lockdown-operative vs lockdown-non-operative, there is a third important dichotomy between factions: small businesses vs large business. At times it might be difficult to differentiate the two, especially when franchising becomes a factor. According to the U.S. Department of State, a small business is any business that “adheres to [its] industry size standards established by the U.S. Small Business Administration (SBA).” Unfortunately, each type of business has its own unique standard, so it would not be beneficial to dive into specifics³. For now, I will make a generalizations about how both types of businesses might be affected by a sudden pandemic.

When it comes to keeping most businesses operational, the most important factor is cash. As long as a business is able to service their liabilities (leases, debts, pensions, etc.), they can remain open. There are three main pipelines by which cash flows through businesses: operations, assets, and finances; each of these pipelines can either take cash from a business or provide cash to a business. Operations are the day-to-day production of a company. If a business makes a profit, its owners can invest that money back into it and continue to operate and grow. Should the business make a substantial amount of money, its owners can purchase assets that will increase productivity (also known as capital). Depending on the business model, assets can pay for themselves (by reducing the cost of production or facilitating the

³ If you are interested in the specific qualifications, please refer to the Electronic Code of Federal Regulations, Title 13, Chapter 1, Part 121

growth of the company) or become a means of investing in a market outside the operations of a business. As an investment, assets can become a way to store value or a means of making extra money. Either as capital or an investment, assets can give or take cash from a business. Should a company operate at a loss and require money to pay for its assets, it can continue to operate through the finances of hopeful investors. In fact, most, if not all, business have depended on debt to finance themselves at some point in time. When Ben the Baker wants to open a shop, he might head over to his local bank to get a loan. Likewise, when Ismai'll the Investment Banker wants to start a hedge fund, he might try to find some wealth companies and individuals to invest in his business. It is here, in the realm of acquiring debt, that we find one of the biggest differences in how small and large businesses might be affected by a pandemic. In times of crisis, large businesses have connections to a broader range of institutional and independent investors who are willing to provide the cash needed to keep them in business. Despite operating at an annual net income loss over the last 11 years, Tesla has been able to expand its business to include more gigafactories, more employees, and is considered a leader in the national shift towards electric cars.

Tesla Annual Net Income (Millions of US \$)	
2019	\$-862
2018	\$-976
2017	\$-1,962
2016	\$-675
2015	\$-889
2014	\$-294
2013	\$-74
2012	\$-396
2011	\$-254
2010	\$-154
2009	\$-56
2008	\$-83

Figure 1.6: Tesla Annual Net Income (in Millions of USD). (Source: Macrotrends LLC)

What allows businesses like Tesla to continuously operate at a loss is the mindset of their investors. If an investor sees the potential for significant profits down the line, they are more likely to pour money into a company. Tesla is able to maintain their confidence by continuously expanding and gaining a larger share of the electric car

market. In a crisis, wealthy investors are willing to continue their support for large companies like Tesla because they are investing based on potential. If Tesla can maintain that investor confidence they can service their debts with the money of new investors and remain in business. Unlike large corporations, small businesses are less privy to investors with this sort of mentality. Generally, affluent private investors have far less interest in the profitability of a small business because there are larger corporations with more promising returns on investment (ROI). A private equity firm with 20 million to invest would not distribute its funds across hundreds of small businesses. As a result, small business need to find different avenues of getting cash. In times of crisis, federal and state loan programs are made available to small business, but these come with a few caveats. During a crisis like an international pandemic, government loan programs are unlikely to discriminate based on potential and profitability. In other words, someone who efficiently ran an expanding business pre-pandemic will be seen on the same level as someone who ran a slowly declining business. Thus, a small business owner is essentially thrown into a first-come-first-serve competition. Even if they did get a loan from the government, they would be subject to a list of government requirements on how to manage their business. If they were averse to such government provisions or could not acquire a loan at all, they could seek out private investors. The largest private investors small businesses have access to are banks. But, acquiring a loan from a bank comes with its own trials. Unfortunately for the business owner, funding anything in a time of crisis and uncertainty comes with additional risk to the bank, which means they require a higher interest rate. Depending on the state of their business, getting such a loan might lead them to bankruptcy anyways. If a business owner miscalculates the demand for their product/service, which might decline in a lockdown situation, they will be unable to service their debt and must close down their store. Alternatively, they could seek out individual investors who believe in their business. These investors can range from generous customers who don't require interest to local investors who will lend at a lower rate than the bank. Fortunately, these investors come with the least requirements and are the most desirable.

