Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Trade and Finance

Bachelor Thesis

The relationship between GDP Growth and Unemployment rates. Testing the Okun's Law in the United States of America

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Faculty of Economics and Management

BACHELOR THESIS ASSIGNMENT

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Economics and Management

Thesis title

The relationship between GDP growth and unemployment. Testing the Okun's law in the USA

Objectives of thesis

Objectives of thesis: This article's primary goal is to 1) explain Okun's law's requirements and presumptions. 2) The economic growth of the USA over the previous 30 or 20 years in relation to Okun's law 3. The empirical research on examining Okun's law 4) Determine the appropriate coefficient and test Okun's rule in the USA over the previous 20 years using data on GDP per capita and unemployment that is currently available. 5) Using the first two chapters as a foundation, describe why the coefficient differs.

Methodology

The study will use a combination of quantitative and qualitative research methods. The quantitative analysis will involve statistical analysis of data to identify trends and patterns in the GDP, Economic growth, and unemployment rate of the USA. With the purpose of providing data on the fundamental factors influencing economic performance, the qualitative study will contain a review of the literature

The proposed extent of the thesis

40-50 pages

Keywords

Unemployment, Economic growth, USA, Okun's Law, Economic policy.

Recommended information sources

Al-Habees, M. A., & Rumman, M. A. (2012). The relationship between unemployment and economic growth in Jordan and some Arab countries. World Applied Sciences Journal, 18(5), 673-680.

Kreishan, F. M. (2011). Economic growth and unemployment: An empirical analysis. Journal of social sciences, 7(2), 228-231.

Mohseni, M., & Jouzaryan, F. (2016). Examining the effects of inflation and unemployment on economic growth in Iran (1996-2012). Procedia Economics and Finance, 36, 381-389.

Prachowny, M. F. (1993). Okun's law: theoretical foundations and revised estimates. The review of Economics and Statistics, 331-336.

Solow, R. (2000). Unemployment in the United States and in Europe-A Contrast and the Reasons (No. 231). CESifo working paper.

Expected date of thesis defence

2023/24 SS – PEF

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Electronic approval: 29. 3. 2023

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Declaration

I declare that I have worked on my bachelor thesis titled " The relationship between GDP Growth and Unemployment Rates. Testing the Okun’s Law in the United States of America " by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break any copyrights.

In Prague on 15.03.2024 _____

Acknowledgments

I would like to thank my supervisor doc. Ing. Inna Čábelková, Ph.D. for her essential help and useful advice that helped me to write the thesis.
Also, I would like to thank Ing. Tomáš Hlavsa, Ph.D for the great teaching of statistics lectures that significantly contributed to my thesis.
Indeed, I want to thank my parents and grandparents for their support

The relationship between GDP Growth and Unemployment. Testing the Okun's Law in the United States of America

Abstract

The thesis's main purpose is to test the applicability of Okun's relationship between the Real GDP Growth Rate and the Unemployment Rate in the United States of America. In the practical part, empirical analysis is based on the data for the last 30 years (1993-2022). Additionally, the goal is to investigate the trends of economic indicators and find their causes in the theoretical part.

The qualitative analysis focused on describing the key economic and political events that happened between 1993 and 2022 in the United States to understand the causes of the Real GDP Growth Rate and unemployment fluctuations. All economic activity such as state regulations, membership in international organizations, and trade relations that occurred during the study period are investigated in the theoretical part.

Quantitative data of GDP values and the Unemployment Rate of the USA was gathered from the World Development Indicators website. The GDP deflator is used to obtain the Real GDP Growth rate. The regression and correlation models were constructed in SAS OnDemand software. Microsoft Excel was applied to visualize time series.

As a result of the analysis in the case of the United States of America, the estimated model proved the main assumption of Okun's Law, which states the existence of a negative relation between Real GDP Growth and Unemployment Rate.

Keywords: Unemployment, Economic growth, USA, Okun's Law, Economic policy

Vztah mezi růstem HDP a nezaměstnaností. Testování Okunova Zákona ve Spojený Chstátech Amerických

Abstrakt

Hlavním cílem práce je ověřit platnost vztahu Okunova zákona mezi mírou růstu HDP a mírou nezaměstnanosti ve Spojených státech amerických. V praktické části je analýza výpočtu založena na údajích za posledních 30 let (1993-2022). V teoretické části je navíc cílem určit trendy ekonomických ukazatelů a najít jejich příčiny.

Kvalitativní analýza se zaměřila na popis klíčových ekonomických událostí, které se odehrály v letech 1993-2022 ve Spojených státech, aby bylo možné pochopit příčiny míry růstu HDP a kolísání nezaměstnanosti. V teoretické části jsou popsány všechny ekonomické aktivity, jako jsou státní regulace, členství v mezinárodních organizacích a obchodní vztahy, ke kterým došlo ve zkoumaném období.

Kvantitativní údaje o hodnotách HDP a míře nezaměstnanosti v USA byly získány z webových stránek World Development Indicators. K získání míry růstu reálného HDP je použit deflátor HDP. Regresní a korelační modely byly zkonstruovány v softwaru SAS OnDemand. K vizualizaci časových řad byl rovněž použit program Microsoft Excel.

