Structural Dynamics of National Economies: A Macroeconomic Comparison Between India and the United States

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Introduction

This project conducts a side-by-side examination of key macroeconomic indicators to shed light on the differences in economic structure and performance between India and the United States. It focuses on variables such as consumption, investment, and government expenditure as portions of GDP; the distribution of income to labour and capital; per capita growth in output and consumption; unemployment rates; and the average length of joblessness. By tracking how these metrics have changed over time and how they behave across different phases of the business cycle especially during economic downturns, the study brings out the distinct economic profiles of India and U.S.

The analysis also explores how each country's economy adapts and recovers in the face of macroeconomic challenges. Ultimately, this comparative approach aims to deepen our understanding of broader macroeconomic trends and the implications they carry for policy in diverse national settings.

1 Economic Indicators

1.1 Consumption as a Fraction of GDP

Consumption as a fraction of GDP refers to the portion of a country's total economic output that is spent on consumption by households and individuals. It is a key indicator of how much an economy depends on consumer spending to drive growth. A higher ratio typically suggests a consumption-led economy.

$$\text{Consumption-to-GDP Ratio} = \left(\frac{\text{Consumption}}{\text{Gross Domestic Product}} \right) \times 100 \tag{1}$$

Country: India

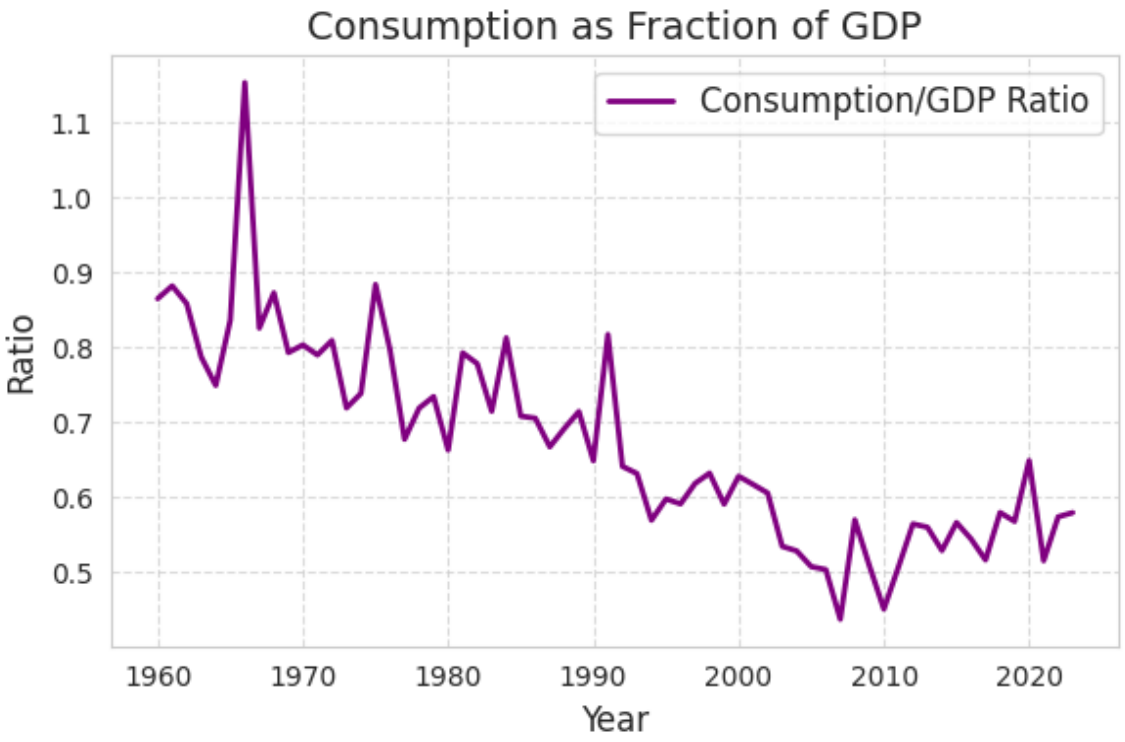


Figure 1: Consumption as a Fraction of GDP

In the graph we can see a long-term downward trend in the consumption-to-GDP ratio from 1960 to 2020. While the ratio fluctuated significantly in the earlier decades, peaking sharply around 1970, it gradually declined over time. Since the 1990s, the values have remained relatively stable, mostly ranging between 0.5 and 0.6, suggesting a consistent reduction in the share of consumption in total economic output over recent decade.

The mean is around 0.672278 and the standard deviation is around 0.134453 .

During Recession Period

In the below graph we see how the Consumption-to-GDP ratio changed during the 2007–2009 recession. In 2007, the ratio was around 0.4371 but jumped to about 0.5699 in 2008. Then in 2009, it dropped to roughly 0.5087. So, during the crisis, consumption rose quickly compared to GDP, then started to fall again afterward.

Here, the mean during this period is around 0.5052 and standard deviation is around 0.0542.

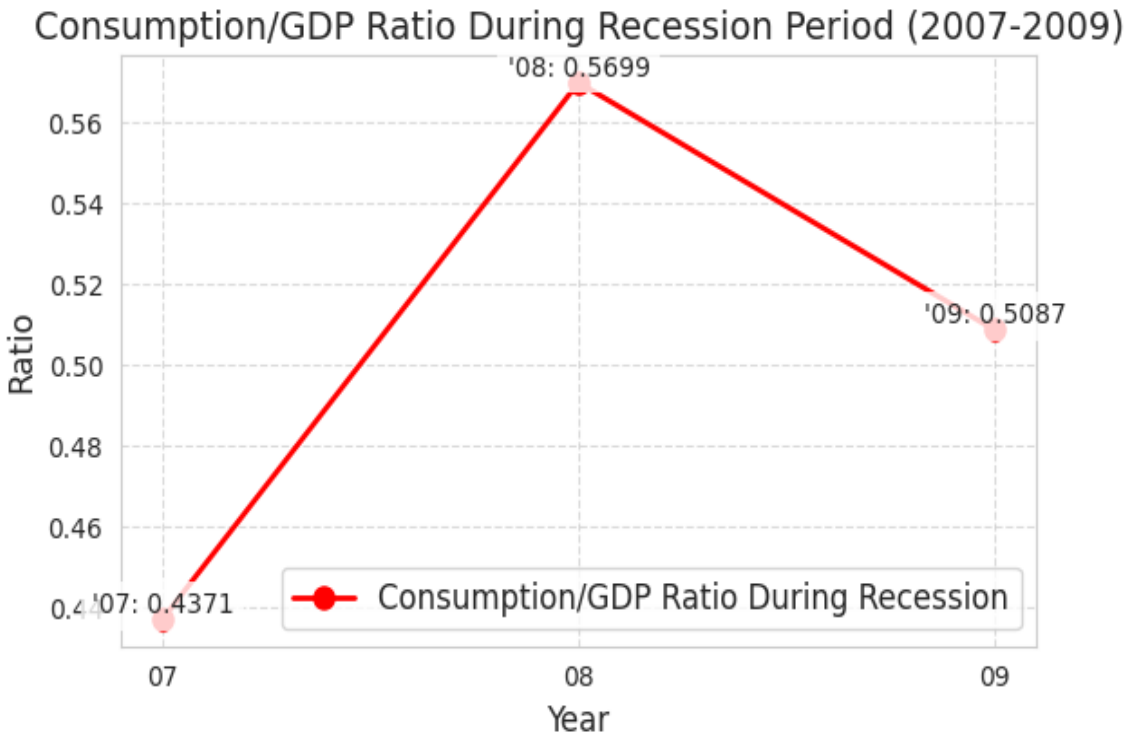


Figure 2: Consumption/GDP Ratio During Recession Period (2007–2009)

Country: USA

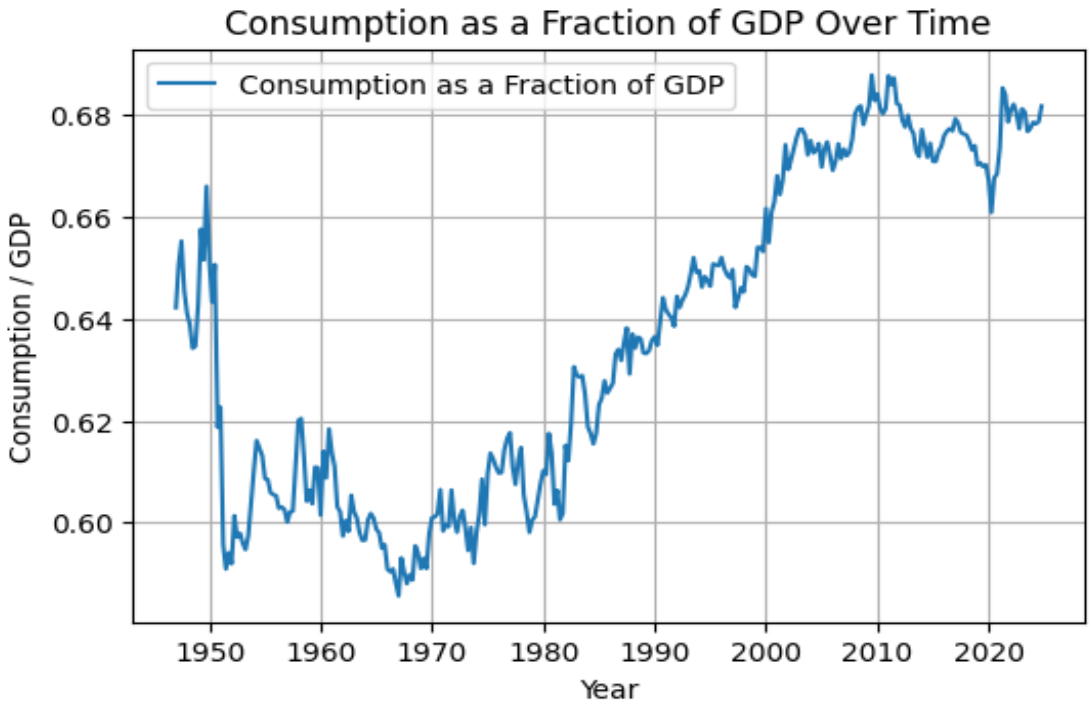


Figure 3: Consumption as a Fraction of GDP Over Time (United States)

The above graph shows how the consumption-to-GDP ratio in the U.S. has changed from the late 1940s to around 2023.

In the earlier years, especially during the 1950s to 1970s, the ratio stayed mostly below 0.62. Starting in the 1980s, it began to rise steadily, reaching above 0.68 in the 2000s. Although there were some drops during events like the 2008 financial crisis and the COVID-19 pandemic in 2020, the overall trend is upward. This suggests that over time, consumer spending has taken on a bigger role in driving the U.S. economy while in the case of India it has fallen as we saw in the previous case.

The mean is around 0.6364 and the standard deviation is around 0.0318 .

During Recession Period

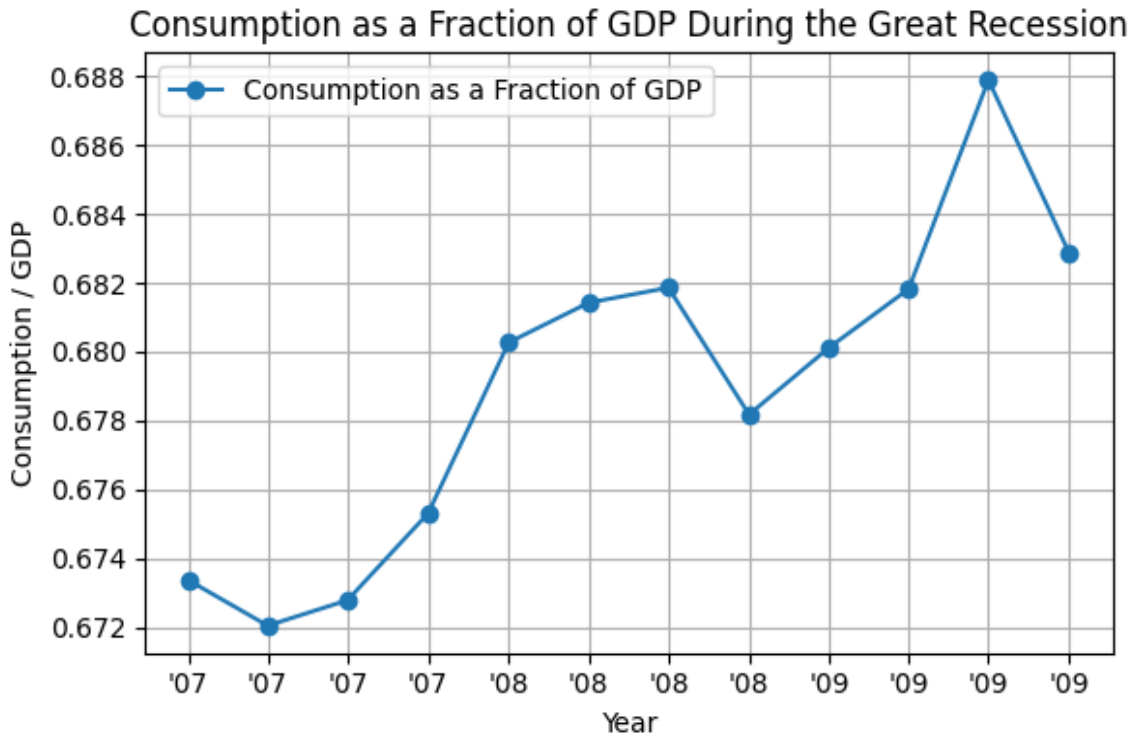


Figure 4: Consumption/GDP Ratio During Recession Period (2007–2009)

In the above graph we see how the Consumption-to-GDP ratio of USA changed during the 2007–2009 recession. At the start of 2007, the ratio was around 0.6730 but jumped to about 0.6815 in early 2008. Then at the end of 2008, it dropped to roughly 0.6780. But again in mid 2009s it started rising and stood at a peak of 0.6880 and again at the end of 2009 fell to 0.683. So, during the crisis, we see a very high volatility in the consumption but it overall was still high as compared to India. Here, the mean during this period is

around 0.6790 and standard deviation is around 0.0048 .