Though there is a variety of different ways a small business could acquire cash, there are still a myriad of complexities stopping them

from doing so. During a world-shaking pandemic, government loans are insufficient, banks are less likely to lend, and individual investors are more inclined to save their money. Due to these complications, a long lasting shutdown will cause several small business, especially brick-and-mortar businesses, to close permanently.

If I made it sound like large corporations faced little issues in a crisis, I apologize. In fact, most of the issues that plague small businesses affect large corporations on a bigger scale⁴. Unfortunately for them, large corporations do not have access to conventional government loan programs, so to acquire cash they rely primarily on private investors, for finances, as well as the typical operations and assets. Since their business extends across the country and, as a result, might be subject to different economic circumstances⁵, their changes to operation must be either universal enough that it doesn't cripple stores in different locations or made specific to different states and regions. Because of the variance between locations, corporations might delegate specific actions to regional or store managers. Thus, it becomes difficult to estimate the amount of cash that can be earned through operations.

Should their business operate at a net loss, many companies have a financial division that manages assets for additional revenue. For example, according to their 2019 fourth quarter earnings report, Amazon earned \$832 million in interests through investments in "AAA-rated money market funds and investment grade [securities]." Though several companies, like Amazon, hold stakes in numerous assets, the return on these investments are not sufficient to cover the loss accrued in a lockdown scenario. The issue lies in the nature of their business model. Corporations that are oriented towards providing products and services for the average consumer allocate too little funding to their investment division for them to earn the required return. To these companies, investments act as a supplement, not a primary source of

⁴ Since the issues of financial institutions are significantly different from those of non-financial institutions, I will be addressing/generalizing both separately. In this segment, I am focusing exclusively on non-financial institutions.

⁵ These different economic circumstances will be primarily affected by the laws in each state. Company stores in states with stricter and/or longer lockdown provisions will suffer heavier losses than stores in states with weaker provisions.

income. As a result, even Amazon's 832 million dollar ROI pales in comparison to its 265 billion in total operating expenses (Amazon.com, Inc., 2020).

The most fruitful means of acquiring cash in these conditions is to seek out loans from private investors. These loans can come in the form of bonds or a private, more complex contract (companies typically issue bonds). Though this effectively provides a large company with cash, it substitutes a lack of cash with an increase in debt. Since companies issue bonds all the time, this is not an abnormal issue. However, since risk increases during a crisis, lenders are less willingly loan and will do so for higher interest rates. As a result, many companies find themselves in an interesting dilemma. To finance their operations, they must take on debt. Unfortunately, demand is low during a pandemic, and it becomes more difficult to make a profit. In these conditions, many companies face the potential of a downward spiral. As their debt to profit ratio increases, it becomes more difficult to make their interest payments. Soon, they begin to default on their payments. With enough defaults, their credit rating⁶ declines, and they would need to issue bonds at a higher interest rate to maintain a steady flow of cash. At this point, rather than continue to accrue debt, most companies declare bankruptcy.

Inflation & The Federal Reserve

Inflation is a critical determinant of economic success and quality of life in all countries. Most of us have probably heard of the economic collapses caused by hyperinflation in post-WWI Germany, 21st century Zimbabwe, and modern-day Venezuela. As prices soar, most lose their savings and the gap between incomes and prices, caused by currency volatility, places many in financial turmoil. Though less popularly discussed (most likely because it is rarer than high inflation), rapid deflation offers its own share of economic problems. As prices fall, consumers begin to save more in anticipation of a further price drop. Soon businesses overfill their inventory and request that suppliers stop producing for them. Out of work, the suppliers and their employees

⁶ A credit rating is a tool lenders use to determine the risks of investing in a company.

contribute much less into the economy since they have no money to spend. In a worst-case-scenario, this leads to a deflationary spiral in which millions are unemployed. Since too much or too little inflation can be harmful, countries need to find the sweet spot of yearly inflation that will allow them to maintain a healthy economy. To facilitate their ability to reach their targeted inflation rate, most countries create and appoint this task to a central bank. The central bank of the United States is the Federal Reserve System, also known as the Fed.