Výsledkem analýzy v případě Spojených států amerických bylo, že odhadnutý model potvrdil hlavní předpoklad Okunova zákona, který uvádí negativní vztah mezi růstem HDP a mírou nezaměstnanosti

Klíčová slova: Nezaměstnanost, Hospodářský Růst, USA, Okunův Zákon, Hospodářská Politika

Table of content

1 Introduction

Okun's Law, named after economist Arthur Melvin Okun, offers a valuable framework for analyzing the dynamic of the relationship between economic growth and unemployment. This law establishes a quantitative relationship between changes in a country's Gross Domestic Product (GDP) and its unemployment rate. It suggests that economic growth and unemployment are inversely related (Prachowny, 1993). The study was made between 1940 and 1960 years in the United States of America, the result of the observations suggests a 1% increase in the unemployment rate leads to a 3% decrease in the GDP growth rate.

The Gross Domestic Product (GDP) Growth Rate serves as a vital indicator of a nation's economic health. It quantifies the percentage change in the total market value of all final goods and services produced within a country over a specific period. Understanding the GDP Growth Rate is crucial for policymakers, businesses, and citizens. As the change in Gross Domestic Product directly influences other economic factors, for example, fluctuations in GDP have an immediate rebound effect on the unemployment rate (Okun, 1962).

The Unemployment Rate is a crucial indicator for measuring the stability of a country. It quantifies the proportion of the labor force that is unable to find employment. Policymakers strive to lower the amount to the minimum point, which indicates appropriate living conditions and the absence of poverty (Wright, 1983). Discovering the connection between Okun's Law and the unemployment rate will provide valuable insights into economic growth and job creation.

The United States of America is an important subject of study for Okun's Law since during the period from 1993 to 2022 many events took place in the country such as the entry into international organizations, the Great Recession, and Covid-19. As a result, according to information from the World Development Indicators, the US GDP growth rate reached

extremes of +5.6 and -2.8. Such fluctuations potentially raised the US unemployment rate to 9.6% and subsequently dropped to 3.6% in the last 30 years (2023). As the world's leading economy by GDP and a member of the World Trade Organization, the North American Free Trade Agreement, and the International Monetary Fund, it has enormous influence on the markets of other countries. Accordingly, the analysis of Okun's law in the case of the USA is important at the global level.

In the thesis, the first part is theoretical, which includes qualitative analysis focused on describing the key economic and political events that happened between 1993 and 2022 in the United States. Consequently, the focus is on how the events during 30 years of US development influenced the GDP Growth Rate and Unemployment rate. In addition, the theoretical part describes the main assumptions of Okun's law and its application in practice.

The second part is practical, which includes the use of real data and the construction of empirical models such as regression, time series, and correlation analysis. The data of the Unemployment Rate and Real GDP Growth Rate of the United States of America between the years 1993 and 2022 is applied in the analysis.

2 Objectives and Methodology

2.1 Objectives

The thesis aims to test the applicability of Okun's Law in the United States of America context by analyzing the relationship between GDP Growth Rate and Unemployment Rate from 1993 to 2022. Through qualitative analysis, the thesis aims to understand key economic and political events in the last 30 years of the United States that influenced both the Real GDP growth rate and the unemployment rate. Additionally, by examining Okun's Law and its core principles, to find the connection between changes in a nation's GDP and its Unemployment Rate. In the practical part, empirical models such as regression, correlation, and time series identify how accurately Okun's Law reflects the relationship between economic growth and unemployment in the specific case of the United States. By combining qualitative and quantitative analysis, the goal is to contribute valuable knowledge that can inform future policy decisions and strategies to promote economic stability and job creation.

2.2 Methodology

The practical part consists of empirical models, such as regression, correlation analysis, and time series to determine Okun's relationship between the GDP Growth Rate and Unemployment Rate in the United States of America between the years 1993 and 2022. Consequently, in regression analysis, the main assumptions will be checked. While the data was collected from the World Development Indicators database. The data includes 60 observations, as the 30-year period is used for both variables. The GDP deflator is applied to obtain the Real GDP Growth Rate. In the final stage of the analysis, Okun's equation will be determined and explained.

The theoretical part of the research involves the observation of published sources regarding Okun's Law, case studies in the United States of America, and scientific articles about economic policies and indicators.

3 Literature Review

3.1 Okun's law

Okun's law is a relationship, it establishes a negative relationship between the unemployment rate and real GDP. This empirical economic concept provides a useful insight into the dynamics of the labor market and its relationship with macroeconomic factors. The basic assumption, which will be discussed in detail in the next section, assumes that.

«*Okun's Law has been accepted as an empirical regularity that predicts a 3-percentage point increase in out- put for every 1-point reduction in the unemployment rate*» (Prachowny, 1993).

This statistical relationship has been observed during various economic cycles, which makes it the basis of macroeconomic analysis. Although Okun's Law provides a useful framework for explaining how changes in the unemployment rate affect the economy, it is important to keep in mind that the relationship does not always exist and may vary depending on the situation. The level to which the law applies can be influenced by a

number of variables, including changing trends in the labor market and initiatives taken by Governments.

In the 1960s, Okun's law was first formulated, named after the economist Arthur Okun. When Arthur Okun helped President John F. Kennedy as an economist and adviser. Based on his observations of economic facts and patterns, he created a law. Okun tried to establish a clear link between changes in the unemployment rate and changes in the gross national product (GDP) of the country. In 1961 Arthur Okun joined the staff of President Kennedy’s Council of Economic Advisers and Began a brilliant career in public service (Kaldor, 1985).

