FYS 525, Topic 8: The Great Depression and Dust Bowl

Background: The Great Depression is the worst economic downturn of the past century. In the United States, the unemployment rate peaked at 25% in 1933, dwarfing the impact of the Great recession and covid-19 recession, and economic recovery took a full decade. At the same time, an avoidable and man-made environmental disaster, the Dust bowl, began in the Southern Great plains, defined by drought and crop failures.

Core Concepts:

1. Rare but catastrophic events. Economies struggle to deal with catastrophes that happen only rarely such as environmental disasters or severe financial crises. It is hard to tell how frequently events such as the Dust Bowl occur- are they once in a century or once in a millennium? It is also hard to insure against these events.

This brings up a subtle but important difference between risk versus ambiguity. Consider a coin flip where heads pays $1,000,000 but tails requires that you pay $1,000,000. The expected payout is zero. The game is risky because we do not know the outcome, but we at least know the odds. Because we know the odds, financial markets have developed all sorts of ways, including formal insurance, to manage this type of risk.

But now suppose that there is a game that pays $1,000,000 with some unknown probability and costs $1,000,000 with one less this unknown probability. When we do not know the odds, we call it *ambiguity* instead of ordinary risk. Financial markets do now know how to manage this ambiguity and insurance markets, for example, generally do not exist. Households and businesses struggle to make decisions in the presence of ambiguity.

Rare and catastrophic events are an example of ambiguity. How likely in an environmental catastrophe like the Dust Bowl or an economic calamity like the Great Depression? It is hard to quantify, potentially making it ambiguous.

2. Financial Crises. Economic downturns, known as *recessions* are relatively common and can happen for a variety of reasons. A financial crisis is an event that may eitehr cause a recession or make an existing one worse. A financial crisis is a period defined by a sudden reduction in credit, a reduced willingness to take on risk, or an abrupt drop in asset prices. Financial crises often lead into major economic downturns, as was the case of the great Depression and the Great Recession which followed the Global Financial Crisis in 2008.

There are many different types of financial crises but when we discuss the Great Depression, we will consider *debt-deflation*. Deflation is the opposite of inflation, it refers to falling prices and most economists consider it to be worse. Consider the following example:

i. A business holds $100,000 in debt. Assume this debt is at a fixed interest rate.

ii. Deflation occurs so that all prices fall by 20%. The value of this debt in real terms (measured in term of goods and services) also rises by 20%. Put another way, the business is now collecting 20% fewer dollars for its sales, making it harder for it to make the payments on its debt.

iii. As businesses and firms become more indebted through deflation, they pull back by reducing their purchases of consumption and investment goods. Reduced demand leads to more deflation.

iv. Steps #2-3 repeat themselves. Economist Irving Fisher described this as a "deflationary spiral" and it remains a major part of the cause of the Great Depression.

3. Money and Gold. Money is an asset that may be used to purchase goods and services. it isn't as easy to measure as you might expect. Currency is money. But what about checking and savings accounts, credit cards, etc. In practice, assets that are "liquid", meaning they can easily be converted to cash, are counted as money.

Prior to 1933, the U.S. used a gold standard to conduce its monetary policy. This meant that the U.S. government promised to convert $20.67 into one ounce of gold. Although money was not literally made of gold, gold effectively acted as money. The price of gold, however, is determined by anything that affects its supply or demand and these need not be related to the economy. A new gold discovery was inflationary. In contrast, a period without new gold discoveries could lead to deflation.

Question 1: What Caused The Great Depression?:

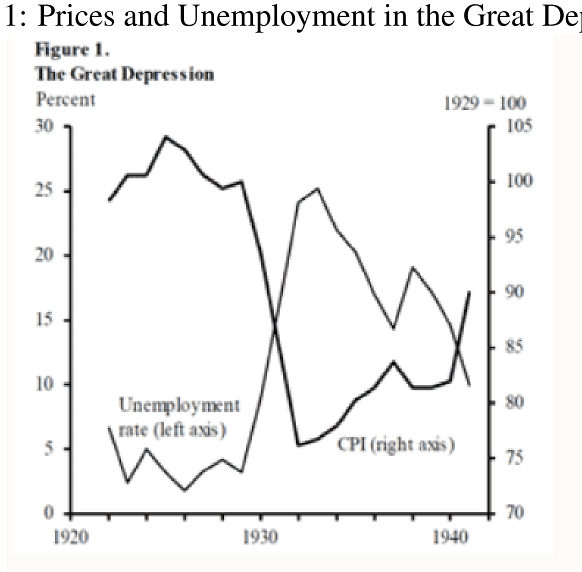
The Great Depression is certainly the worst macroeconomic calamity to strike the United States since the Civil War. Before discussing the events leading to the Great Depression, we begin by considering some simple statistics for the United States that describe the scope of the downturn.