Since January 2012, the Fed's goal has been to maintain a 2% annual inflation rate⁷. (Board of Governors on the Federal Reserve System, 2012). Though the rarely hits their desired inflation rate precisely (mainly because inflation rates are difficult to control), they've managed average slightly below 2% from 2012-2019, with the US finishing 2019 with a rate of 1.81%.

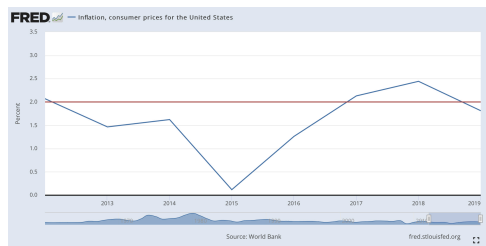


Figure 1.7: Annual rate of inflation from 2012-2019 vs the Fed's 2% target. (Source: FRED Economic Data)

In a pandemic situation, the US needs to worry about the potential of both harmful deflation and inflation. If the lockdown response leads to the unemployment of several people, the US could be on the path towards a deflationary spiral if fiscal policy is not implemented. When it comes to addressing the possibility of inflation, things become a bit more tricky, and much of the difficulty is due to the lack of widespread consensus on the effect of the Fed's actions. In the face of a potential financial/economic crisis, which a long term lockdown will certainly cause, the Fed's primary goal is to provide liquidity to the entire system. For this purpose, they have four tools at their disposal: their discount

⁷ "As measured by the annual change in the price index for personal consumption expenditures, or PCE" - The Board of Governors of the Federal Reserve System.

rate, open market operations, reserve requirements, and interest on reserves.

The discount rate of the Fed is the interest they charge on overnight /short-term loans to commercial banks. Using the principles of competition and supply & demand, they can control the federal funds rate⁸. Naturally, as they raise the federal funds rate, commercial banks would carry on the costs to their borrowers and charge higher interest rates. When interest rates rise, the conventional borrower (like a small business owner) is less likely to borrow from the commercial bank which makes the commercial bank less likely to borrow money from the overnight lending market. Since a reduction in lending means a reduction in spending, raising the discount rate is a deflationary tactic. In a time of financial/economic crisis, the Fed reverses this process and lowers their discount rate, causing an increase in lending (or at least attempting to increase lending). The hope is that more borrowing equals more spending which stimulates the economy. In conventional times, lowering the discount rate might cause demand-pull inflation in certain areas of the economy. However, since the economy is not operating anywhere near its maximum capacity in a lockdown scenario, this inflation simply counteracts the deflationary pressure caused by increased unemployment. For this reason, the FED's inevitable decrease of the discount rate should not have any negative effects to the economy via inflation; it will only stimulate the economy.

Like the discount rate, the Fed's control of commercial banks' reserve requirement allows them to stimulate the economy by providing liquidity. By lowering the amount of money banks must keep in reserve, the Fed increase the supply of loanable money and in effect decreases the interest rate of overnight loans which trickles down to the average borrower. Similarly, the Fed's control over the interest rates of these reserves allow them to stimulate or contract the economy (higher rates are contractionary while lower rates are expansionary. As in the case of the discount rate, the Fed will take measures to stimulate the economy using these two tools. Naturally, their effects on inflation follow the same logic as the effects of lowering the discount rate. So long as the economy is not operating a near maximum capacity, the

⁸ The rate at which banks lend to each other in short-term contracts.

inflationary pressure caused by these actions should be balanced by the deflationary pressure of unemployment.