Originally published in 1962, Okun's article "Potential GNP: Its measurement and significance" were based on empirical support, as a result of which the wealth of empirical data confirming the basic idea of Okun's law became one of the factors that accelerated its adoption (Prachowny, 1993). Economists noticed that fluctuations in the unemployment rate did correspond to changes in the volume of economic production over time. This empirical support helped to confirm the status of the law as a fundamental idea of macroeconomics.

This has given decision-makers an easy-to-use but successful tool to understand the possible consequences of employment-related policies and economic interventions. The law implied that reducing unemployment could stimulate economic growth, which was especially important during recessions and recessions in the economy.
In the previous section, we summarized the general relationship between GDP growth and unemployment, highlighting economic difficulties that emphasize this relationship. Now we will take a closer look at Okun's law, an economic theory that, in particular, considers this connection. It is important to investigate the basic assumptions of Okun's law in order to fully understand its structure and consequences.

3.1.1 Assumptions of Okun’s Law

This section will provide an in-depth discussion ofimportant assumptions, offering the theoretical foundations required for a deeper knowledge of Okun's law and its empirical applications.

«Okun's Law might be better characterized as a "rule of thumb" because it is based on empirical observation of data, rather than a conclusion derived from a theoretical prediction» (2022)

It is important to understand the practical characterization of Okun's law, which is based on the concept that it is firmly grounded in empirical observations.

First of all, Okun's law establishes an inverse relationship between the growth of real GDP and the unemployment rate. This means that economic growth will lead to a decrease in the unemployment rate, and an economic downturn will lead to an increase in the unemployment rate. In addition, it assumes a certain degree of stability over time, which implies that the relationship between GDP and unemployment remains relatively constant (Prachowny, 1993).

«Okun's Law postulates an inverse relationship between movements of the unemployment rate and the real gross domestic product (GDP)» (Okun's Law Does the Austrian unemployment–GDP relationship exhibit structural breaks?, 2001)

Okun's law assumes an inverse relationship between fluctuations in the unemployment rate and changes in real GDP. At its core, this equation highlights the crucial concept that as GDP fluctuates, so does the unemployment rate. In other words, when the economy experiences strong growth and GDP increases, the unemployment rate tends to decrease. This decline reflects the growing demand for labor as businesses thrive, develop and provide employment opportunities. During economic downturns or recessions, which are characterized by a decline in GDP, the unemployment rate tends to increase as businesses reduce their workforce and employment opportunities become fewer. The statement was also proved in similar research in the economy of Kazakhstan (Mukhanov, 2023).

With this in mind, time to turn to the classical version of Okun's Law, which provides a formal basis for understanding the relationship between changes in the unemployment rate (ut) and changes in the annual gross domestic product (yt).

$$\Delta ut = \beta 0 + \beta 1 \Delta yt + e,$$

Here in the formula Δut means a change in the unemployment rate, while Δyt shows a change in year GDP figures, and finally β is "Okun's coefficient," or in other words the linear effect of changes in economic indicators affecting the unemployment rate. The ratio - β0/β1 shows which output growth rates are associated with a stable unemployment rate. And e is an error term (Prachowny, 1993).

As previously stated, the fundamental components of the equation are Δut, Δyt, β0, β1, and et. They show the change in the unemployment rate, which is usually expressed in the percentage rate. This value is an important indication of the employment market, health and impacts on both individual well-being and the wider economy. On the other hand, the Δyt, denotes the change in annual GDP figures, as a key metric for estimating economic performance.

β1 is known as Okun's coefficient and plays an important role in this relationship. β1illustrates the linear impact of fluctuations in economic performance on the unemployment rate. It estimates the jobless rate's sensitivity to changes in GDP. A positive β1 suggests that an increase in GDP corresponds to a decrease in the unemployment rate, while a negative 1 indicates the opposite. In addition, the value of β1 reflects the intensity of this relationship; a larger β1 implies a more significant reaction of the unemployment rate to changes in economic activity.

Furthermore, β0/β1 is a crucial component of Okun's law. It functions as a useful benchmark for figuring out the rate of output growth necessary to keep the unemployment rate steady (Prachowny, 1993). Understanding this radio can help determine the level of economic growth needed to increase labor force participation and reduce unemployment.

3.1.2 Policy implementations and Practical application

Understanding Okun's law and its application in real situations can be very useful for the field of economic policy, showing governments the way to achieve the dual goal of full employment and strong economic growth. Okun's Law, which explains the feedback

between changes in real GDP and changes in the unemployment rate, is an important tool for decision makers trying to negotiate in a complex area of economic management. Governments address the implications of Okun's Law, with the goal of reducing unemployment and stimulating economic growth. (A fiscal job? An analysis of fiscal policy and the labor market, 2015).

One of the essential ways how Okun’s law can help with implemnatation is fiscal policy.Through the prism of Okun's Law, it is possoble to see how the instruments of fiscal policy, as wellas episodes of fiscal consolidation and expansion affect the results in the labor market.

First of all, governments can increase public investment in infrastructure, education, healthcare and other sectors. This can directly or indirectly create jobs, helping to reduce unemployment and increase economic activity. This approach assumes that the government allocates funds to various sectors of the economy, paying special attention to initiatives that can directly or indirectly create jobs (Fiscal policy and Economic Growth, 1992).
Second of all, using Okun’s law goverments are able tocut taxes.Especially for low- and middle-income earners, can stimulate consumer spending, leading to increased demand for goods and services, which in turn can stimulate economic growth and job creation (Fiscal policy and Economic Growth, 1992).