1. Unemployment rose to 25% by 1933%.

2. Aggregate output fell by about 30% between 1929 and 1933.

3. Prices fell by about $\frac{1}{3}$ over the same time

Figure 1: Prices and Unemployment in the Great Depression



These numbers dwarf those of any subsequent macroeconomic downturn, including the Great Recession. The causes of the Great Depression remain somewhat controversial. The following series of events provide a monetarist perspective and describe a series of adverse events that led to the Depression.

The Stock Market Crash of 1929

This stock market crash is often equated as being the catalyst of the Great Depression in popular memory. There is some truth in this. The stock market crash appears to coincide (and at least partially cause) an economic downturn that was severe but conventional. But without subsequent events in the banking sector, it would never had become an event on the order of the Great Depression. Speculative bubbles are among the most common causes of economic downturns. These represent periods where asset prices become artificially high as savers come to expect high returns instead of focusing on the assets' fundamentals (e.g dividends for stocks). The Great Recession was preceded by a housing bubble. A bubble in technology stocks preceded a recession around 2000. It appears that stocks were subject to a bubble into 1929 with valuations inconsistent with their earnings. At the same time, the 1920s were characterized by a dramatic expansion of credit that has led some to discuss a "credit bubble." The following chart shows the rise and fall of stock prices in the United States.

Figure 2: Stocks in the Great Depression

Stock prices peaked in August 1929 at 382 (Dow Jones). After this, they began a steady but unremarkable decline into October 1929. October 24 is known as "Black Thursday." On that date, prices fell by about 11%. The following week had "Black Monday" and "Black Tuesday" which each encompassed similar prices drops. Although there would be short lived recoveries, this began a general stock market crash that would bottom out in July 1932 at a price of 41, an extraordinary decline of almost 90%. Stocks would not reach their previous peak until 1954. The stock market crash often dates the start of the Great Depression. And it was followed by a decline in prices and output, and a rise in unemployment that would bottom out in 1932 or 1933. But the stock market crash did not make the Great Depression inevitable. It was instead the first of a series of events that would usher the Great Depression in. It did not lead to an immediate panic beyond the stock market. The New York Fed stepped in to provide liquidity to troubled firms through its discount window. Its actions were an effective application of its role of lender of last resort. Private households supplied liquidity in a manner not dissimilar to what was seen in 1907.

The stock market crash did, however, help cause the emerging economic downturn. It did so in a way that was consistent with our earlier analysis of credit crises. The decline in stock prices led to a decline in wealth which then reduced consumption and investment. This was then amplified by a decline in access to credit as potential borrowers were less credit worthy due to their declining wealth. Unemployment began to rise soon after the crash.

The Collapse of the Money Supply

A critical component of the Great Depression was the collapse of the money supply between 1929 and 1933. Friedman and Schwartz in their 1963 landmark *Monetary History of the United States* estimate that the money supply declined by 31%. Numerous factors contributed the the collapse of the money supply. We consider the most important.

i. Bank failures. Declining economic conditions induced higher default rates and caused banks to take losses on the loans that they had made. This caused many banks to become insolvent and vulnerable to failure. The first wave of bank failures in the United States occurred in 1930 when banks with deposits of about $450 million failed. The most prominent was the Bank of the United States with $200 million. Although just a commercial bank, not a Central Bank, its name and size seemed to convey special importance.

It is not the case that banks that failed saw all of their customers' deposits wiped out. For the Bank of the United States, Friedman and Schwartz (1963) report that customers recouped 83.5% of their deposits. But this is still a large loss and a decline in the money supply. It is understandable that in an era without deposit insurance, customers became concerned with the solvency of other banks.

In some ways the bank failures that started in 1930 are similar to those of the Financial Crisis in 2008. In the former, commercial banks, those that take deposits, were primarily affected. In the latter, it was more on the investment banking side. But in both cases, deposit insurance did not apply, the FDIC which currently insures commercial bank deposits was not formed until 1932.