1.2 Investment as a fraction of GDP

Investment as a fraction of GDP measures the portion of a country's economic output spent on investment activities such as infrastructure, machinery, and buildings. It helps assess how much of the gross domestic product is dedicated to future economic growth. A higher ratio often indicates strong development efforts.

$$\text{Investment-to-GDP Ratio} = \left(\frac{\text{Total Investment}}{\text{GDP}} \right) \times 100 \tag{2}$$

This metric is widely used in economic analysis to compare investment levels across countries or over time.We will be comparing the investment ratio here between India and USA to see how much they are focusing on future and see their investment patterns.

Country: India

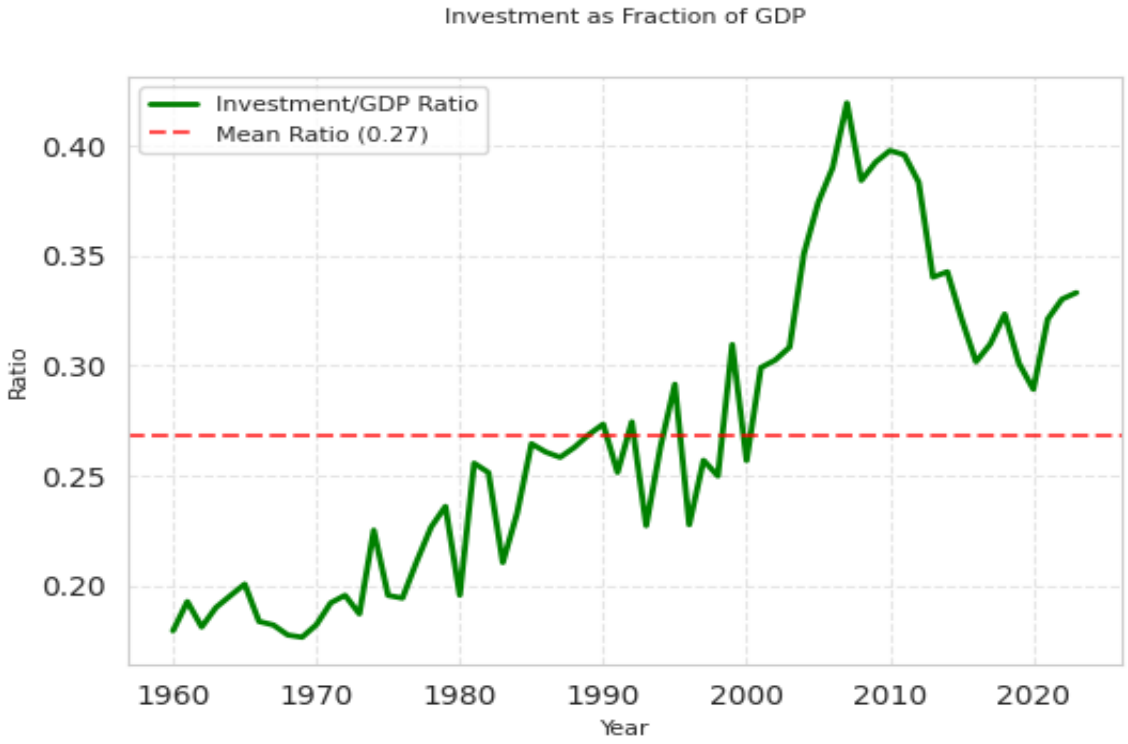


Figure 5: Investment as a fraction of GDP Ratio

The above graph shows the investment-to-GDP ratio from 1960 to 2022. Over this period, the ratio shows a general upward trend, especially from the early 1990s to the mid-2000s, peaking above 0.45 around 2007. Following that peak, the ratio declined significantly but remained above its long-term average of 0.27, which is marked by a red dashed line. Since 2010, the ratio has fluctuated but stayed relatively high compared to earlier decades. Overall, the data reflects a steady increase in investment's share of GDP over time, with surges and adjustments linked to economic cycles.

The mean is around 0.268091 and the standard deviation is around 0.068553.

During Recession Period

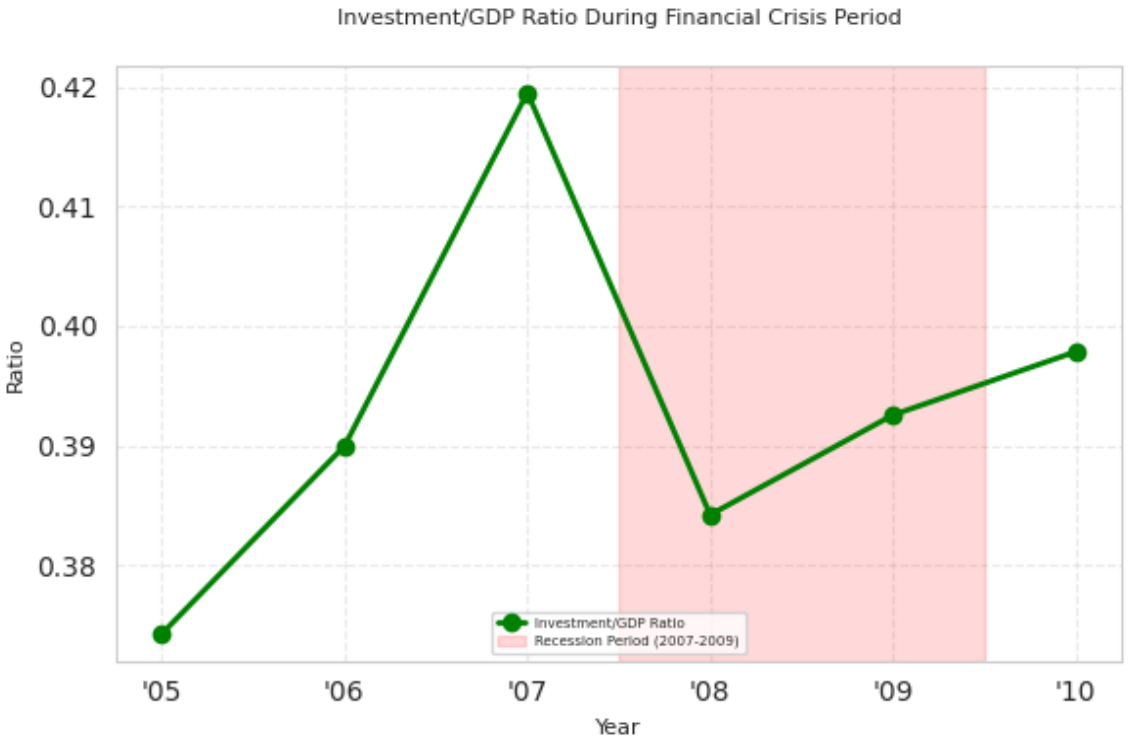


Figure 6: Investment/GDP Ratio during 2007-09

The graph focuses on the investment-to-GDP ratio from 2005 to 2010, capturing the period surrounding the global financial crisis. The ratio rose steadily from 2005 and peaked sharply in 2007 at approximately 0.42 due to the rise in investment in housing sector. However, as the recession began,highlighted in red from 2007 to 2009, the ratio declined significantly, reaching a low around 0.385 in 2008.

Following the downturn, investment levels began to recover modestly, with the ratio climbing slightly in 2009 and 2010. The shows how the financial crisis disrupted investment activity, leading to a noticeable but relatively short-lived contraction.

Here, the mean during this period is around 0.3987 and standard deviation is around 0.01505 .

Country: USA

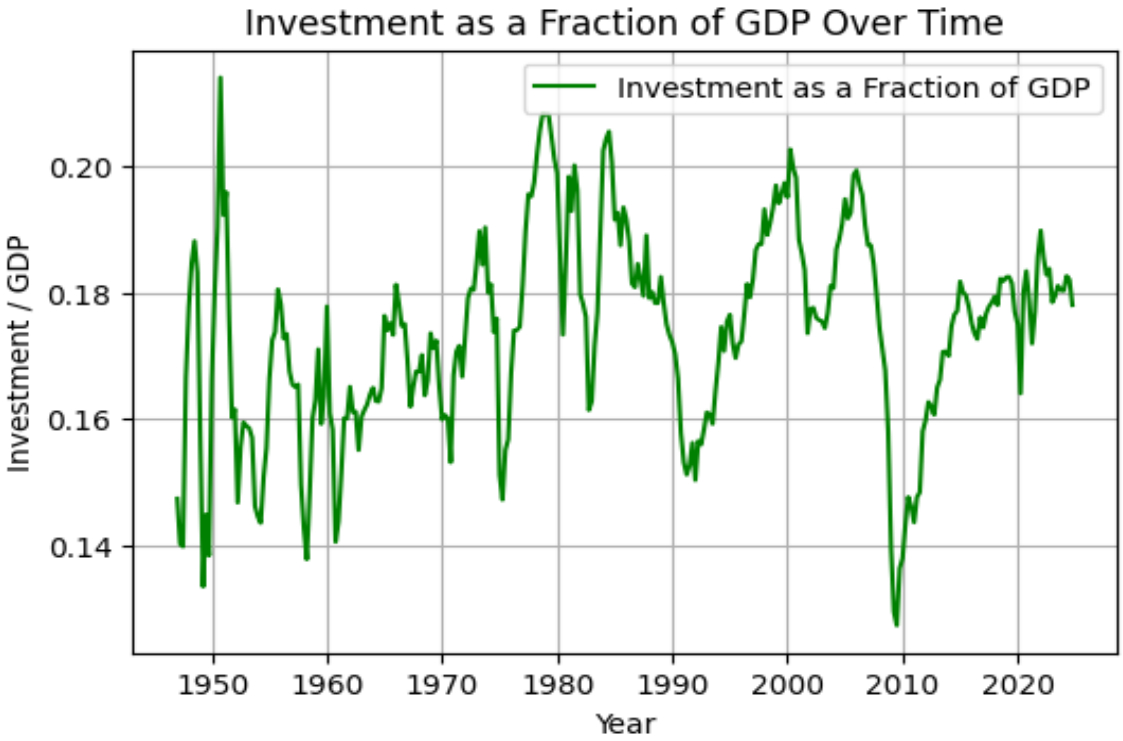
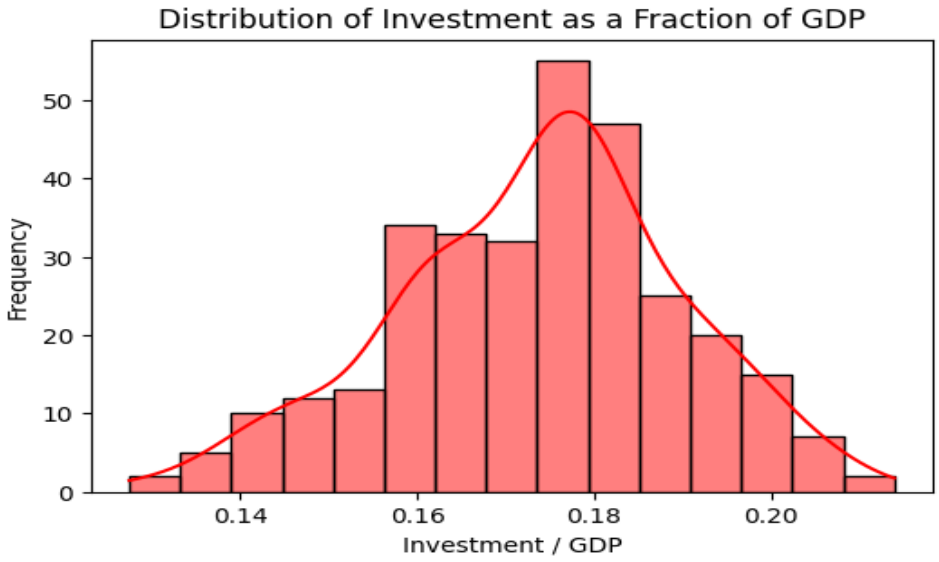


Figure 7: Investment as a Fraction of GDP Over Time (United States)

The graph shows the investment-to-GDP ratio in the U.S. from the late 1940s to 2023. Over this extended period, the ratio exhibits consistent fluctuations, typically ranging between 0.14 and 0.21. Peaks occurred around 1950, the late 1970s, and early 2000s, with notable dips during the early 1980s, the Great Recession (around 2009), and briefly during the COVID-19 pandemic.