When it comes to open market operations (OMO)⁹, things start to become especially controversial. If the pandemic precipitates a financial crisis, the Fed is most likely going to launch a massive OMO. When performing open market operations, the federal reserve purchases assets, usually treasury bonds or mortgage-backed securities, by “printing money.” I placed “printing money” under quotation marks because it is and over simplified, and potentially misleading, way of describing what it is the Fed actually does. To better understand why this term is misleading, we need to first discuss the overnight lending market in our banking system. As I mentioned before, commercial banks keep reserves and many have a reserve requirement set by the Fed. These reserves are the cash banks keep at hand rather than lend to borrowers. Keeping this money at hand acts as a buffer against loan loss and cash withdrawals from customers. Since each bank has its own unique borrowers and customers, and therefore its own unique level of risk, different banks hold different amounts of reserves at any time. While having such a buffer is useful, keeping money in storage doesn’t generate much interest¹⁰ for banks. So, to earn interest, banks loan reserves to other banks in an overnight bank funding market (OBFM). Again, since each bank faces different levels of risk at different times, they need different amounts of reserve at hand. If a bank is short on reserves, the best way to acquire the cash needed is to borrow from another bank in the OBFM. Since incidents can occur at anytime, these loans are short-term (hence the word “overnight”) and, as with all loans, are backed with collateral (securities). Naturally, the forces of supply and demand set the overnight bank funding rate (OBFMR); here is where the Federal Reserve’s open market operations come into play. Since the Federal Reserve has the ability to create electronic funds and use them as a

⁹ “the purchase and sale of securities in the open market by a central bank” - Board of Governors of the Federal Reserve System.

¹⁰ Remember that the Fed pays a bit of interest on reserves.

medium of exchange¹¹, they can purchase securities from banks and increase the total amount of reserves in circulation (which in effect reduces the OBFR).

The most prolific and controversial use of OMOs is the launching of quantitative easing (QE). When applying QE, the Federal Reserve uses an exorbitant amount of money to purchase long-term securities. Quantitative easing is a relatively new financial tool in the US. It was first launched in November 2008 in response to the 2007-2009 financial crisis. From 2008-2014, the Federal Reserve launched four rounds of QE totaling in a 2.4 trillion dollar¹² increase to their balance sheet (The Balance, 2020). Such a drastic increase to the money supply caused many to speculate on the future effects on inflation. However, as we saw in figure 1.7, the inflation rate post-QE has been below or slightly above 2%. Why is that? Why doesn't such a massive increase in reserves trickle down to the population as hyperinflation? Answering these questions requires the deconstruction of the common understanding of fractional-reserve banking.

“Fractional reserve banking is a system in which only a fraction of bank deposits are backed by actual cash on hand and available for withdrawal” (Investopedia, 2020). This allows banks to expand capital exponentially. The simplified understanding of this system is that when someone deposits \$100 to a bank with a 3% reserve requirement (RR), that bank keeps \$3 in reserves and lends out the remaining \$97. The borrower of the \$97 will also deposit this money in a bank (or exchange it with someone who will) which will take 3% of \$97 (\$2.91) and loan out the rest (\$94.09). On and on it goes until the money “runs out.” This is an oversimplified and slightly misleading description of how the US banking system works. In reality, banks do not restrict their lending to remain in accordance with the reserve requirement; if a loan is profitable, they will issue it. When banks issue so many loans that they cannot meet their RR, they borrow reserves from the OBFM. As more banks loan beyond their RR, the demand for reserves increases causing the OBFR to rise. An increase in the OBFR should discourage banks

¹¹ The Fed doesn't actually print money; the Treasury Department's Bureau of Engraving and Printing (BEP) does. However, the Federal Reserve does dictate how much money is printed at the end of the year and handles the distribution of the currency.

¹² Approximately 11% of US GDP in 2019

from loaning beyond their RR, but the Fed steps in before it does. If banks lend less, the country's potential for economic expansion is inhibited because potentially profitable ventures are left unfunded, which puts a deflationary pressure on the economy. Similarly, if banks lend too much, a significant increase in spending creates an inflationary pressure. Since the Federal Reserve is in charge of monetary policy, they dictate what OBFRR is appropriate to allow steady growth in the economy. So, when banks borrow beyond their RR and the OBFRR rises above the Fed's targeted rate, the Fed increases the supply of reserves through OMO.

By understanding this system, it becomes clear why QE should not be the catalyst for hyperinflation. The money supply increases when banks make loans that become deposits. The trillions of dollars in additional reserves will not trickle into the economy at a high rate because banks only lend if they find profitable ventures¹³. Since the Fed only launches QE when the OBFRR is already very low, the decrease in the OBFRR is not large enough to spur banks into lending dramatically more than they already are. Instead, the mass purchase of long-maturity securities decreases long term interest rates and, as a result, encourages more borrowing. That being said, the inflationary pressure caused by this increase in borrowing is not significantly different than the pressure caused by the other tools of the Fed.