Subsequent banking failures would occur in large numbers every year through 1933. Ultimately about 40% of commercial banks holding about 33% of U.S. deposits failed. With them went much of the U.S. money supply.

ii. Bank runs. If depositors are afraid of bank failures, it is sensible that they withdraw their deposits. Thus although the money supply was collapsing, cash was increasing dramatically as customers converted from bank deposits to cash.

iii. Contractionary monetary policy. You might expect that given the circumstances, the Federal reserve would have responded with monetary policy that sought to offset the decline in the money supply (this enatails lowering interest rates). This did not happen. The Fed instead did little to abort the decline in the money supply. The Fed's main motivation for pursuing this policy was its desire to defend the gold standard. This required that they raised interest rates (which slows the growth of the monetary base) in order to boost the return on deposits and thus discourage depositors from converting more dollars into gold. The Fed raised discount rates twice. It only began a tepid program of open market purchases in April 1932. Friedman and Schwartz (1963) argue that this program was half hearted and that many Fed members would have preferred to not engage in it at all. Modern analysis also often accuses the Fed of having engaged in only limited emergency lending.

Friedman and Schwartz (1963) title a Chapter"Why Was Monetary Policy So Inept" They argue that the Fed suffered from weak leadership, especially the more isolated districts. They maintain that the Fed failed to understand the crisis and even succumbed to the belief that it was needed to eliminate previous inefficiencies from the economy. They further claim that the contemporary state of economics was advanced enough that better leaders should have been able to do a better job.

> The actions required to prevent monetary collapse did not call for a level of knowledge of the operation of the banking system or the workings of monetary forces or of economic fluctuations which was developed only later and was not available to the Reserve System. On the contrary, as we have pointed out earlier, pursuit of the polices outlined by the System in the 1920's, or for that matter by Bagehot in 1873, would have prevented the catastrophe

In 2004, Ben Bernanke, soon to be Chairman of the Federal Reserve, agreed that the Fed fucked up.[1]

> The Federal Reserve had the power at least to ameliorate the problems of the banks. For example, the Fed could have been more aggressive in lending cash to banks (taking their loans and other investments as collateral), or it could have simply put more cash in circulation. Either action would have made it easier for banks to obtain the cash necessary to pay off depositors, which might have stopped bank runs before they resulted in bank closings and failures. Indeed, a central element of the Federal Reserve's original mission had been to provide just this type of assistance to the banking system. The Fed's failure to fulfill its mission was, again, largely the result of the economic theories held by the Federal Reserve leadership. Many Fed officials appeared to subscribe to the infamous "liquidationist" thesis of Treasury Secretary Andrew Mellon, who argued that weeding out "weak" banks was a harsh but necessary prerequisite to the recovery of the banking system. Moreover, most of the failing banks were relatively small and not members of the Federal Reserve System, making their fate of less interest to the policymakers. In the end, Fed officials decided not to intervene in the banking crisis, contributing once again to the precipitous fall in the money supply

[1] Remarks by Governor Ben S. Bernanke At the H. Parker Willis Lecture in Economic Policy, Washington and Lee University, Lexington, Virginia, March 2, 2004. "Money, Gold, and the Great Depression."

The contemporary defense of the Federal Reserve is that tight monetary policy was needed to defend the gold standard, which was legislated by Congress. Friedman and Schwartz (1963) are dismissive and conclude that the Fed had enough gold to sustain lower interest rates. They also note that the first Glass Steagall Act in 1932 allowed the Fed to temporarily go below its mandated currency to gold ratio. The Fed did not, however, immediately do so. It instead began some more aggressive open market purchases because it felt pressured by Congress with the threat of subsequent legislation.

Irving Fisher's theory of debt-deflation originated as an attempt to explain the Great Depression. In my opinion, it remains the best explanation for how the banking crisis propagated so atrociously. According to Fisher, the large reduction in money created the deflationary spiral that was the Great Depression. Deflation beget lower output through increased real debt burdens and high real interest rates. This reduced demand which beget more deflation...

The misery of the Great Depression is hard to understate. Unemployment reached record heights. Foreclosures rose dramatically. Homelessness increased. By almost any metric, the Great Recession was far worse than any other economic downturn in American history. "Hoovervilles," a type of slum sprung up throughout the country.