Despite the volatility, the ratio appears to stabilize near 0.18 in recent years, suggesting a return to long-term average levels. The graph reflects how investment relative to GDP responds to broader economic cycles.



During Recession Period

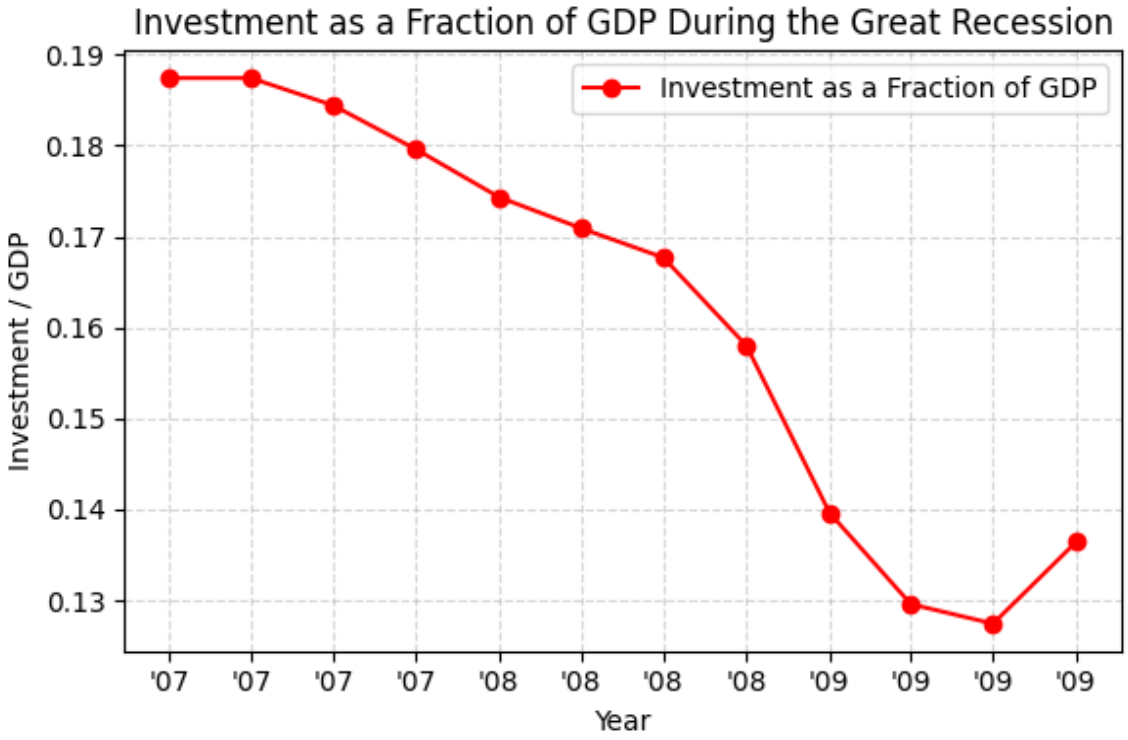


Figure 8: Investment/GDP during recession

The graph shows how investment as a part of the U.S. economy dropped during the Great Recession from 2007 to 2009. At the start of 2007, investment made up about 19 percent of GDP. But as the recession got worse, that number fell quickly,dropping to around 13 percent by early 2009. That's a big decline, showing how hard the economy was hit. Near the end of 2009, there's a small increase, meaning investment started to recover a bit.

1.3 Government spending (all levels) as a fraction of GDP

Government spending as a fraction of GDP shows how much money all levels of government spend compared to the size of the overall economy. It helps us understand how big a role the government plays in economic activity.

$$\text{Government Spending as \% of GDP} = \left(\frac{\text{Total Government Spending}}{\text{GDP}}\right) \times 100 \qquad (3)$$

When this percentage is high, it means the government is a large part of the economy. When it's lower, the private sector plays a bigger role.

Country: India

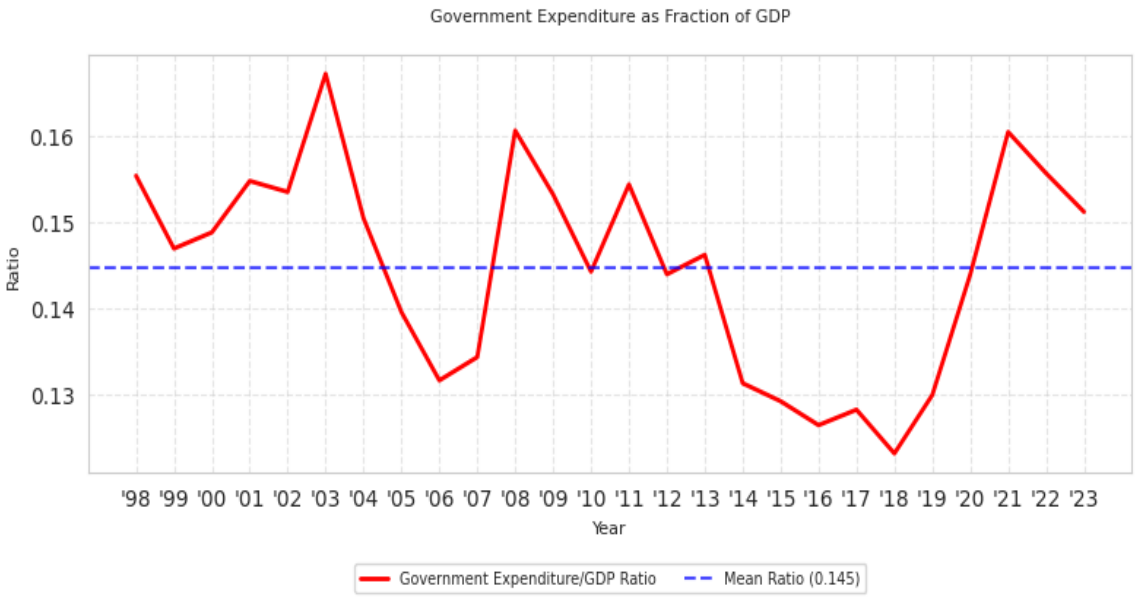


Figure 9: Government Expenditure as a Fraction of GDP (India)

The graph shows how much the government spent compared to the size of the it's economy from 1998 to 2023. The red line tracks the government spending-to-GDP ratio, while the blue dashed line shows the average level over time—about 14.5

Government spending rose above average during years like 2003, 2009, and 2021—often during or after big events like recessions or emergencies. In contrast, it dipped below average between 2015 and 2019. Overall, the graph shows that government spending changes from year to year, depending on economic conditions and national needs.

During Recession Period

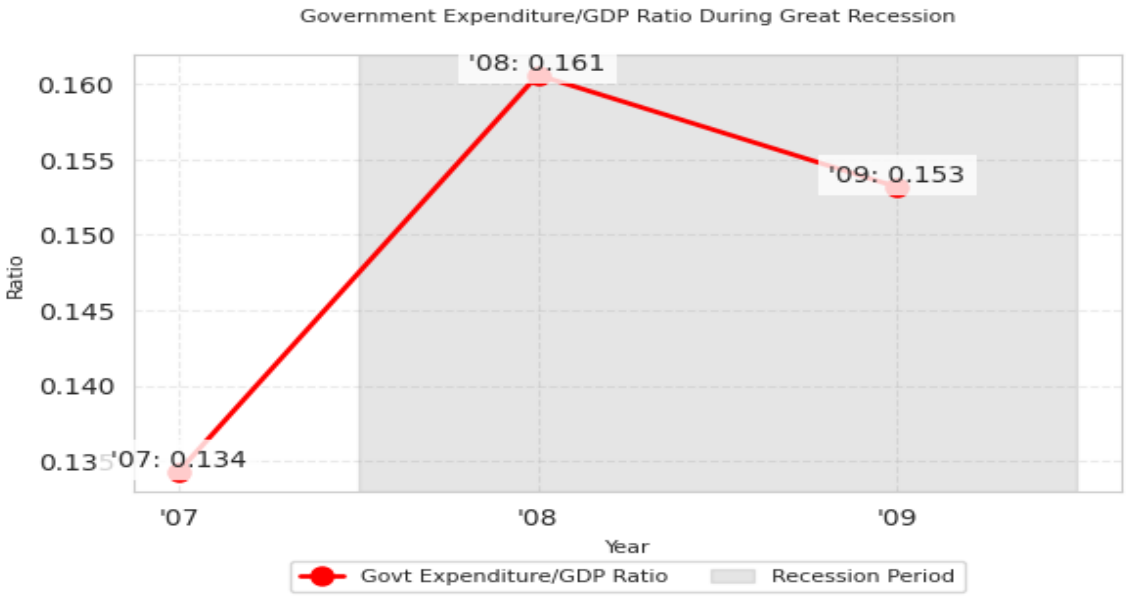


Figure 10: Gov Expenditure/GDP during recession

This graph shows how much the government spent as a share of the economy during the Great Recession (2007–2009). In 2007, government spending was about 13.4 percent of GDP. As the recession hit hard, that number jumped to 16.1 percent in 2008, likely due to efforts to support the economy. In 2009, it dropped a bit to 15.3 percent, but spending still remained high compared to before the crisis.

The shaded grey area marks the recession period, showing how government spending increased during tough economic times to help stabilize the economy.

Country: USA

Figure 11: Government Spending as a Fraction of GDP Over Time (United States)

The graph shows how much the government has spent compared to the size of the economy from 1960 to 2023. As we can see that government spending as a share of GDP rises during hard times,like during the 2008 financial crisis and especially during the COVID-19 pandemic around 2020, where there's a huge spike. That's because the government stepped in with major stimulus and relief programs.

While the ratio goes up and down over time, there's a general pattern of spending increasing during emergencies and then slowly falling afterward. This helps show how the government supports the economy during big national challenges.

During Recession Period

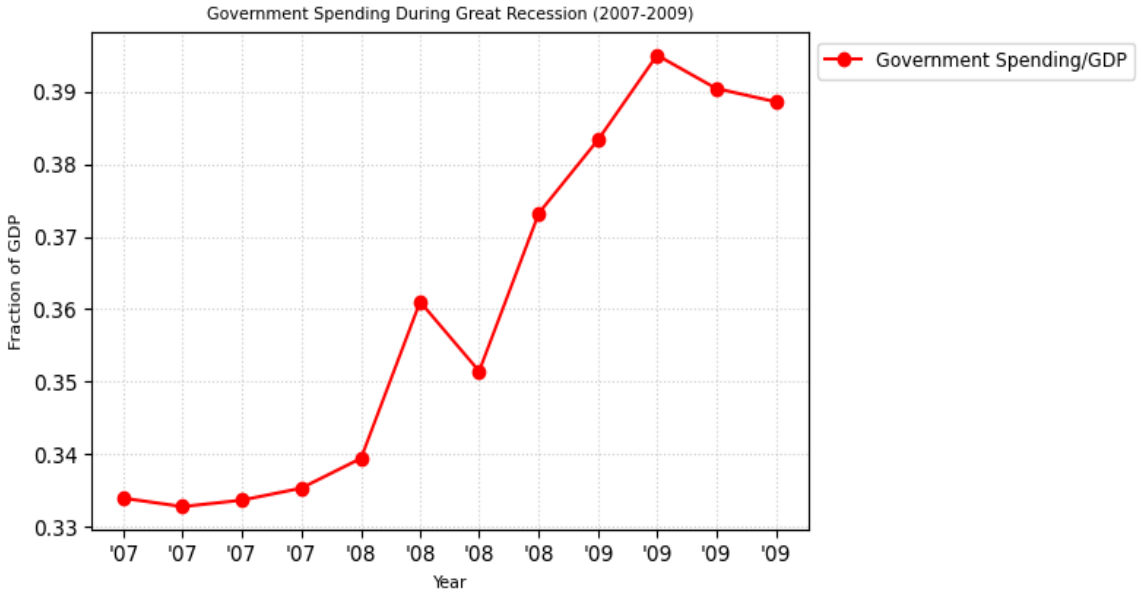


Figure 12: Government Spending During the Great Recession (2007–2009)

The graph shows how government spending changed during the Great Recession from 2007 to 2009. At the start of the recession, spending was around 33 percent of GDP. As the economy worsened, the government increased spending to help businesses, support jobs, and boost the economy.