Elva Bova in her analysis of fiscal policy and the labor market through a prism of Okun’s law has investigated the topic deeply. The article analyses that fiscal consolidation, with efforts to lower budget deficits, significantly influences the Okun's coefficient. In this context, a higher Okun's coefficient indicates that employment is more responsive to changes in economic output. The study finds that fiscal consolidation increases responsiveness during both recession and expansion periods. The study showed that fiscal consolidation, which involves reducing the budget deficit, significantly affected the Okuns ratio, making employment more sensitive to changes in output both during the recession and during the boom. On average, a 3% increase in the output gap led to an increase in the employment gap by 1 percentage point during recessions. On the contrary, the budget expansion did not have a significant impact on the Okun‘s coefficient. (A fiscal job? An analysis of fiscal policy and the labor market, 2015)

Overall, the article provides valuable information about the intersection of Okun’s law and fiscal policy. It highlights the impact of fiscal policy instruments based on usage of Okun’s law.

Another scintific article, where the purpose is to assess whether Okun's Law remains a valuable and significant tool for guiding monetary policy in the modern economic landscape. Discribes understanding the relationship between changes in economic output and employment. As described in Okun's Law, is important for central banks as they seek to stabilize the economy, promote job growth and manage inflation (Okun’s Law: A Meaningful Guide for Monetary Policy?, 2012).

In the context of an ever-changing economic landscape, the article confirms the continuing relevance of the Okun Law as a guideline for monetary policy. Its ability to capture the dynamics between unemployment and economic growth and its role in informing the actions of central banks to stabilize the economy strengthen its place as an indispensable guide for decision-making in the field of modern monetary policy. As policymakers continue to address the challenges posed by today's economic complexities, the enduring principles of Okun's Law provide valuable information and direction to promote both stability and growth in our economies. (Okun’s Law: A Meaningful Guide for Monetary Policy?, 2012)

Turning to the topic of economic growth in the United States, it is obvious that understanding the Okun law and its practical application in real situations can be a valuable help for economic policy. Governments are using Okun's law to pave the way for achieving the dual goals of full employment and sustainable economic growth. It provides a framework for decision-makers to understand the complex relationship between changes in real GDP and fluctuations in the unemployment rate, offering vital recommendations in the field of economic management.

3.1.3 Okun's law in the thesis

Consequently, according to the findings of Arthur Okun, a 1% increase in unemployment leads to a 3% loss in GDP growth.However, the way that unemployment responds to shifts

in GDP varies between counties and periods. Due to,structural differences, government policies, global integration, or demographics. In general, the effect of GDP on unemployment is expcted to remain statistically significant in any economy. While, as it’s considered to have a negative correlation between the two variables, whereas the GDP growth rate increases, the unemployment rate tends to decrease.Understanding the factors of the variability of the application of Okun's law in different economies, the purpose of the work is to test a statistically significant inverse relationship between GDP growth and unemployment in the USA.

3.2 Economic conditions of the USA

Being one of the biggest and most powerful economies in the world, the United States is crucial in determining the direction of the world economy. To test Okun's Law and assess the relationship between GDP growth and unemployment, one must have a thorough understanding of the current state of the economy. The major factors of the US economy will be covered in this section. The economic state of the United States in the period from 1993 to 2023 will be investigated in this paper.

First of all, it’s Gross domestic product. One of the main measures of a nation's overall economic health is its GDnation’sa nominal GDP of 26.24 trillion US dollars as of 2023, the US economy continues to lead the international economy. (2023) One important indicator of the expansion or recession of economic activity is the GDP growth rate.
The secod ascpet that will be insetigated is Unemployment rate. The unemployment rate, which is projected to be 3.6% in 2023, represents the portion of the labor force that is actively looking for work but is having difficulty finding positions. (2023) Examining the latest patterns in unemployment offers valuable perspectives on the obstacles encountered by the labor force and the wider consequences for financial stability.

Another important aspcet is Inflation and Interset rate. Two major factors that influence the state of the economy are interest rates and inflation. Policymakers keep a tight eye on the inflation rate, which indicates a general increase in prices, and the interest rate, which affects borrowing costs and investment decisions. The current monetary conditions can be assumed

from the fact that the percentage of inflation is 3.7% and the percentage of interest rate is 5.25 (2023).

One more indicator, the USA invests an important amount of its budget to education, helping to produce a workforce that is skilled. Educational resources are expanded by private donations and programs like Pell Grants and Title I. Strengthening the nation's economic competitiveness requires resolving financing issues. US Goverment invests in education to prevent unemployment increase.For example,Among 25-34 year-olds, 46% of men and 56% of women have attained tertiary education.

Now, menthoing Labour market charakteristics it’s worthunderstandibng that the labor market's structure offers an advanced perspective on employment trends. The gig economy, technology developments, and changes in industry preferences all influence how work is changing. The distribution of employment across sectors in 2023 is shown, providing insight into the workforce's adaptability.

And Finally, Global positioning of the US will be covered in thesis. The trade policies and worldwide positioning of the United States have a substantial impact on the country's economic conditions, given the interrelationships of the global economy. Economic dynamics are complicated by ongoing trade negotiations, international agreements, and geopolitical factors. The United States' trade links and their impact on domestic economic performance are demonstrated by the country's two trillion dollar exports and three trillion dollar imports.