Other Mistakes

Other policy makers made numerous errors. The fiscal policy response was botched. Although the Hoover Administration was able to increase spending on relief measures, the overall increase in government spending was limited. Friedman and Schwartz (1963) note that larger increases were vigorously opposed because, despite the crippling deflation, they would be "inflationary." A similar obliviousness would manifest itself in 2009 when fiscal stimulus was debated in response to the Great Recession. Additionally, balanced budgets were almost a moral issue, Through 1932, politicians in both parties advocated for them and Congress thus raised taxes to cover increased expenditures.

In 1930, Congress passed and President Hoover signed the Smoot-Hawley Tariff. This was a

Figure 3: Hooverville, Similar to Smith Hall

protectionist measure that raised average tariffs to one of their highest levels in U.S. history. This measure reduced the gains to trade and certainly made to situation even worse. It should be noted, however, that the role of this tariff in causing the Depression has diminished in recent decades. By 1934, subsequent legislation largely undid this tariff.

Fortunately, the Smoot-Hawley Tariff is the last time in U.S. history that politicians have resorted to anti-trade rhetoric as a response to difficult economic times.

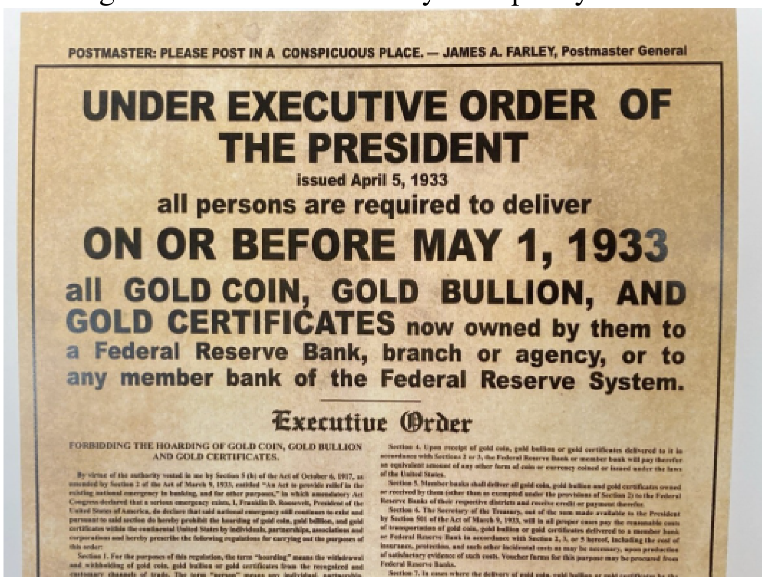
2. What Lasting Changes Came from the Eventual Recovery?"

The Great Depression reached its bottom in 1933 and recovery then began. It is often dated as having ended much later than 1933 because conditions remained very poor during much of the recovery. Some of the recovery was probably just the natural tendency of economies to eventually self-correct. But policy also played a major role. Many of these polices resulted in lasting changes to teh U.S. economy. We consider some of these policies:

i. The End of the Gold Standard. In April 1933, President Roosevelt issued an executive order taking the U.S. off of the gold standard. Americans had to turn in their gold to the Federal Reserve.

It would not be legal for Americans to own gold bouillon for several decades. The Fed was still to maintain a gold standard for foreigners (and would until 1971), but this was at the devalued rate of \$35:1.

Figure 4: The Birth of Many Conspiracy Theories



The end of the gold standard created an environment where expansionary monetary policy was far more feasible. After its repeal, the Federal Reserve did engage in more aggressive monetary policy, although modern economists still often criticize it for being too passive even after the repeal of the Gold Standard. Bernanke (2004) uses cross country evidence to suggest that the faster a country abandoned gold, the better it recovered from the Great Depression:

> The willingness or ability of countries to remain on the gold standard despite the adverse developments of the 1930s varied quite a bit. A few countries did not join the gold standard system at all; these included Spain (which was embroiled in domestic political upheaval, eventually leading to civil war) and China (which used a silver monetary standard rather than a gold standard). A number of countries adopted the gold standard in the 1920s but left or were forced off gold relatively early, typically in