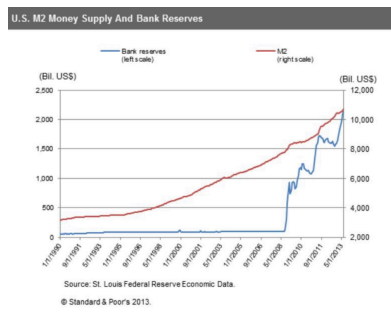


Figure 1.8: U.S. Money Supply (M2) vs Bank Reserves (Source: *Repeat After Me: Banks Cannot and Do Not "Lend Out" Reserves* by Paul Sheard)

¹³ See figure 1.8 for more confirmation on the lack of direct correlation between bank reserves and the money supply.

Should the government shut down the economy, we are more likely to see an inflationary shift in areas that are conducive to a lockdown (online shopping) and deflationary pressure in areas that are not (gas prices). Because of the monetary system we have in place, neither hyperinflation nor hyperdeflation should be an issue. The Federal Reserve System has the tools to counteract the deflationary pressure of unemployment and the ability to ease off should inflation start to grow above their target.

In Debt We Trust

In 2014, the United States federal debt rose to over 18 trillion dollars, surpassing the total real GDP for the first time in 70 years (The Bureau of Fiscal Service, 2014). This upward trend in debt acclimation continued into 2019 during which US national debt rests at 106% of real GDP.

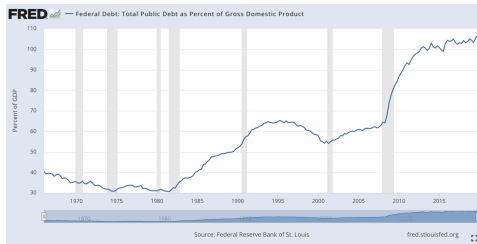


Figure 1.9: U.S. National Debt as a Percent of GDP, 1966-2019 (Source: FRED Economic Data)

As with all debt, the cause of this is the government's increasing need to spend beyond its means. In a way the growth of this figure comments on the principles of politics. Should a group of politicians enact a highly demanded policy that involves government spending, they must continuously renew this policy to remain in office. Similarly, politicians who seek to reduce national debt by cutting spending find themselves obstructed by their peers who hope to capitalize on the wide spread support of policies like social security. Naturally, if you cannot reduce the cost of doing business, you must increase your

revenue so things balance out. Unfortunately, this is also a frowned upon political stance in the US. Widespread tax hikes for any policy will almost always face opposition from most of those affected¹⁴. In times of economic prosperity, we have a population that would like the maintain the status quo of government spending without taking the pay cuts necessary to foot the bill.