By mid-2009, spending rose to over 39 percent of GDP,a big jump. This rise shows how the government stepped in to respond to the crisis. After that, spending stayed high but leveled off slightly.

Overall, the graph highlights how the government plays a bigger role during economic downturns to keep the economy stable.

1.4 Payments to labor as a share of GDP

Payments to labor as a share of GDP tell us how much of a country's income goes to workers through wages, salaries, and benefits. It helps to show how fairly income is shared between workers and businesses.

$$\text{Labor Share} = \left(\frac{\text{Total Labor Compensation}}{\text{GDP}} \right) \times 100 \tag{4}$$

So, if workers earn $60 out of every $100 the country makes, the labor share is 60%. A higher labor share means more of the economy is going to workers. A falling share could point to rising inequality or shifts toward profits over wages.

Country: India

Figure 13: Labour Share of GDP

The graph shows the trend of labor's share in India's GDP over time, with a mean value of 49.3 prcentage. As we can see that the labour share has grown over the years in India. It shows that the people are earning more as compared to previous years. The trend also suggests fluctuations in the percentage of GDP allocated to labor compensation.

During Recession Period

Figure 14: Labour Share of GDP during recession

This graph shows how the labor share fluctuates during the Great Recession (2007–2009). In 2007, the share was about 53 percentage . As the recession hit hard, that number jumped to 74 percent in 2008, likely due to efforts to support the economy. The shaded grey area marks the recession period, showing how during tough economic times it changed to help stabilize the economy.

Country: USA

Figure 15: Labour Share of GDP

The graph shows the trend of labor payments as a share of GDP from 1981 to around 2023. The share fluctuated around 41–44 percent until the early 2000s, peaking near 44 percent in 2001. It then declined steadily, bottoming out below 39 percent after 2010. Despite slight recoveries, the share has remained lower in recent years, suggesting a long-term decline in labor's share of economic output.

During Recession Period

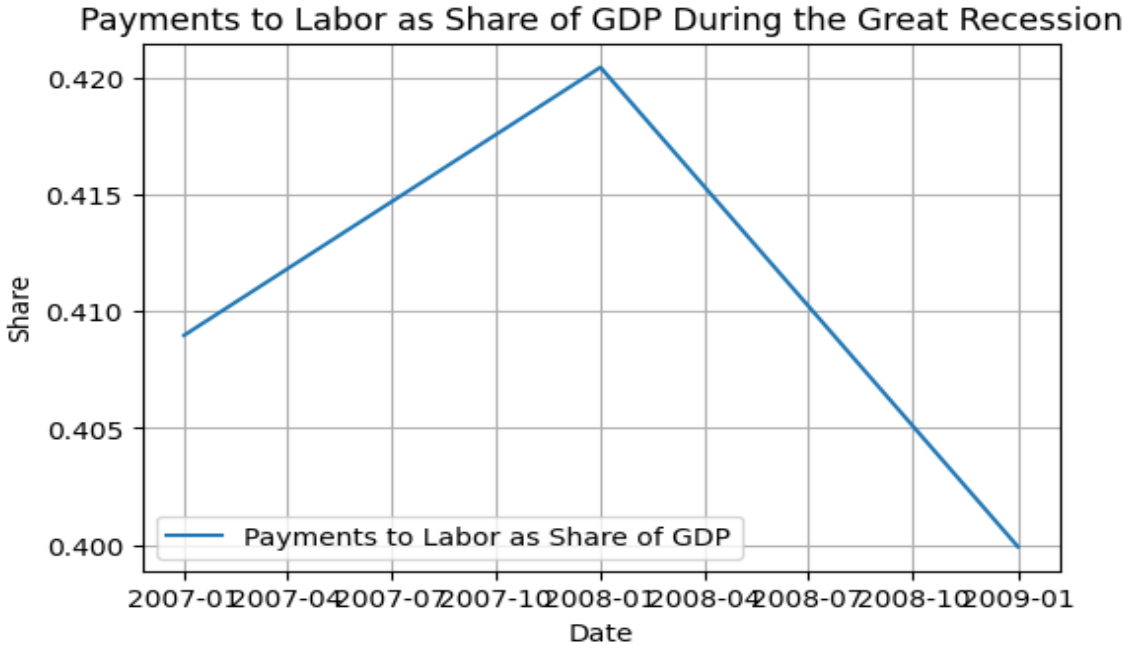


Figure 16: Labour Share of GDP during recession

The graph shows how labour share payment rose during the Great Recession from 2007 to 2009. At the start of 2007, it was nearly at 40.8 percent. But as the recession got worse, that number rose quickly,peaking to around 42 percent by early 2008. Then again we see a big decline, showing how hard the economy was hit. Near the end of 2009, there's a fall, meaning labour payment started to reduce again.

1.5 Payments to capital as a share of GDP

Payments to capital as a share of GDP measure how much of a country's total income goes to capital owners—like businesses, investors, and landlords. This includes profits, interest, and rents. It shows how income is divided between capital and labor in the economy.

$$\text{Capital Share} = \left(\frac{\text{Capital Income}}{\text{GDP}} \right) \times 100 \tag{5}$$

For example, if businesses earn $40 out of every $100 of GDP, the capital share is 40%.

A rising capital share may signal that more income is going to profits rather than wages, which could point to growing inequality or shifts in how the economy is structured.

Country: India

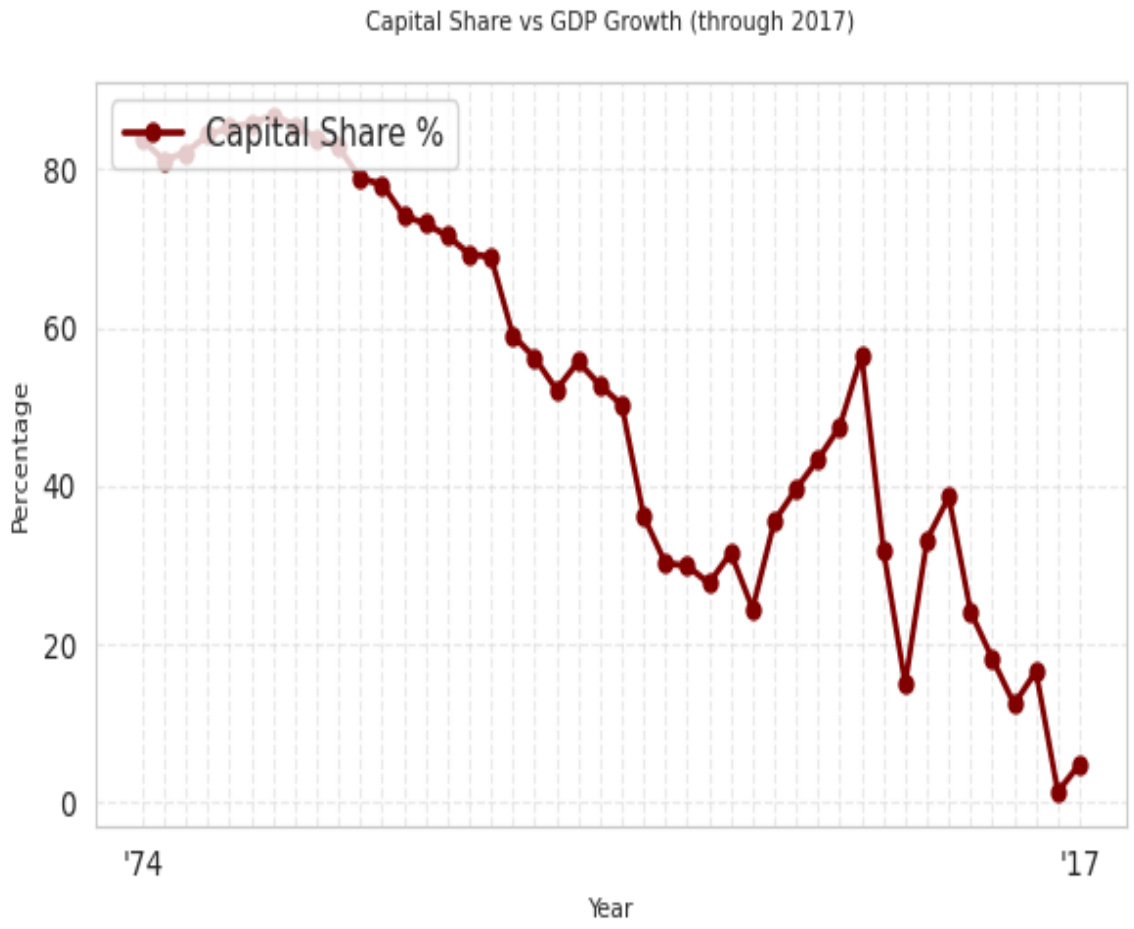


Figure 17: Capital Share of GDP

The graph shows the trend of capital payments as a share of GDP from 1974 to around 2017. The share fluctuated around 41–46 percent until the early 2000s, peaking near 57 percent in 2004. It then declined steadily, bottoming out below 18 percent after

2010. Despite slight recoveries, the share has remained lower in recent years, suggesting a long-term decline in capital's share of economic output.

During Recession Period

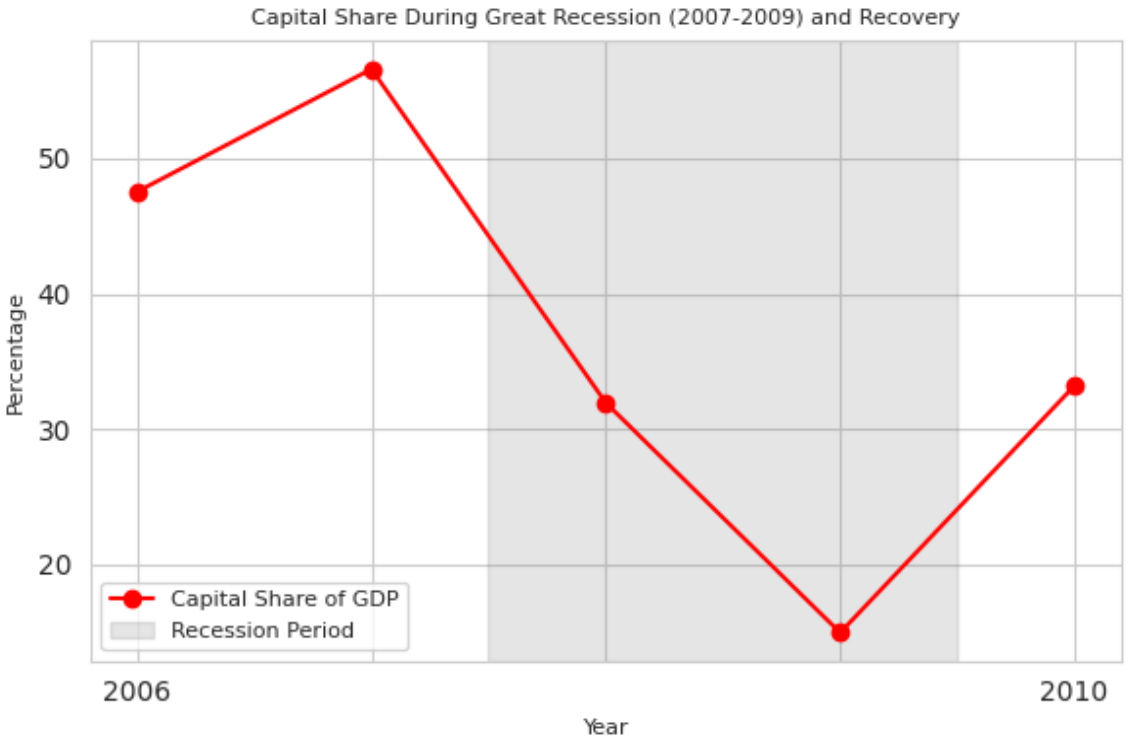


Figure 18: Labour Share of GDP during recession

The capital share peaked before the recession. It was nearly at 54 percent,and then it dropped sharply during it and fell to nealy less than 10 percent, and then began to recover afterward.