Thisintoduction highlights how important the US economy is to the world economy and how testing Okun's Law requires an understanding of the US economy from 1993 to 2023.
To Okun's Law and understand the complex relationship between GDP growth and unemployment, now the focus movesinto the key economic indicators and trends that define the U.S. economic landscape.

3.2.1 Key Economic Trends (GDP)

Beyond the focus which is GDP changes and the unemployment rate. Thesis will investigate other key indicators. In further practical part through regression analysis the indicators hypothesis will be accepted or declined according to the results.
Generally, over 30 years period US economy past through diverse global political and economic obstacles, where it experienced rocket growth and stagnations. (Kimberly, 2022). According to World Bank data and US Bureau of Economics the time period of US GDP fluctuations can be divided in 8 key parts.

The first key period is 1990s the United States experienced consistent economic growth during the 1990s. During this time, real GDP growth averaged 3.8% annually, which was notably greater than the previous 30 years' average growth rate of 2.6%. (2023).Numerous causes, including the development of the internet and the dot-com boom, the financial sector's deregulation, and the North American Free Trade Agreement (NAFTA), pushed the 1990 decade's economic boom. (Bean, 1992). Between 1995 and 2000, the internet sector of the US economy saw a period of fast expansion known as the "dot-com boom." Internet-related businesses experienced a rise in investment during this period, and their stock prices jumped. The US GDP was significantly impacted. Venture capital investments in internet technology companies reached $46 billion in 1999 alone, in comparison with $5 billion in 1995. (2023) Indeed, that investment stimulated economic growth and at the end resulted in the creation of new enterprises and jobs. (The Origins of Financial crisis).Consequently, the US economy's consumer spending went up as a result of the dot-com boom. Billions of dollars spent by consumers on new internet goods and services, this expenditure contributed to the 1990s economic boom.

Another, essential factor in US GDP fluctuations in 1990s is The North American Free Trade Agreement (NAFTA).In 1993, the United States, Canada, and Mexico signed the pact into law. With the help of implementation of NAFTA on January 1, 1994, taxes on goods exchanged between the three nations werecanceled. (The Impact of NAFTA on the US, 2001).Over the first ten years of its operation, NAFTA is estimated by the US International Trade Commission to have increased US GDP by $0.5 trillion to $1.1 trillion.Between 1994

and 2000, trade between the two nations grew by more than 400%. Over $100 billion in investments from US corporations were made in Mexico during that time.The deal improved US economic trade, production, and efficiency. (NAFTA Renegotiation and Modernization, 2018). It's worth mentioning the Deregulation of the financial industry in the 1990s.The important change in this time was the cancelletion of the Glass-Steagall Act in 1999. The Glass-Steagall Act, was implemeted by US Goverment after the stock market crash of 1929, the law that separated commercial banking from investment actitvity. In the end after the final repeal, banks were allowed to engage in all three activities for the first time since the 1920s. (Strahan, 2003).The 1990s became the pireod of the rise of non-bank financial institutions and their new products as financial derivatives and asset-backed securitie. According to the study by the Federal Reserve Bank of St. Louis that deregulation of the financial industry increased US GDP by 1.5% to 2.5% between 1990 and 2000 (Strahan, 2003). These are tree one of the main events that influenced economic expansion in 1990s.

Year	GDP ($ Billions)	Real GDP Growth (%)
1993	6,106	2.9
1994	6,427	3.9
1995	6,779	2.6
1996	7,2	3.6
1997	7,616	4.3
1998	8,127	4.3
1999	8,685	4.6

Table1 US GDP development 1990s (2023)

Early 2000s is the second chapter in US economy in the last 30 years.The much lower growth US has experiencedh in the early 2000s, due to the strong economic expansion of the 1990s. Avergae real GDP was just 2.2% per year during this period, which was lower than the average growth rate of 3.8% in pierod of 1990s. (2023).As mentioned in the last phragraph the dot-com boom appeared in the latest 1900s, which created a bubble. Consqeuantly the bubble burst happend in 2000, it appeard that intrernet-related stocks were overvalued and not profitable. As a result The Nasdaq Composite Index fell by over 75% between 2000 and 2002 (Nasdaq).The bubble bust led to a recession in 2001 and 2002. The recession was characterized by a decline in economic growth, an increase in unemployment.

The second important event occured in early 2000s in US are terrorist attacks and their subsequent result of war in Iraq and Afganistan.The economic influence of the attacks on 11th of September ,was severe. The attacks caused a significant decline in consumer confidence, which led to a decrease in consumer spending, which resulted in slower GDP growth (2023). The respose of US goverment to the attacks was sending military groups to middle east.The war costed US2.313 trillion dollarsand they increased the national debt. The wars also led to an increase in military spending, this s had a significant impact on the federal budget deficit. (Thomas, 2023)