> 1931. Countries in this category included Great Britain, Japan, and several Scandinavian countries. Some countries, such as Italy and the United States, remained on the gold standard into 1932 or 1933. And a few diehards, notably the so-called gold bloc, led by France and including Poland, Belgium, and Switzerland, remained on gold into 1935 or 1936.
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> If declines in the money supply induced by adherence to the gold standard were a principal reason for economic depression, then countries leaving gold earlier should have been able to avoid the worst of the Depression and begin an earlier process of recovery. The evidence strongly supports this implication. For example, Great Britain and Scandinavia, which left the gold standard in 1931, recovered much earlier than France and Belgium, which stubbornly remained on gold. As Friedman and Schwartz noted in their book, countries such as China–which used a silver standard rather than a gold standard–avoided the Depression almost entirely. The finding that the time at which a country left the gold standard is the key determinant of the severity of its depression and the timing of its recovery has been shown to hold for literally dozens of countries, including developing countries. This intriguing result not only provides additional evidence for the importance of monetary factors in the Depression, it also explains why the timing of recovery from the Depression differed across countries.

The United States, and most other advanced economies, have never returned to a commodity standard. This is one of the reasons why the business cycle has become less severe since the Depression. Rather than base monetary policy on a resource whose price fluctuates for non-economic reasons, monetary policy is now more flexible. Support for the Gold Standard has become relegated to the fringe of modern monetary economics.

ii. Beer and Wine. In March 1933, FDR signed a bill that legalized beer and wine. Couldn't have hurt.

iii. Bank Holidays. Bank holidays are governmental actions that either close or reduce banking activities. The bank holiday may be used to either recapitalize banks or to determine which banks are vulnerable and then close them in an orderly manner. If successful, a bank holiday might help restore confidence in the banks when they reopen.

Before March 1933, many states had enacted bank holidays. One of FDR's first acts, however, was to declare a 4 day bank holiday. This was ended when Congress passed the Emergency Banking Act. The most important provision of this act was that it instructed the Federal Reserve to loan unlimited currency to member banks against good collateral. Banks judged to be insolvent were not reopened. This act was essentially deposit insurance, a policy that eliminates risk from depositors, and which would later be made permanent with the creation of the Federal Deposit Insurance Commission.

The bank runs of 1930-1933 had included a self-fulfilling component. Worried about the health of their bank, depositors would withdraw their deposits creating a liquidity crisis even if the bank was solvent. Deposit insurance works to eliminate this behavior. It seems to have worked. After March 1933, bank runs subsided.

Most economists support deposit insurance for this reason. Some, however, maintain that it causes depositors to disregard the solvency of their banks, allowing insolvent banks to receive more deposits, This may be de-stabilizing.

iv. The New Deal. Recall that Schiedel lumped the New Deal in with the World Wars as a single massive equalizing event. We also saw that the New Deal inspired constitution of Japan in 1945 may have played a role in the Japanese "economic miracle."

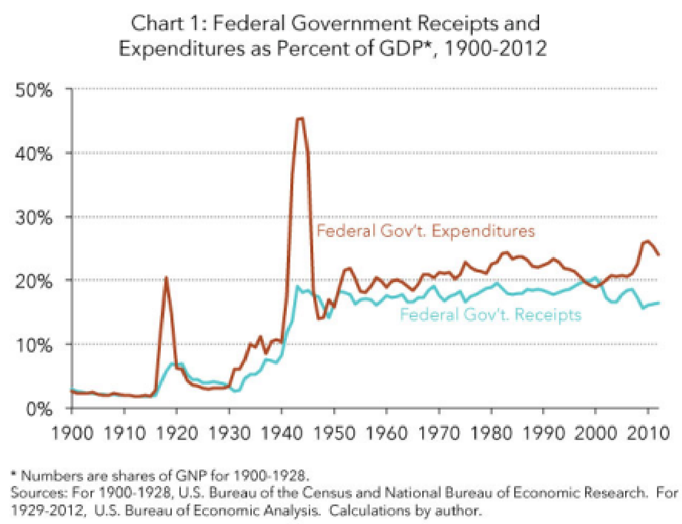
The New Deal refers to a set of relief measures passed beginning in 1933 in order to deal with the Great Depression. It includes the Emergency Banking Act discussed separately above. The New Deal is a complicated, and still controversial, set of policies. We will focus only on a few of its provisions.

a. Some New Deal programs worked through direct government spending or by directly employing those who were out of work. Examples include the Civilian Conservation Corps and the Works

Progress Administration, programs that made the U.S. Federal government a large scale employer. Other programs provided aid to cities or states. These programs represent expansionary fiscal policy. Although there remains disagreement, the bulk of the evidence suggests that deficit spending in a severely depressed economy does lead to increases in output and declines in unemployment.