The overall pattern is a boom–bust–recovery cycle.

Country: USA

The graph shows the trend of capital payments as a share of GDP in the U.S. from 1981 to 2023. Capital's share gradually increased from around 55 percent in the 1980s to nearly 60 percent by 2010. Despite some fluctuations, the overall trend remains upward. This suggests a shift in economic returns from labor to capital, highlighting growing capital income dominance in the distribution of national output over time.

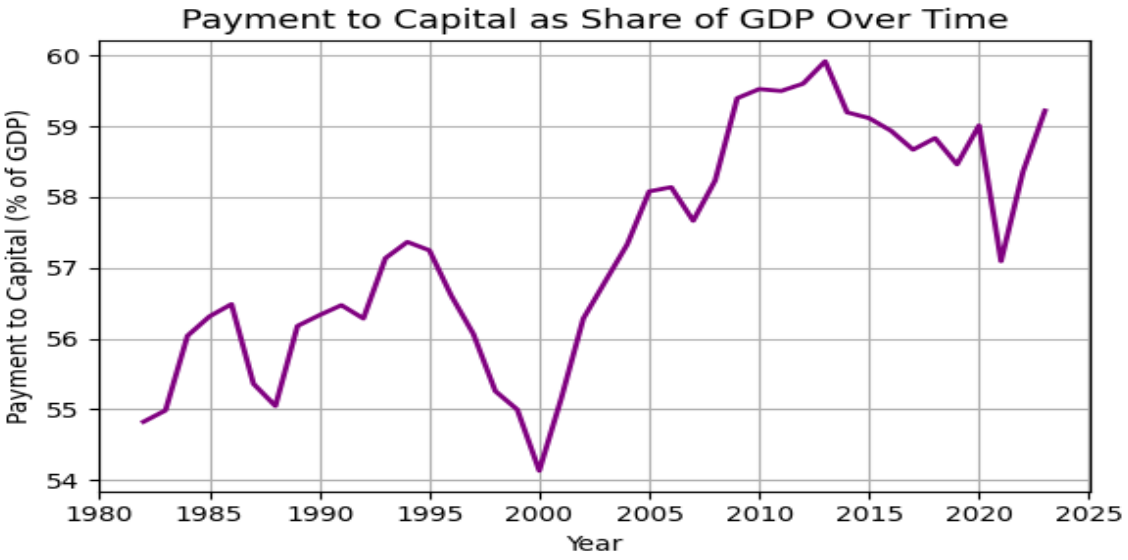


Figure 19: Capital Share of GDP

During Recession Period

Figure 20: Capital Share of GDP during recession

The graph shows the capital share of GDP in the U.S. during the Great Recession (2007–2009). Despite the economic downturn, capital's share increased steadily from around 57.7 percent in early 2007 to over 59.3percent by early 2009. This trend indicates that capital income remained resilient—and even grew—as a portion of GDP, highlighting the unequal effects of the recession between labor and capital.

1.6 Growth rate of output per capita

The growth rate of output per capita shows how much the average income or production per person in a country is increasing over time. It's a key measure of economic progress and helps us understand how living standards are changing.

$$\text{Growth Rate of Output per Capita} = \left(\frac{\text{Real GDP per Capita in Year 2} - \text{Year 1}}{\text{Year 1}}\right) \times 100 \tag{6}$$

For example, if GDP per person rises from \$50,00 to \$52,00, the growth rate is 4%.

A higher growth rate usually means better productivity, more income, and improved quality of life for people over time.

Country: India

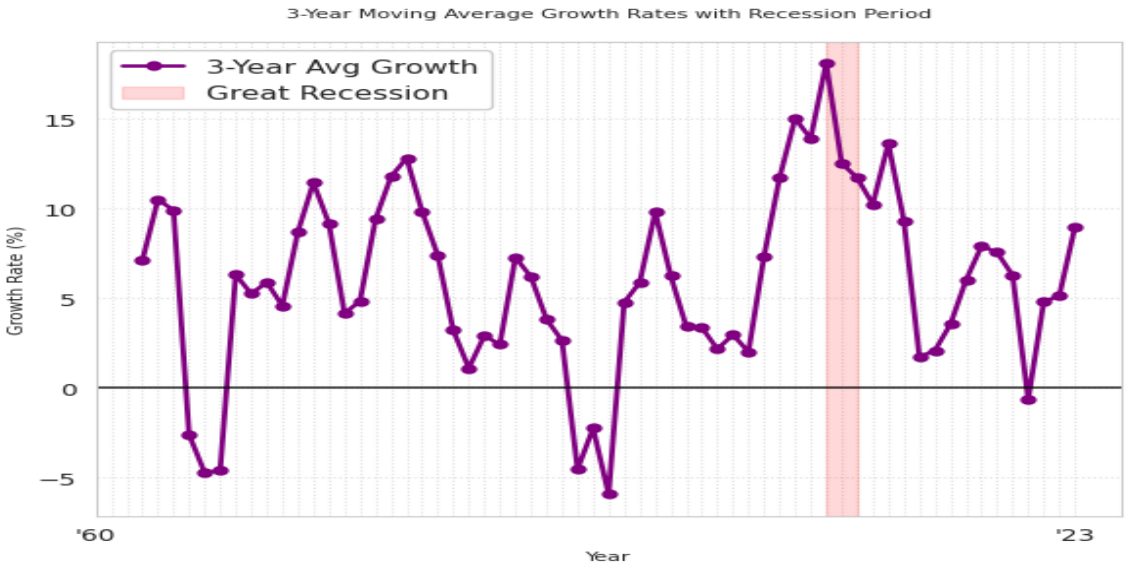


Figure 21: Growth rate of Output

The graph displays the 3-year moving average growth rates in the from 1960 to 2023. The line, indicates how the growth rate has fluctuated over time, with noticeable peaks in the 1980s and early 2000s, and significant declines in the early 1980s and around the 2008 financial crisis. The shaded red region highlights the Great Recession.

During Recession Period During the Great Recession (2007–2009), the growth rate sharply declined, dropping from a peak near 18 percent to below 5 percent, signaling a substantial economic slowdown during this period.

Country: USA

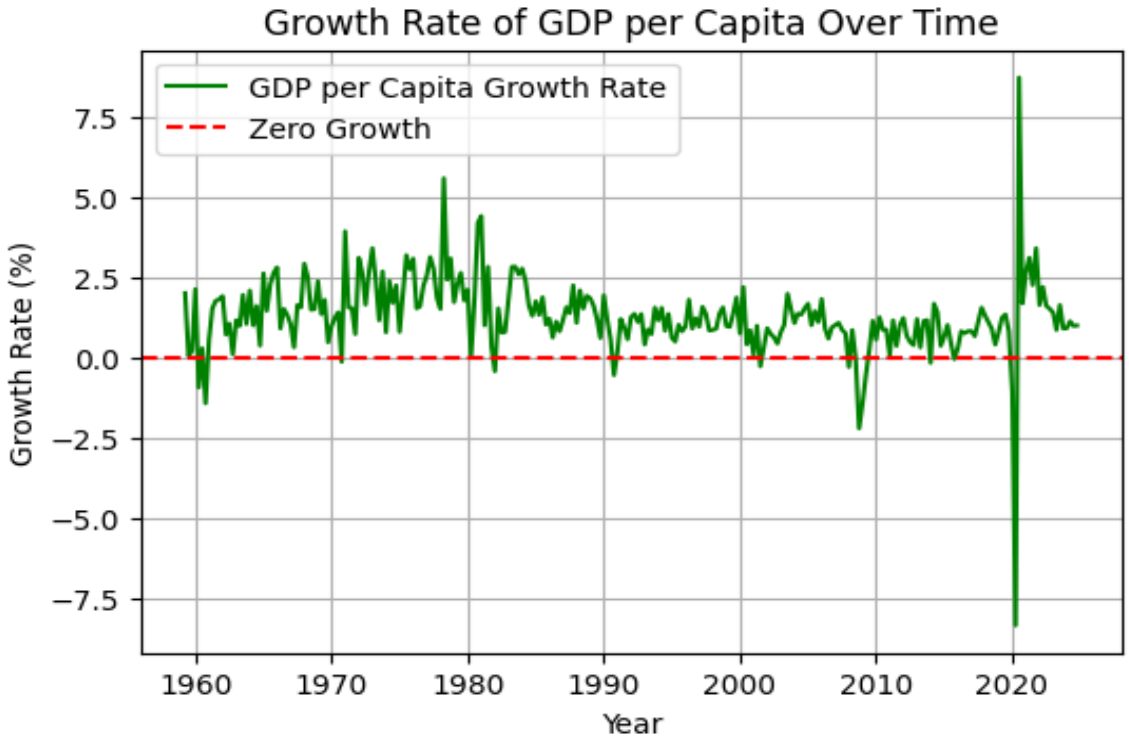


Figure 22: Capital Share of GDP

The graph shows the annual growth rate of GDP per capita in the U.S. from 1960 to 2023. Overall, growth rates were higher and more volatile in the earlier decades, particularly in the 1960s and 70s, but gradually stabilized at lower levels in more recent years. Notably, the growth rate occasionally dips below the zero-growth line, indicating contractions during economic crises.

During Recession Period

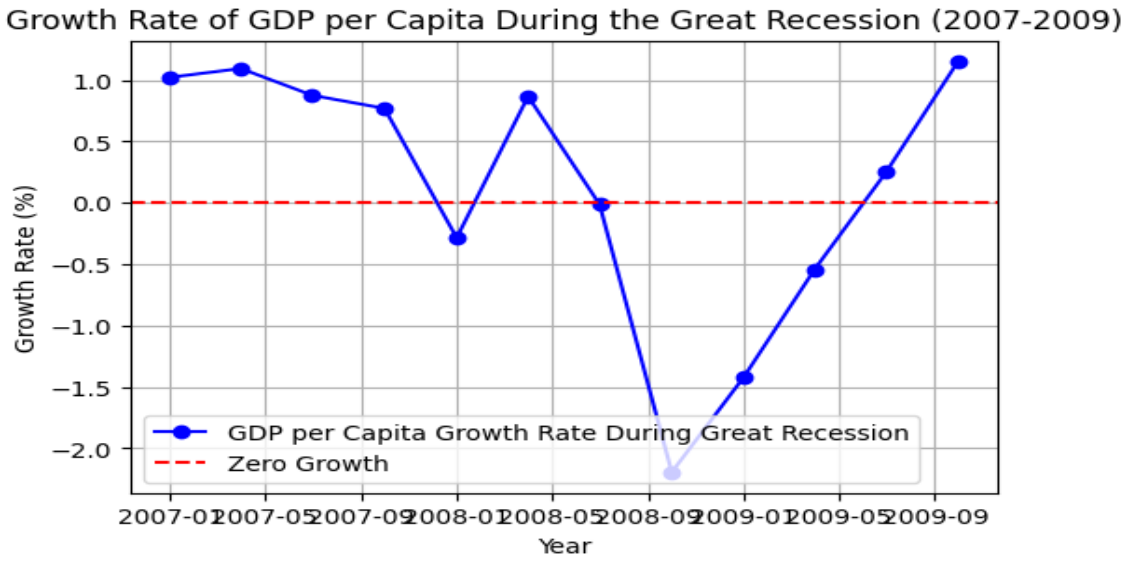


Figure 23: Growth rate of Output

The graph shows how the the quarterly GDP per capita grew during the Great Recession (2007–2009). It starts with moderate positive growth in early 2007, but by mid-2008, the rate drops sharply, hitting a low of around -2 percent in early 2009, signaling the recession's depth but then again it rose and reached nearly above 1 percent indicating the beginning of economic stabilization.

1.7 Growth rate of consumption per capita

The growth rate of consumption per capita measures how much the average spending by each person increases over time. It shows if people are able to buy more goods and services, which often reflects rising incomes and living standards.

$$\text{Growth Rate of Consumption per Capita} = \left(\frac{\text{Consumption per Capita in Year 2} - \text{Year 1}}{\text{Year 1}}\right) \times 100 \tag{7}$$

For example, if average consumption grows from $30,000 to $31,500, the growth rate is 5%.