Despitechallenges in early 2000s, the US economy experiencedgrowth in the Mid-2000s, when real GDP growed at an average rate of 3% per year. The growth kept by a various reasons, including the housing boom,the internet economy and the policy of the Federal Reserve.One of the main facors of the increasing GDP was the boom of housing marketin the United States that occurred between 2002 and 2006. After the recession in early 2000s US goverment had to higher economic activity of the country. The soulution was thatthe Federal Reserve had to decrease interest rates, as a result during this time, there was a a huge surge in demand for homes (The Great Recession: A Macroeconomic Analysis, 2015). And the belief in houising market that home prices would continue to riseled to a significant increase in economy. Boom in consumer sepdning also occured due to rapid growth of housing.However, the housing boom was unsustainable, as it will be seen in the folowing time pireod analysis.The internet economy started to grow in early 2000s even it expirinced stagnationm butcontinued it's expansion in mid 2000s. The number of people using the internet grew from 51% in 2000 to 68% in 2005 (Brian, 2023). The 17% increase contributed to the GDP growth. And It helped to offset the decline in economic growth caused by wars in Afghanistan and Iraq. Gnereally, the United States experienced diversr economic outcomes during the mid-2000s. Although there was moderate economic growth, it was based on stable foundation. Long-term negative effects on the economy were severe due to the housing boom and the wars in Afghanistan and Iraq (Mian, 2014).

Finally, it's the period of severe economic downturn in 2007-2009. In 2007 the subprime mortgage crisis began, it was found that low-interest rates with a combination of the idifference of banks created an unstable economic environment. Banks provided house mortgages to borrowers with poor credit histories. In the end, borrowers begin to default on their loans. Mortgage-backed securities (MBS) that were based on these loans started to lose

value as borrowers started to default on their debt. Banks, hedge funds, and other investors that had bought MBS suffered losses as a result. (The Financial Crisis, 2011). Indeed, the insecure decisions of banks and government regulations led to the crisis.. Housing investment, the main cause of economic growth in the last years, that at the end leading up to the crisis fell by 22.1% in 2009. Overall, the 2009 US experienced a fall of -2.7% in GDP (Bureau of Economic Analysis, 2023). It was the biggest decline in GDP since 1946. The total economic loss was estimated at over 300 billion US dollars affecting house owners, businesses, consumers, and even other countries. Another key sign of the crisis was the decline in business investment by 17% in 2009. Businesses were forced to scale back as the economic situation in the US was uncertain (Robert B. Avery, 2015). The government of the US and the whole world will have a long decade to recover from the crisis. The consequences can be felt even today, as the economy recovers from its effects and policymakers face with the challenges of regulating a complex and interconnected financial system. (The Great Recession: A Macroeconomic Analysis, 2015)

Year	US GDP	Housing Investment	Business Investment
2007	$14,349.1 Billion	$1,942.4 Billion	$2,745.3 Billion
2008	$14,761.2 Billion	$1,895.6 Billion	$2,628.4 Billion
2009	$14,412.8 Billion	$1,513.6 Billion	$2,278.6 Billion

Table 1 US crisis 2007-2009 (2023)

Now the thesis will study the 5th period in the development of the US GDP. It's post-2008 crisis recovery. The Great Recession of 2008-2009 had a huge impact on the US economy, as unemployment reached 10% and a decline in GDP appeared. Despite these facts, the overall early recovery can be noticed starting by the end of 2009. The US government gad to implement various measures to fight the recession. One of the major ones was the American Recovery and Reinvestment Act of 2009 (ARRA) (Aravind Boddupalli, 2021).The stimulus package was aimed at supporting individuals and businesses affected by the recession. It was approved and put into action in the 111th United States Congress and signed by President Barack Obama on February 17, 2009. The tax cuts for individuals and businesses, as well as tax credits for first-time homebuyers, were introduced by the ARRA

package. For instance, the maximum earned income tax credit was increased from $4,800 to $5,800 for the 2009-2010 tax years. ("The American Recovery and Reinvestment Tax Act of 2009", 2009). Moreover, the first-time Homebuyer Tax Credit was introduced, it was also a part of the ARRA package. The temporary measure was designed to stimulate the housing market during a period of economic crisis. The credit tax provided around $8,000 for first-time homebuyerspurchased houses in 2009 and 2010 (T., 2009).

One more way of fighting crisis was the implementation of The Home Affordable Modification Program (HAMP). The goal of the programm was to help struglling borrowers to make their morgage payments more affordable. With the help of the program interest rates could have been reduced and people had their mothtly paymets lower. As well as the extending the repayment term was an option for borrowers.More than 3 million homeowners were able to escape foreclosure and change their mortgages to more affordable terms thanks to HAMP (Melissa, 2022). Ineed, it means that Goverment spending increased, as it can be seen in table below by 9.8% more in 2010 compated to 2008. The increase also had postitive impact on Personal Consumption Expendutires with the 9.1% in 2010,As a result of governmets implementations the US economy began to recoverwith 2.9% increase. And compared to crisis year of 2008 the change in GDP growth rate in 2010 was +5.3% (2023).All information above was the immidate reaction of the govermen after 2007-2008 crisis in the US, however in 2010s United states will countinue it's recovery for the whole decade.