In recent decades, the spending components of the New Deal have been given less credit for the recovery. This is mostly because they did not result in a large initial increase in spending. As shown below,, this spending does represent the start of a permanent and major increase in the size of government spending as a share of GDP.

Figure 9: U.S. Tax Revenue and Government Spending



b. Keep in mind that the Great Depression was characterized both by deflation and low output. Other New Deal programs sought to raise prices directly. The National Industrial Recovery Act was passed in 1933. It sought to form cartels within industries by coercing firms to coordinate on price setting and to set codes of conduct. It was declared unconstitutional by the United States Supreme Court in 1935. Its symbol was an eagle, which became the namesake for the Philadelphia Eagles. Other New Deal programs worked to place floors on agricultural prices which had been especially hard hit during the Depression. The U.S. government continues to prop up some agricultural prices in the United States today.

Although the NIRA had some admirable components–it was a major step in prohibiting child labor– subsequent economists have often judged the cartel nature of these programs harshly because they work to increase prices by simultaneously restricting output. Restricting competition is often among the worst ways to increase prices. A substantial fraction of economists believe that the New Deal prolonged the Great Depression rather than ameliorating it. These critics point to the anti-competitive aspects of some elements of the New Deal, most prominently the NIRA, as having chilled economic incentives. Some estimates suggest, that despite being in existence for just two years, the NIRA raised unemployment by 2%.[2]

c. Banking, Monetary, and Financial Regulation. In 1933, Congress passed the second Glass-Steagall Act (U.S. banking Act). This was a major regulatory initiative that sought to reduce volatility in financial markets. Among its provisions was a separation between commercial banks (those that accept deposits) and investment banking activities. This separation would exist into the 1990s. The bank runs of the 1930s, in contrast to those in 2008, were on commercial banks. By forbidding commercial banks from engaging in riskier activities (compared to traditional banking activities), it was hoped that this separation would prevent future runs on commercial banks. This law also created permanent deposit insurance through the FDIC. In the decades following this law, the commercial banking sector was clearly more stable than before.

Glass-Steagall also created the Federal Open Market Committee. Subsequent legislation gave it its present form by 1942. This action sought to prioritize open market operations which had been underutilized throughout the economic downturn and thus had contributed to crippling deflation. Along with the 1977 reform that gave the Federal Reserve its current dual mandate to combat price instability and unemployment, this is among the most significant reforms of the Federal Reserve Act.

The first Glass-Steagall Act, passed in 1932 prior to the New Deal, is also worth mentioning. This law increased the ability of the Federal Reserve to lend to member banks. On an emergency basis,

[2]Weinstein, M. 1981. "Some Macroeconomic Impacts of the National Industrial Recovery Act, 1933-35." in The Great Depression Revisited, ed. K Brunner. Boston: Martinus Nijhoff.

it allowed the Fed to loan currency even if this took it below the Gold requirements contained in the 1913 Federal Reserve Act.

d. Other programs likely had only a small impact on the rate of recovery, but had major long term effects. Examples include the creation of Social Security in 1935, which created the public pension program still in existence today, and the Wagner Act of 1935 which made it much easier for workers to organize into labor unions. This raises an important point. Any evaluation of the New Deal must also take into account the longer term and social benefits and costs of these programs, and not just the effect of the programs on inflation and aggregate output in the years immediately after 1933.

To conclude on the New Deal, I present an exchange between economists Brad Delong and Arnold Kling. Delong begins

> A normal person would not argue that the New Deal prolonged the Great Depression.

Which drew the following response from Kling:

> A reasonable view is that some New Deal policies helped, and some hurt....
>
> Knowing what I know now, if I could go back to 1933 and tell President Roosevelt what to do, I would say "yes" to deposit insurance, "yes" to going off the gold standard, and "no" to pretty much every other New Deal policy, including Social Security. I would also encourage two things that were not tried–a monetary expansion and a fiscal expansion (which in those days, with taxes relatively low, would have meant more government spending)..

Delong then replies:

> But relative to Hoover, Roosevelt's administration did pursue both fiscal and monetary expansion. Fiscal policy shifted from Hoover's balance-the-budget-at-allcosts to

Roosevelt's we-won't-worry-about-the-deficit-for-a-while–a big difference. It would have been much better if the New Deal had involved much bigger deficits, but the deficits it did involve were quite a help.