A higher growth rate means people are spending more, which can signal a stronger economy and better quality of life.

Country: India

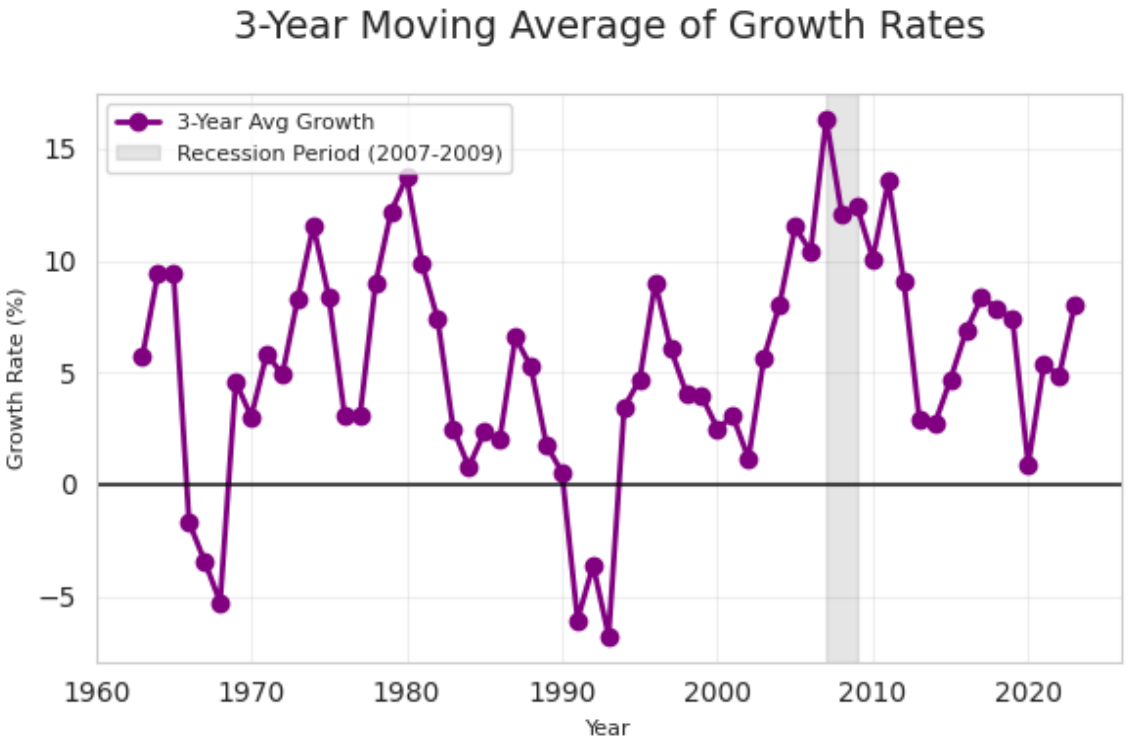


Figure 24: Growth rate of Consumption

This graph shows the 3-year moving average of growth rates from 1960 to 2023. The growth rate has fluctuated significantly, with high peaks in the 1980s and 2000s, and notable downturns in the early 1990s and late 2000s. But after the recession it has heen above 0 percent and in recent time it has rose only.

During Recession Period

During the Great Recession, the moving average dropped sharply, reflecting the eco-

nomic contraction, but then rebounded strongly in the following years.It dropped from nearly 17 percent to nearly 10 percent and then again rose after the recession.

Country: USA

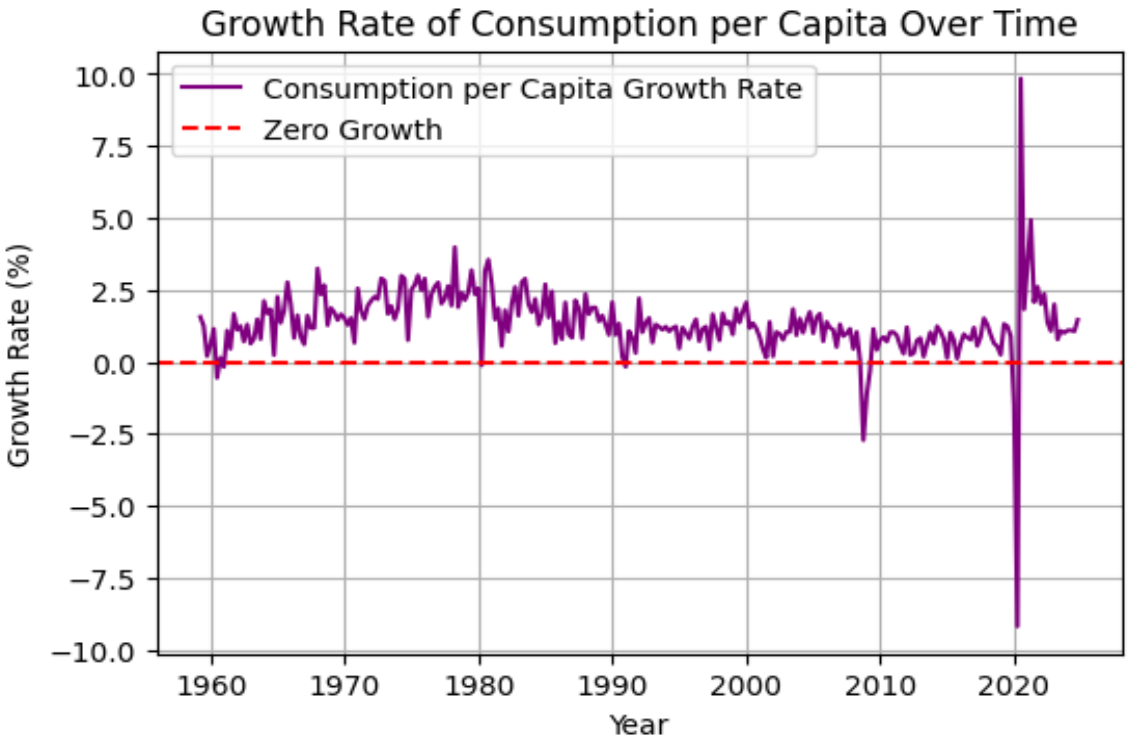


Figure 25: Growth rate of Consumption

The graph shows the annual growth rate of consumption per capita in the U.S. from 1960 to 2023. From the 1960s to the 1980s, growth rates were relatively higher and more variable, peaking around 4 percent. Over time, growth stabilized at lower levels, averaging around 1–2 percent in recent decades and was nearly at 1.5 percent.

During Recession Period

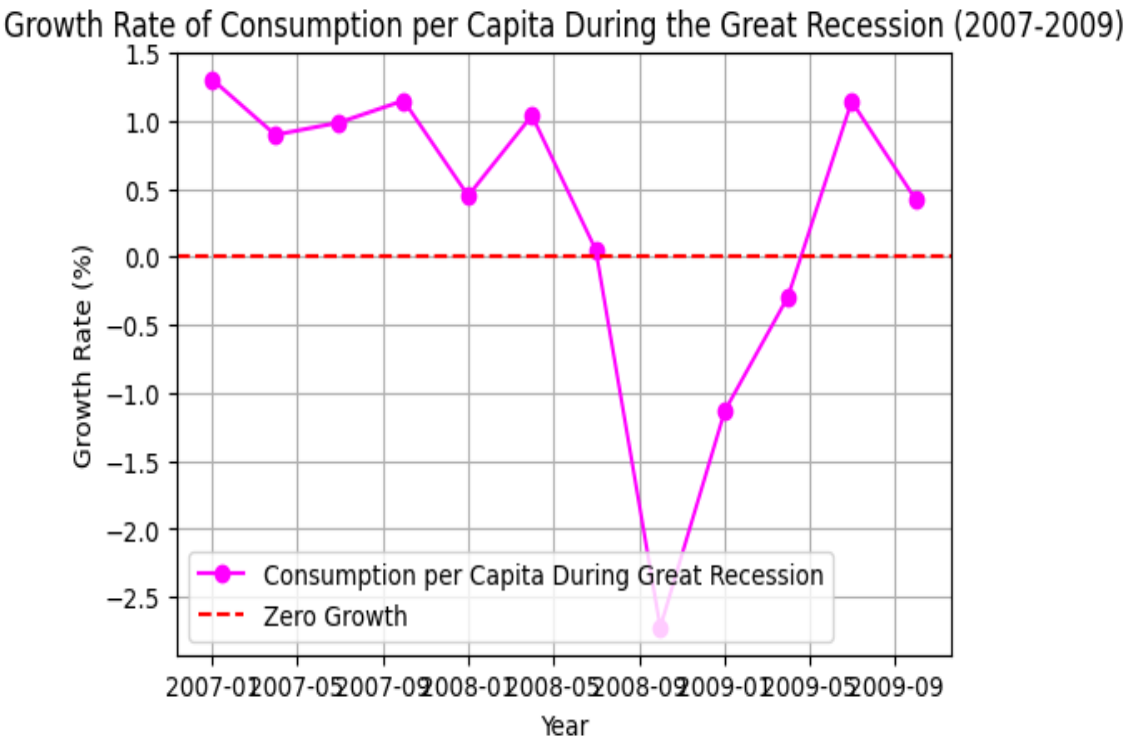


Figure 26: Growth rate of Consumption

This graph shows the growth rate of consumption per capita in the U.S. during the Great Recession (2007–2009). At the beginning of the period, growth remained modestly positive. However, by mid-2008, the rate began to decline significantly, hitting a low of nearly -2.7 percent in late 2008, indicating a sharp drop in consumer spending. This decline reflects the economic strain and uncertainty households faced during the crisis.

By mid-to-late 2009, the growth rate began recovering, returning to positive levels as conditions improved.

1.8 Civilian unemployment rate

The civilian unemployment rate is a key measure used to understand the health of a country's labor market. It shows the percentage of people in the civilian labor force who are not employed but are actively looking for work. This rate only includes people aged 16 and older who are either working or actively job hunting—it does not count students, retirees, or those not seeking employment.

$$\text{Unemployment Rate} = \left(\frac{\text{Unemployed People}}{\text{Civilian Labor Force}} \right) \times 100 \tag{8}$$

It helps us to understand how well the economy is providing jobs. A high unemployment rate often signals economic trouble, while a low rate suggests that most people who want jobs are able to find them. It also influences decisions on interest rates, public policy, and social support programs.

Country: India

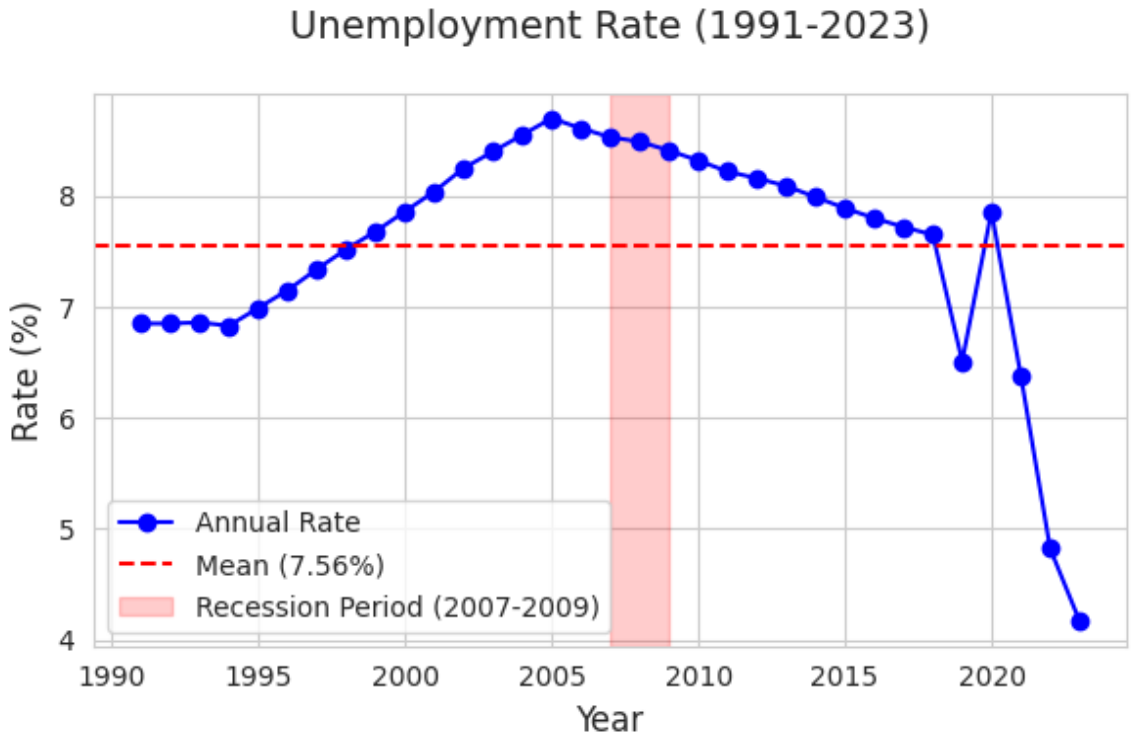


Figure 27: Unemployment Rate

The graph shows the unemployment rate from 1991 to 2023. Prior to the recession, unemployment was high, peaking around 2005–2006. It was nearly at 9 percent and during the recession also, the rate remained elevated, reflecting widespread job losses and economic uncertainty. Post-recession, unemployment gradually declined but remained above the mean rate of 7.56 percent until around 2015 at nearly 7.6 percent.