Economic Indicator	2008	2010	Change
Real GDP Growth Rate	0.1%	2.9%	+2.8%
US GDP (in billions of current US dollars)	13,842.1	15,049.0	+8.7%
Government Spending (in billions of current US dollars)	$6,336.7	$6,957.6	+9.8%
Personal Consumption Expenditures (in billions of current US dollars)	$10,564.7	$11,529.2	+9.1%
Inflation Rate	3.2%	3.0%	-0.2%

Table 2 Post-Crisis recovery (2023)

The next time sequence in US economy is 2010s, it's the pireod of economic recovery and steady growth. Between 2011 and 2014 US expirieced a steady growth with an average annual GDP growth of 2.1%. The growth appeard, but at the same time unemployment reached it's maximum up to 9%. Several factors contributed to the steadygrowthduring this

period. One of the major factos is shale oil and gas boom between 2011 and 2014. During that time the production of oil and gas occured due to the discovery ofshale reserves in the United States and new fracturing technology. The technology abled extract oil in very efficeint waywith the help of horizontal drillingmulti-stage fracturing. Sothe efficient extraction began in founded reserves of Eagle Ford in Texas and the Bakken Shale in North Dakota. The incresead production lowevered enrgy prices and contibuted to the GDP of US. For instance, the gallon of gas dropped to 2.50 US dollar with the 17% decrease compared to priveos years. (World Energy Outlook, 2023) The reduction contibuted to buisness and individuals , as has savings for gasoline was estimated for 1200 US dollars per year.It's worth highliting thecontribution of Oil industry to GDP. As between 2011 and 2014 the contribution to real GDP growth was estimated estimated of 0.3 to 0.5 anually (The Economic Impact of the Shale Oil and Gas Revolution., 2019). Additionally, industry created a job places for millions of US citizens.

And already in 2015, the growth became stable.The oil boom led to increasing GDP which strengthened the demand of US citizens. As people were more confident in the future, they started to spend more and save less. As well as the rising wages are worth mentioning from 2015 to 2017 (Lindholm, 2018). The values represent that in 2015 the average hourly wage US was $24.14, but by the end of 2017 increased by 6% in two years up to $26 (Bureau of Economic Analysis, 2023). The government also influenced the growth by keeping interest rates low and allowing citizens to easily access credits. Over two years, the total amount of outstanding consumer credit rose from $3.8 trillion in 2015 to $4.2 trillion in 2017, a 10% rise (Wage Growth and Inflation in the United States, 2018). With the help of easy access to credit, customers had more financial flexibility which allowed them to finance larger purchases and make more costly choices. The following factors influenced GDP growth from $18,156 billion in 2015 to $19,391 billion in 2017, which shows a $1,235 billion growth or 6.5% (Bureau of Economic Analysis, 2023).

The expansion continued in 2018, the main contribution was made by the new US government in head Donald Trump.

The tax rate for business was dropped from 35% to 21% to stimulate economic growth. As a result, businesses invested more and they hired more workers. The second major impact was Deregulation Initiatives. To lower compliance costs and promote lending, the

administration relaxed laws about banks and other financial organizations (Belton, 2017). Overall, the US economy was steadily recovering from the 2008 crisis. In 2018 US reached its pick of economic growth with a percentage of 2.9 and the GDP was $19,482 billion (World Development Indicators, 2023). Following the 2008 financial crisis, the US economy recovered over a ten-year period that was marked by stabilization, modest growth, and accelerated expansion. Positive trends were seen in key economic indices such as real GDP growth, the unemployment rate, and stock market performance. The recovery was aided by monetary policy, government assistance, and the US economy's resilience. However, the steady growth will be stopped in the following years by the global crisis. The crisis and its influence on GDP will be explained more deeply in the next sections.

Year	Real GDP Growth Rate (%)	GDP (Billions of Current US Dollars)
2015	2.6	18.206
2016	1.6	18.509
2017	2.2	18.925
2018	2.9	19.482

Table 3US GDP development 2015-2018 (2023)

In 2019 the pandemic appeared in China had rapidly spread across the world and impacted the global economy. And US was not an exception, the american economy got severe shocks caused by the pandemic. Lockdowns, which were introduced as a try to stop the COVID-19 virus from spreading, had impacted all economic sectors. Economic activity was crushed as a result of consumers being locked to their homes, businesses stopping their production, and supply chains being broken.It caused a decline in consumer spending, which is a major force behind economic expansion. Moreover, as businesses had stopped their activity people lost their jobs. Workers were forced to stay home, and as a result unemployment rate reached its peak at 14.7%. In total, it’s appeared that 23.1 million people left unemployed. As people had uncertainties with their jobs Consumption Expenditures decreased by 34,7% in 2020. Spending on services, like restaurants, travel, and entertainment, declined by the rate of 47.8%, the largest quarterly decline on record.

Moreover, consumption of durable goods such as cars had decreased by 68,6% in the same year. These factors only highlight the GDP decline in the second quarter of 2020, as the real GDP dropped by an annualized rate of 31.4%, representing the biggest quarterly decline recorded.

Overall, the pandemic caused a 2.8% percentage drop in US GDP in 2020 with values of $19,377 billion. Compared to post pandemic crisis real GDP of the US was counted for $19.928 billion. This is a reflection of the economic downturn that was caused by the COVID-19 pandemic.

Year	Real GDP Growth Rate (%)	GDP (Billions of Current US Dollars)
2019	2.2	19.928
2020	-2.8	19.377

Table 4 Impact of pandemic crisis on US economy (2023)

Once again as in the previous crisis, US had to recover from the pandemic. The saver of the economy became vaccination, several pharmaceutical companies introduced vaccines in 2020 (Wang, 2020). And already the percentage of vaccinated people started to rise. It resulted in the gradual finish of lockdowns around the countries and reopening of businesses. The years 2020-2022 are called post covid-19 crisis (Weinstock, 2021). As a response of the goverment to stop the decline of the economy, they introduced The Coronavirus Aid, Relief, and Economic Security Act (CARES). The fiscal stimulus measures were implemented in March of 2020. The measures included direct payments up to $1200 for individuals. Also, The CARES Act provided a weekly supplement of $600 to unemployment benefits doubling the average weekly benefit (Acs, 2020). The program included another key aspect which is Paycheck Protection, which helped businesses save and keep their employees on payroll during COVID-19.