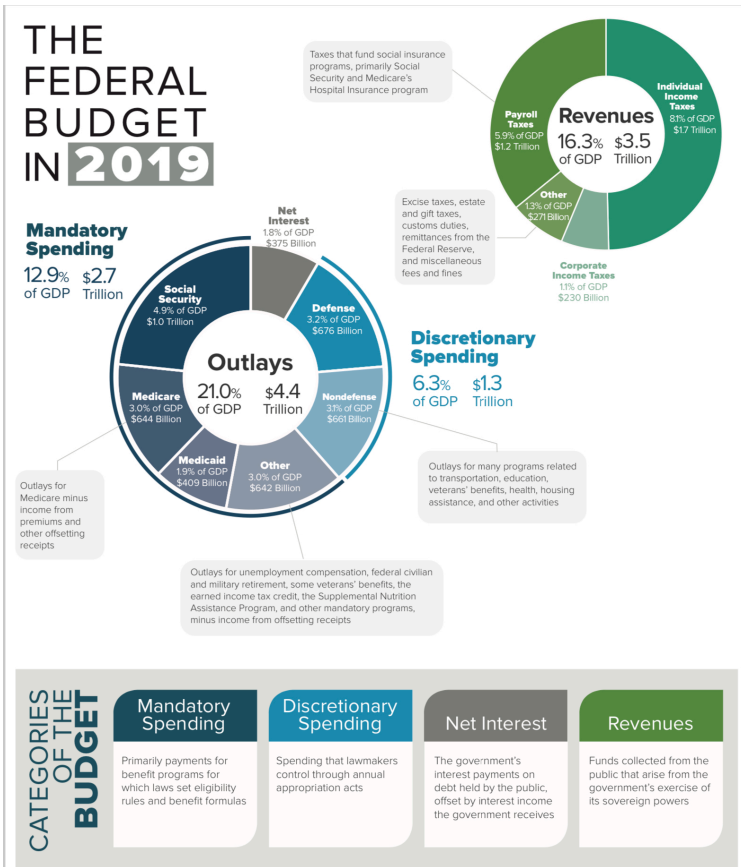


Figure 1.10: U.S. The Federal Budget Infographic, 2019 (Source: Congressional Budget Office)

¹⁴ It is important to note that in multiple polls the majority of US voters believe that the wealth should be taxed more heavily (Politico 2019: 76%; Reuters/Ipos 2020: 64%; Brookings Institute 2020: 67%). Whether or not such a tax will be effective in reversing the rate of national debt growth is still a matter for debate.

As in 2008, the economic crisis caused by the shutdown will lead to a dramatic increase in the national debt. Since many citizens are laid off or furloughed, the federal government would need to enact a large scale fiscal policy to prevent a downward spiral¹⁵. During the Great Recession, the federal government spent over \$1 trillion to stimulate the economy and pull the country out of recession (Blinder, 2010). Most of this cash went towards bailing out interconnected financial institutions and injecting the liquidity needed to sustain health levels of lending as well as end the freefall of home and auto markets. A government-induced shutdown is much different than the typical recession because the government actively prevents the economy from recovering. Essentially, the economy will be on placed on perpetual life support, sponsored by the government¹⁶, until it is deemed safe enough to reopen. Therefore, the growth of the US national debt is dependent on how long the nation remains in lockdown. The scale of this impending deficit is even more remarkable once you consider the fact that funding taxpayers requires more cash than bailing out a few corporations. A one month payment of \$1000 to the roughly 120 million taxpayers comes with at least a \$120 billion price tag. Once you account for the possibility of a large scale bailout for corporations and small businesses, as well as the several social programs that will be set in motion, a one-month economic shutdown becomes an increasing burden on future taxpayers¹⁷ (those who pay for US debt).

Without a doubt, the US national debt will skyrocket during a long term pandemic, but why does this matter? What effect will it have in the long term? If the US ever becomes unable to service its debt and begins to default, US treasury bonds will lose their status as the lowest risk investment. As investors begin to drop treasury bonds, the international value of the dollar will decline, causing the US to spend more in international trades and purchases. While this scenario is a

¹⁵ Since one person's spending is another person's income, massive job loss without income will cause otherwise healthy businesses to experience massive loss in revenue. From here you could get mass evictions and the possibility of a financial crisis.

¹⁶ In this section I will focus primarily on the national debt. Later in this book I will address state and local debt.

¹⁷ Of course, the deficit spending will increase at a faster rate the longer we remain in shutdown.

bleak possibility, politicians, and economists, are not worried about by it in the short term. Since international demand for US treasuries have not seen any worrisome declines in recent years, yields on treasury bonds have remained particularly low.



Figure 1.11: Yields on US Treasury Bonds with a 10-year maturity (Source: Macrotrends.net)

Additionally, roughly $\frac{1}{4}$ of the national debt is owed to the Federal Reserve, providing the US with the potential benefit of renegotiating approximately 25%. Should the US need more cash at an interest rate that the private and international investors cannot provide, the Federal Reserve can purchase US securities and keep the yield on treasury bonds low.¹⁸

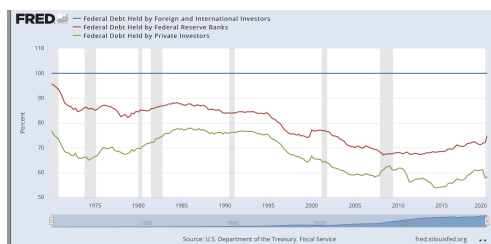


Figure 1.12: Percent of Federal Debt held by Private Investors, The Federal Reserve, and International Investors (Source: FRED Economic Data)

¹⁸ Since the Great Recession, the Federal Reserve has purchased a significant amount of US treasury bonds via QE. The gradual increase in the Fed's share of the US national debt, as shown in figure 1.12, has raised questions on the long term consequences of the Fed's actions (such as the increase in the money supply discussed in *Inflation and the Federal Reserve*).