The COVID-19 pandemic caused a sharp spike in 2020, followed by a rapid decline in subsequent years. Overall, the graph emphasizes how economic crises significantly impact labor markets, often with prolonged recovery periods following recessions or unexpected shocks.

Country: USA

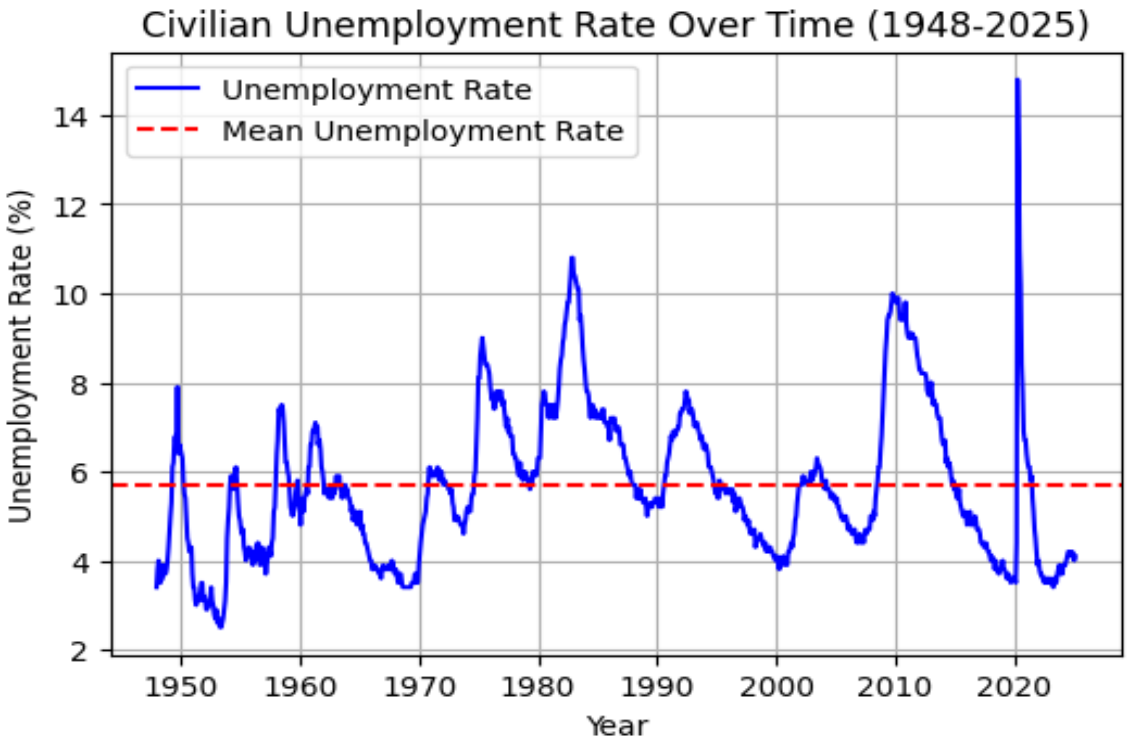


Figure 28: Unemployment Rate

The graph shows the U.S. Civilian Unemployment Rate from 1948 to 2025, with a mean rate of nearly 5.9 percent. Historically, unemployment fluctuates with economic cycles—peaking during recessions like the 1970s oil crisis, and the 2008 Great Recession, then declining during recoveries.

Long-term trends show unemployment rising in economic downturns but generally returning near the mean over time, reflecting labor market resilience. However, structural changes (automation, gig work) may be altering recovery patterns.

During Recession Period

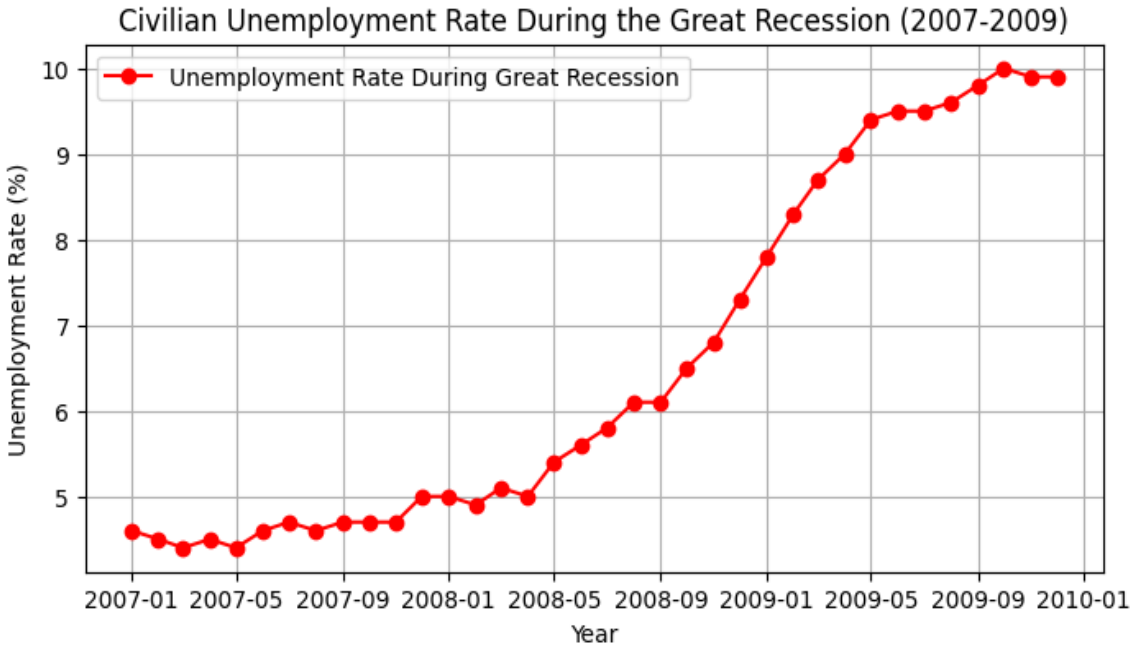


Figure 29: Unemployment Rate during Recession

The 2007–2009 financial crisis caused a sharp spike, with unemployment remaining elevated for years before gradually improving. The COVID-19 pandemic (2020) triggered another dramatic surge, followed by a swift recovery due to stimulus measures and labor market adjustments.

1.9 Average duration of unemployment

The average duration of unemployment measures the mean length of time individuals remain unemployed while actively seeking work. It is calculated by summing all unemployed individuals' jobless periods and dividing by the total number of unemployed.

$$\text{Average Duration} = \frac{\sum(\text{Individual Unemployment Durations})}{\text{Total Unemployed}} \tag{9}$$

Country: India

Alternate Findings: Employment to Population ratio over time

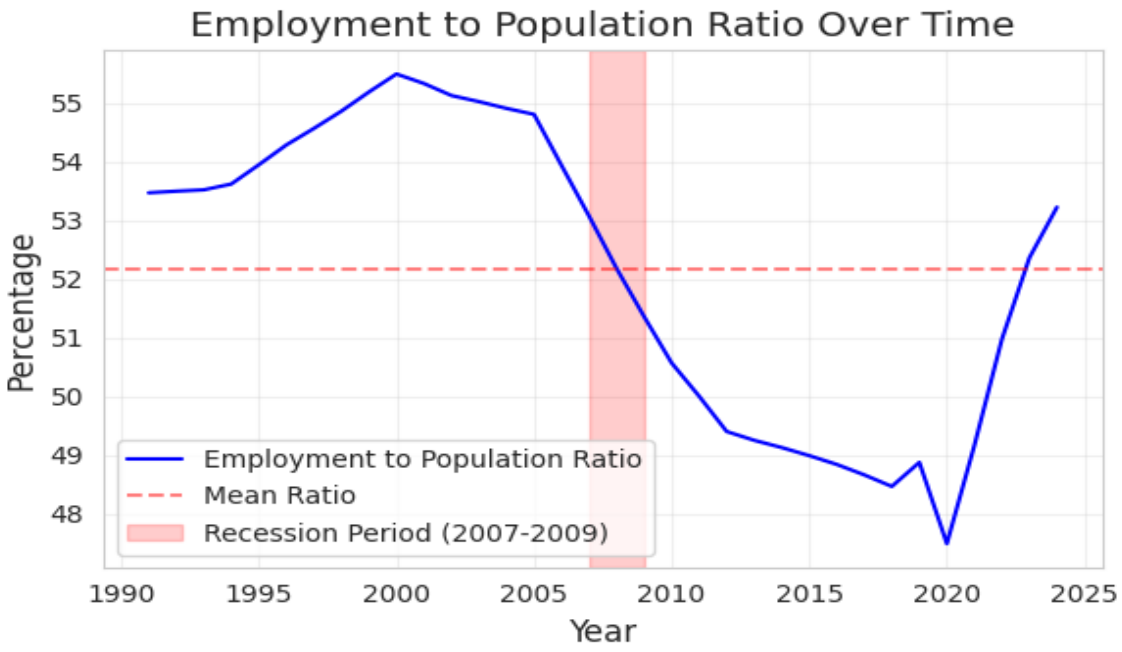


Figure 30: Employment to Population ratio over time

The graph shows the U.S. Employment to Population Ratio from 1990 to 2025, alongside its mean value and the 2007–2009 recession period.

Over this span, the ratio generally trends upward, rising from 53 percent in 1990 to 52 percent in 2025, reflecting broader labor market participation.

Notably, the Great Recession (2007–2009) caused a temporary dip, as job losses reduced employment despite population growth. However, the ratio rebounded post-recession, suggesting economic recovery and possibly demographic shifts.

The steady climb implies improving job opportunities or changing workforce dynamics, such as higher female participation or delayed retirements.

Yet, structural factors (automation, education gaps) may limit further gains. The graph highlights how economic shocks disrupt employment trends, but long-term forces often dominate.

Country: USA

Figure 31: Duration of Unemployment Over time

The graph shows the Average Duration of Unemployment from 1948 to 2025, with a mean duration at 17 weeks. Historically, the duration spikes during economic downturns, such as the 1970s oil crises, the early 1980s recessions, and notably during the Great Recession (2007–2009), when joblessness became more prolonged due to scarce opportunities.

The COVID-19 pandemic (2020) also caused a sharp rise, as temporary layoffs and sectoral collapses extended job searches. However, recoveries typically reduce duration over time, as seen post-2010.