Similarly for monetary policy: Hoover's Fed was desperate to avoid gold losses, which meant raising interest rates whenever gold flowed out. Roosevelt's Fed wasn't. Again, a bigger monetary expansion would have been a greater help, but the change from Hoover to Roosevelt was a great help. So you have four big macroeconomically-significant pluses working to alleviate the Great Depression: deposit insurance, abandoning the gold standard, fiscal expansion, and monetary expansion. What do you have on the negative side? The short-term damage done in 1993-4 by the NIRA, and the work-relief programs that probably created several percentage points' worth of structural unemployment.

The Recession of 1937 and Ultimate Recovery

In 1937, the economy re-entered recession (here meaning negative economic growth), with unemployment again rising to 19.0%. If the Great Depression is defined as including the extended period of poor macroeconomic conditions that existed after 1933, then this was a recession within a depression.

It is not possible to definitively determine the cause of the Recession of 1937. It is especially hard because this period coincides with slowdowns both in the Federal Reserve's monetary expansion and on deficit spending. Monetary and fiscal explanations are thus both plausible. On the monetary side, the Federal Reserve slowed down its open market purchases and approximately doubled reserve requirements. On the fiscal side, some New Deal spending subsided, the payroll tax (used to finance Social Security) debuted, and general taxes were also raised. Many have taken this recession as a lesson against withdrawing recovery measures too soon into an economic recovery.

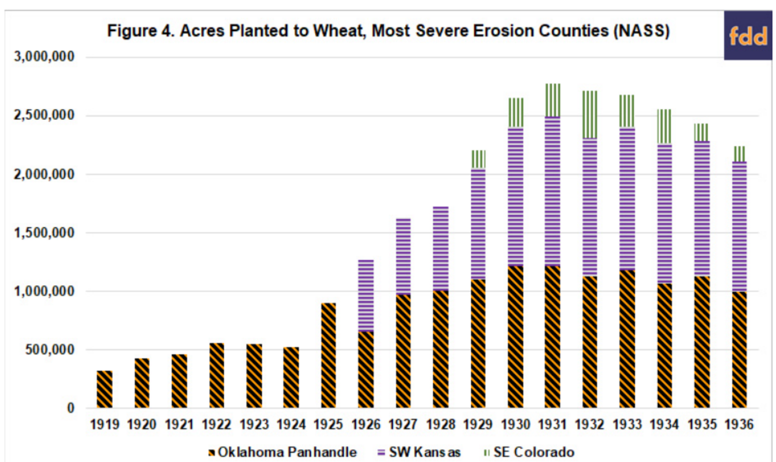
After 1937, final recovery was achieved with GDP growing by about 50% by 1942. The additional catalyst was the massive boost in aggregate demand provided by the Second World War. Initially, this entailed U.S. firms providing military material to combatants. Later, the U.S. would enter the war. Unemployment would then fall to record lows.

The claim is sometimes made that World War II ended the Great Depression. This is similar to saying the Stock Market Crash caused the Great Depression. World War II was the final act of the recovery, but many other events had caused the recovery to begin several years earlier.

3. Was the Dust Bowl a Natural or Man Made Disaster?

The Dust Bowl was an ecological disaster in the American Great Plains. In many ways, it was unrelated to the Great Depression itself- we cannot claim that one caused the other. But by occurring at the same time, the economic hardship of each was amplified.