In the economic crisis that a long-term government induced shutdown will create, the federal debt will not be a topic of concern. Generally, the value of a nation's national debt is assessed on how the funds are used. In times of relative prosperity, many argue that the increase in government spending works to stimulate the economy. This certainly rings true in times of crisis, during which government spending can prevent larger economic losses than the debt accrued.

Politics and Viruses

The impact of a global pandemic on any individual nation is largely dependent on its governmental and social response. With a swift response of lockdowns, social distancing, widespread testing, and the prohibition of international travel, a nation could restrict the spread of the virus and facilitate a quicker economic reopening. Such a response would require a coordinated effort between both the government and its citizens. The relationship between these two entities is a crucial factor in every governmental response to any pandemic. Naturally, every politician is partially motivated by a desire for reelection. This almost universal desire influences their decisions when tackling the production possibilities frontier (PPF) between the economy and public health.

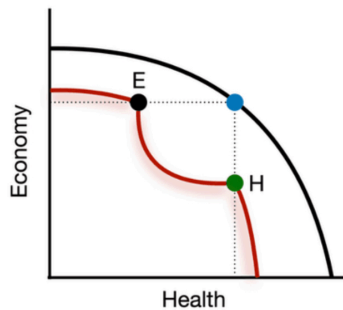


Figure 2.1: The PPF between public health and the economy during a pandemic.
(Credit to Joshua Gans in his book *Economics in the Age of COVID-19*)

In figure 1.1, the black curve represents the maximum limit of combinations of health and economic prosperity we can sustain in normal circumstances. If you begin at a low level of health, improving the health of the general population, sacrifices a bit of productivity. Likewise expanding the economy forfeits a bit of citizen health. To better visualize this concept, let's examine what it means on a micro-level.

Sussie the Saleswoman works 50 hours a week and wants to raise that time to 80. Though she will increase her number of sales, working

more hours will mean less time for leisure. Like every human, Sussie benefits from healthy doses of stress, exercise, sleep, and a proper diet. Working 30 more hours a week will significantly affect her ability to take care of herself. Therefore, she will sacrifice a bit of health to increase her productivity. However, if Sussie kept increasing her working hours she will lose sleep, and her productivity will decline with each hour invested. This is the law of diminishing returns; it is the reason why our PPF is concave. Expand this tradeoff to include millions of workers and you have figure 1.1's simplified macroeconomic PPF.

During a pandemic, things get a bit more complicated. Represented by the red curve (in figure 1.1) there is a segment in which our pandemic PPF becomes convex. This dip represents the effects of an economic shutdown. There is a baseline of economic suppression needed to effectively prevent the spread of a virus. Thus, to prevent a small (relative to the total population) number of people from falling sick, or more importantly dying, the country needs to initially shutdown a large portion of the economy. Afterwards, the base suppression of economic activity is sufficient to prevent a further loss in health. If you are having trouble grasping this concept, a good comparison is an online business. For Danny the Designer to make any revenue, he first needs to invest time and money into his T-shirt design. Once his design is complete, he can mass produce them via a third party manufacturer with zero cost (to him) per shirt. Additionally, he can make more revenue by copying his design onto different products (which takes far less effort than creating the initial image). Like Danny, a country needs to invest a significant amount of their economy to gain worthwhile payoffs in health. After the initial investment, they can gain marginal payoffs through marginal increases in the intensity of a shutdown.

When faced with this PPF, politicians must decide the best course of action for both the country and their constituents. Will they shutdown the economy and run up the debt needed to protect their citizens? How well could they prevent evictions, unemployment, and keep those of lower economic status financially stable? How much economic success is a life worth? Along with these questions are a myriad of different factors politicians need to consider before taking any action.

To understand the nature of the US's initial response to the coronavirus, we must understand the mentality

About the Author