During Recession Period

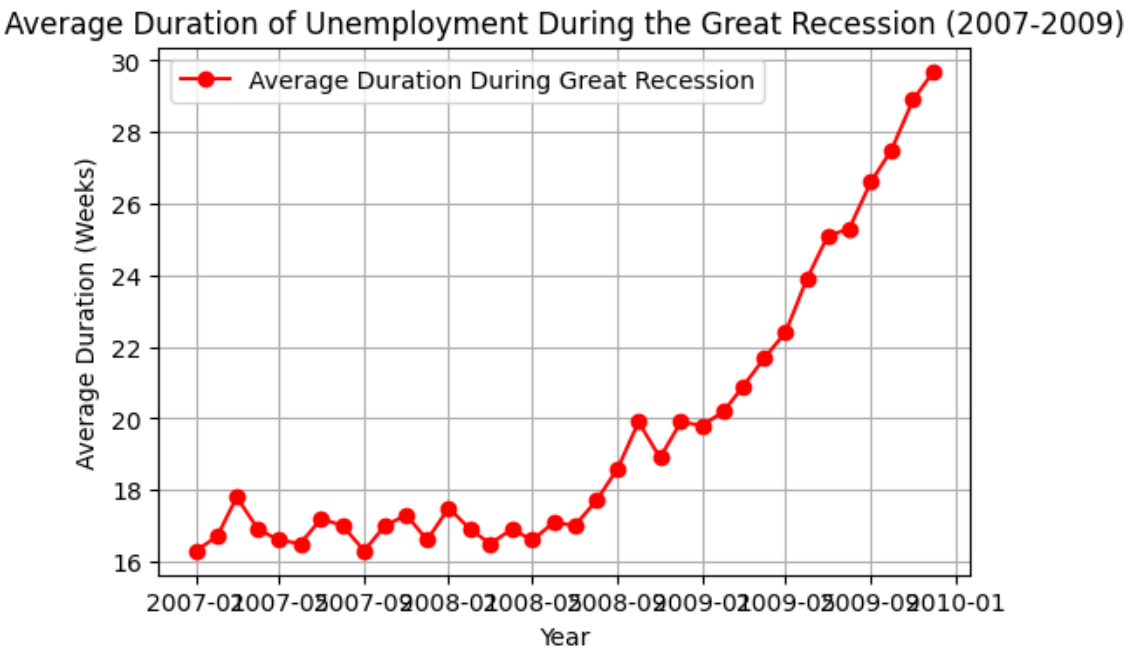


Figure 32: Duration of Unemployment during Recession

The graph shows the average duration of unemployment during the Great Recession (2007–2009) and its immediate aftermath. At the onset of the crisis in early 2007, the average duration was relatively low (around 16–18 weeks), reflecting stable labor market conditions. However, as the recession intensified, the duration surged sharply, peaking at nearly 30 weeks by mid-2009—the highest level in decades.

This increase highlights the severity of the downturn, as mass layoffs and hiring freezes left job seekers stranded for longer periods. Even after the recession officially ended in mid-2009, the average duration remained elevated well into 2010, illustrating the slow and uneven nature of labor market recoveries

1.10 Inflation

Inflation is an increase in the level of prices of the goods and services that households buy. It is measured as the rate of change of those prices. Typically, prices rise over time, but prices can also fall (a situation called deflation).

The most well-known indicator of inflation is the Consumer Price Index (CPI), which measures the percentage change in the price of a basket of goods and services consumed by households.

$$\text{Inflation Rate} = \left(\frac{\text{CPI}_{\text{current}} - \text{CPI}_{\text{previous}}}{\text{CPI}_{\text{previous}}} \right) \times 100 \tag{10}$$

Country: India

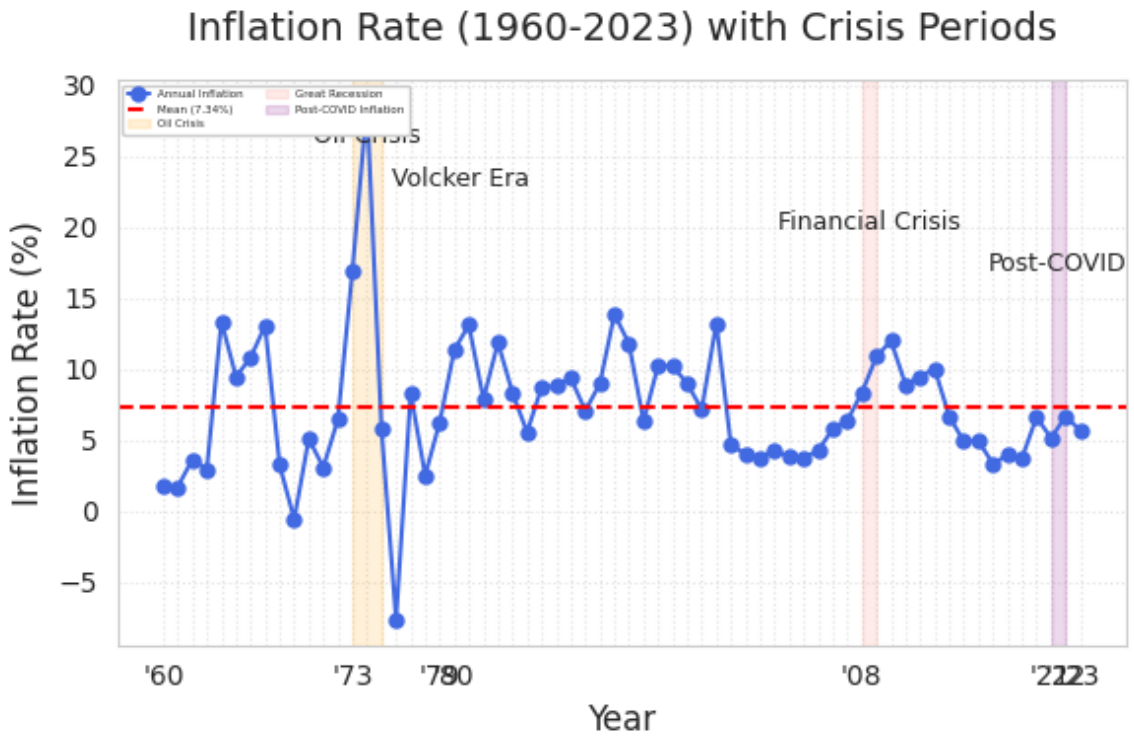


Figure 33: Inflation Rate

The graph tracks the Inflation Rate from 1960 to 2023, highlighting three major crisis periods:

The Volcker Era (late 1970s-early 1980s),

The 2008 Financial Crisis, and

The Post-COVID period (2021-2023).

In the 1970s, inflation surged to double-digit peaks due to oil shocks and loose monetary policy, prompting to aggressive rate hikes. By the mid-1980s, inflation was tamed but at the cost of a severe recession.

The 2008 Financial Crisis saw inflation briefly turn negative (deflation) as demand collapsed, while the Post-COVID era brought a sharp rebound, with inflation hitting 40-

year highs in 2022 (over 8 percent) due to supply chain disruptions and stimulus-driven demand.

Country: USA

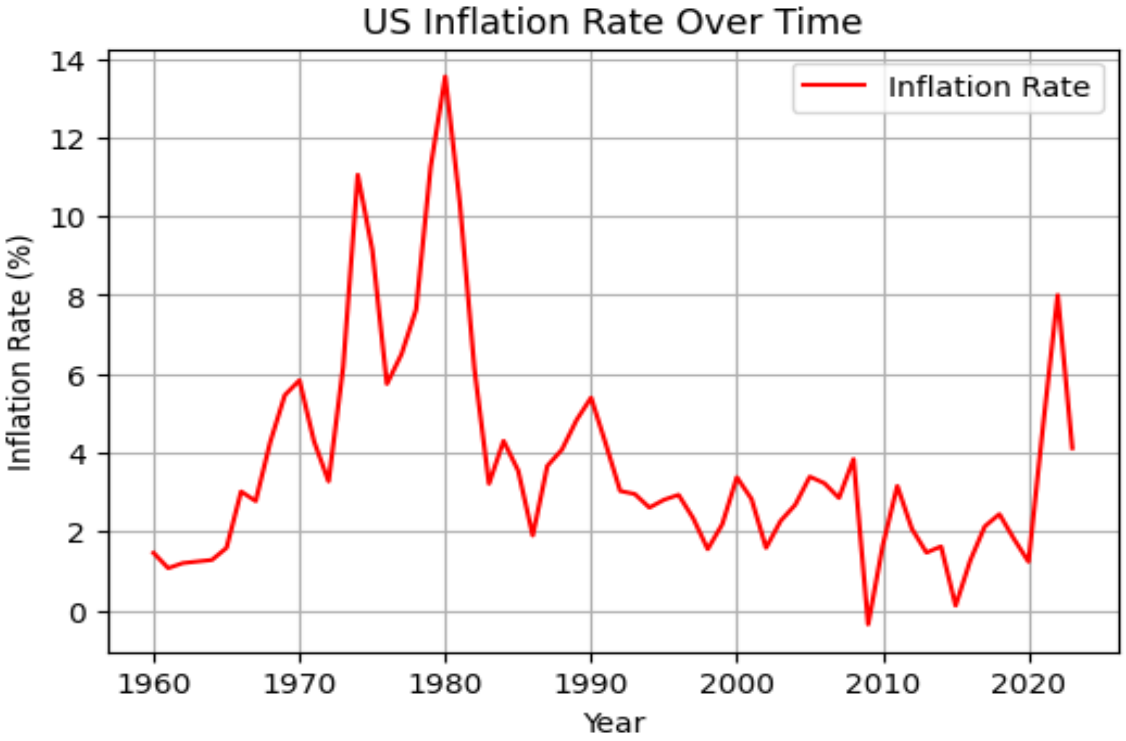


Figure 34: Inflation Rate

The graph shows the U.S. Inflation Rate from 1960 to 2022, capturing key economic shifts. Inflation remained low in the early 1960s but surged during the 1970s oil crises, peaking near 15 percent due to energy shocks and loose monetary policy. The Volcker-era rate hikes (early 1980s) tamed inflation but triggered a recession. By the 1990s–2000s, inflation stabilized at 2–4 percent, reflecting improved Fed policies and globalization.

The 2008 crisis briefly caused deflation before modest recovery. The trend highlights how external shocks and policy choices shape price stability, with high inflation often requiring painful corrections.

During Recession Period

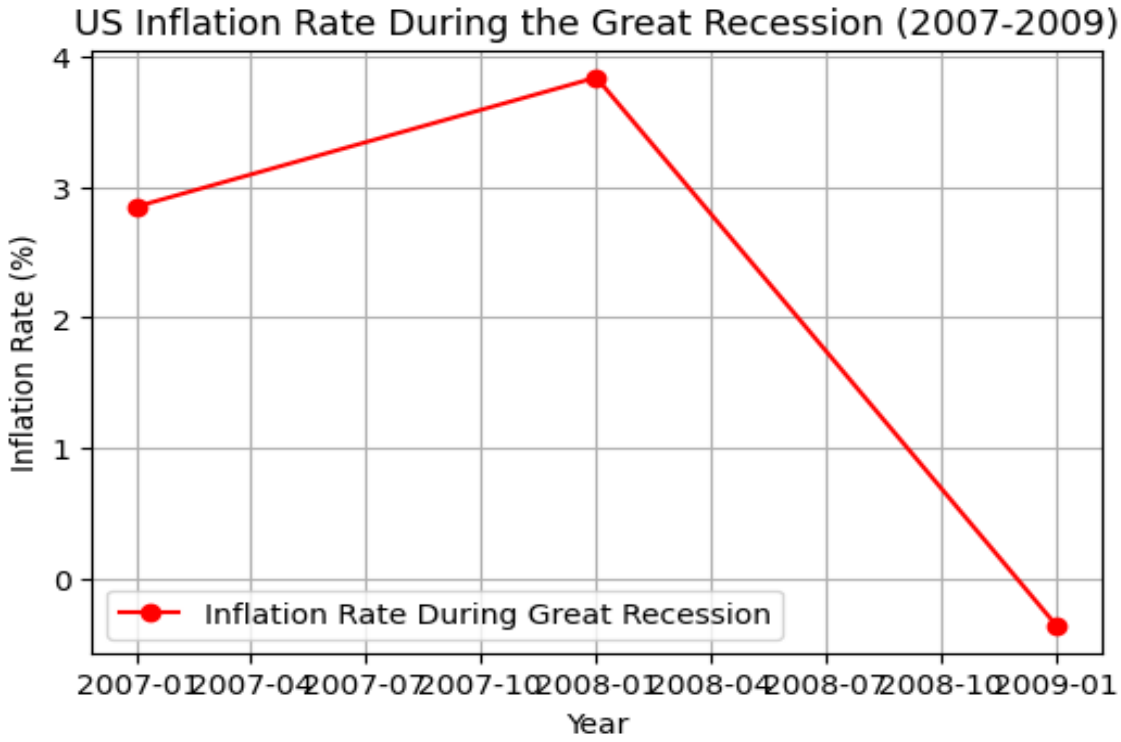


Figure 35: Inflation Rate during Recession

The graph depicts the U.S. Inflation Rate during the Great Recession (2007–2009), revealing how the financial crisis impacted price stability. In early 2007, inflation hovered around 2–3 percent, near the Federal Reserve's target. However, as the crisis intensified in 2008, inflation spiked briefly to 3.9 percent (mid-2008) due to soaring oil and commodity prices.

By late 2008, the collapse of Lehman Brothers and the ensuing credit crunch triggered a rapid deflationary swing, with inflation plummeting to -2 percent by late 2009—the first negative reading since the 1950s.

The Fed responded with aggressive rate cuts and quantitative easing to avert a deflationary spiral. The graph highlights how financial crises can destabilize prices, swinging from inflation to deflation risks within months.

Colab Notebooks

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