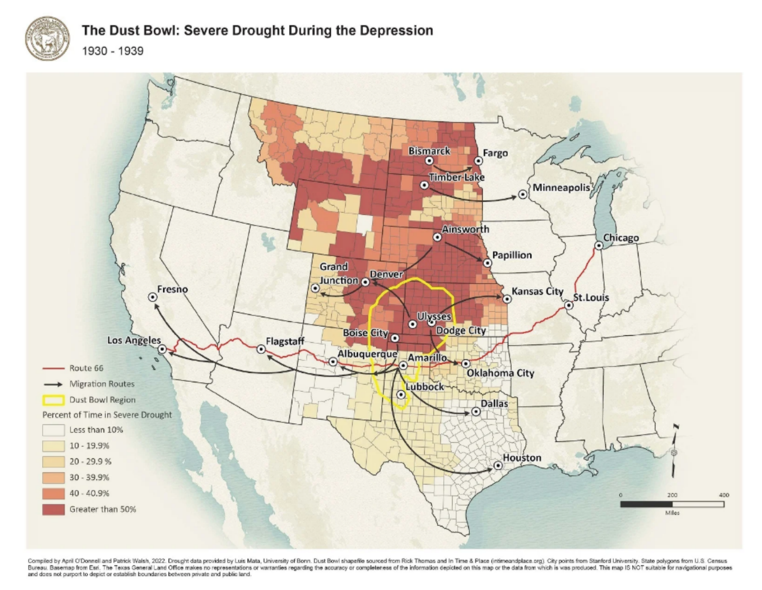
The origins of the Dust Bowl are a misunderstanding of rare events, In this case, however, the rare event was unusually abundant rainfall in the early twentieth century. This made land that was usually marginal temporarily more productive. Wheat plantings took off.[3]



The problem was that farmers (and policymakefrs) did not know that the wet years of the early twentieth century were the anomaly. Starting in 1933, coincidentally when the Depression hit its bottom, drought conditions arrived. The following map shows the extent of the devastation.[4]

[3]Graph from fardocdaily.com

[4]Map from Texas State Historical Association



The Dust Bowl itself was the hardest hit area and is usually centered in the Oklahoma panhandle. Compounding the problem were recent farming practices that had uprooted the grasses that naturally held the topsoil in place. Wet topsoil generally stayed in place. Under drought conditions, however, the topsoil was vulnerable to being picked up by the wind leading the the Dust Bowl's infamous dust storms. Arguello (2021) writes.

> Years of deep plowing removed the deep-rooted grass that was anchoring the region's topsoil in place. The result was an overabundance of crops on arid, unanchored soil that could lead to extreme erosion in especially dry conditions.
>
> Subsequently, the Plains recorded some of the driest seasons that had been seen in decades. Eroded topsoil was then picked up by winds to create the towering "black blizzards," which could spread to neighboring states and reduce visibility to less than a yard. Black Sunday saw a series of dust storms spread from Canada to southern Texas, stifling the air with thick clouds of dirt and eroding much of the farmland away. Dust storms had rocked the Midwest for the past several years, but it was the catastrophe of Black Sunday that led Spearman Reporter editor Edward Stanley to coin the term"Dust Bowl."

Figure 5: April 14, 1935: Black Sunday

The overfarming of the region was not a free market outcome. Federal policy, especially the Homestead Act had instead encouraged farmers to settle the region. For this reason, the Dust Bowl is considered to be mostly a man-made disaster. Arguello writes ho the short-term implications of Black Sunday.

> The timing could not have been worse. The area had already been plagued by drought for nearly half a decade, leading to several poor harvests in a row, and the Great Depression was in full force. Half a million people were left homeless by the damage caused by the storms; 350 houses were said to have been destroyed by one storm alone. Many died of dust pneumonia, and others of malnutrition. With their livelihoods and homes destroyed, thousands of families packed up everything they could into rickety jalopies and set off for better opportunities. The largest short-term migration in American history was underway.
>
> The journey of roughly 3.5 million Midwesterners in the 1930s is immortalized in John Steinbeck's The Grapes of Wrath, which follows the plight of a family making their way to the promised land of California, where they were told they could make

> a living picking peaches. The migrants were often referred to as "Okies" or "Arkies" even though they came from at least eight states, not just Oklahoma and Arkansas. Not all the migrants were former farmers; the Depression had put many white collar workers out of a job as well, and many made the trip west.

The Dust Bowl resulted in one of the largest internal migrations in American history. Most of those who left, never returned and it contributed to the growing populations of the U.S. West Coast. Arguello writes of the lasting damage to the region affected.

> Although the short-term ramifications of the Dust Bowl were obvious and brutal, many of the hardest hit regions suffered economic consequences for decades. 75% of the top-soil had been blown away. Land values declined, and only a fraction of the agricultural losses were recovered. Just as the rain returned and crops began to stabilize again, the United States entered World War II, once again dashing any hopes of economic stability.

Most importantly, the Dust Bowl served as inspiration for the start of *Interstellar*. Without the Dust Bowl, would mankind have ever traveled to Miller's Planet? And despite everything that has happened, I still believe that Dr. Mann is the best of us.

Figure 6: Those are the Best Odds I've Had in Years