Another response of the government to the pandemic was monetary policy support. Interest rates were lowered in 2020 reaching near-zero levels to make borrowing easy. The monetary policy implemented by the Federal Reserve played a critical role in supporting the recovery. The unemployment rate dropped from 14.7% in 2020 to 3.6% in March 2022, and real GDP growth increased from -3.5% in 2020 to 2.1% in 2022 (Bureau of Economic Analysis, 2023). These measures demonstrate the importance of monetary policy support and the CARES program in healing from economic shocks and providing economic stability. In the end, US citizens and its government could overcome the crisis and enter the path of GDP growth.

3.3 Global Economic influences

The first influences from the outside world to be covered are globalization and trade trends. United States is an open economy that has international connections with other countries, consequently, the growth of the economy happened not only because of internal factors but also of global trends. The last 3 decades were the most ambitious years for humanity in terms of globalization. Since the US is the largest economy in the world, it has affected the whole world and correspondingly in the opposite direction too. This chapter will cover the main global factors that influenced GDP development (WTO, 2016).

One of the main turning points was the establishment of the World Trade Organization (WTO) in 1995. It's the international organization that regulates trade between nations and provides a framework for diverse trade agreements, as a result, it reduces barriers between countries (Keith E. Maskus, 2001). The new organization by that time increased exports from $504 billion in 1995 to $1.1 trillion in 5 following years. According to a study made by the Peterson Institute for International Economics, it was found out found that the WTO's rules have raised the US GDP by an average of 0.5% per year since 1995 (Gary Clyde Hufbauer, 2013). Generally, WTO had a positive impact on the US economy and its GDP development. It created a more competitive system of global trade.

In the 2000s China's economy experienced expansion that affected the US and the whole globe. In 2001 it also joined the World Trade Organization. As a result of these events, the US started to heavily import from China (Morrison, 2019). Consequently, the US and China became major trading partners with each other. The information regarding increased trade can be proved by the following values, for example in 2000 exports of the US were estimated at $96.0 billion (Bureau of Economic Analysis, 2023). But, by the next 8 years, it increased to $485.2 billion, which means 521%. In reverse, China invested in the US around $112.1 billion in 2007, which shows a growth of over 1,650% in 8 years (Bureau of Economic Analysis, 2023). Even though the economy of the US experienced a trade deficit, this relationship between the 2 biggest economies also contributed to the US GDP. As it was stated in previous sections, the average GDP growth in the early 2000s was 2.2%.

The next global influence that has impacted the US economy and its GDP is technological advances. In the last 30 years, all industries have been transformed by the use of technology. Thanks to these achievements thousands of job places were created, as well as overall productivity increased. One of the key aspects is the information technology revolution when people could use computed, interpreted, and structured data to operate businesses more effectively. It is an enormous boost for the global economy, including the United States. As proof, the McKinsey Global Institute made an analysis where it was found that technological advancements are 28% of economic growth in the United States between the years 1995 and 2015 ("How Technology Drives Economic Growth", 2015). Overall, information technologies boosted trade between countries and influenced the globaliyation process, which resulted in US GDP growth.

The development of the financial market is also a major global influence on the US Economy, as it has both negative and positive impacts. In the 1990s and early 2000s financial liberalization appeared, and it increased the integration of many countries into the global financial market. First of all, the US financial system took advantage of it, as increased competition from foreign firms helped to provide more innovations (Milanovic, 2012). Secondly, it has opened more areas for US companies to develop and launch new products around the globe. With the help of global expansion, the US GDP grew at an average annual rate of 3.2% from 1990 to 2007. However, these interconnections between countries increase the risks of world crises, because a collapse in one region can spread to other parts (Habermeier, 2010). And in the end, it has happened, for example, the subprime mortgage crisis in the US triggered a global financial collapse in 2008, with the GDP decreasing by 2.8% (Bureau of Economic Analysis, 2023).

As stated in previous sections the crisis of 2008 in the US rapidly spread to the global economy. Investors all around the world lost confidence in the US economy, they began to withdraw money from the American market. Indeed, the outflow of a large amount of money led to a liquidity crisis, which caused a credit crunch. In the end, businesses and people couldn't borrow money. The US was involved in Global Cooperation measures to prevent the crisis from continuing. For instance, the Basel Committee on Banking Supervision created the Basel 3 Accord to improve global bank requirements, where the US government

had a major involvement. As well as, the forum of the 20 largest economies, or G20 played a role in fighting the global 2008-2009 crisis. Where the US and other 19 countries created fiscal packages to stimulate economic growth in the World (Shiller, 2017). Overall, the US and the Global Economy could overcome the crisis and start their economy development again.

However, in the 2010s US economy faced trade tensions at the global level with other countries. One of them is The Trans-Pacific Partnership. Originally it was a trade agreement between the United States and 11 other Pacific Rim countries. The countries in the agreement are Australia, Brunei Darussalam, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, and Vietnam (Plummer, 2016). The TPP was made to reduce tariffs on a wide range of goods and protect labor standards. In the end, it was supposed to boost economic growth, create jobs, and improve the competitiveness of the USA. But, in 2017 ex-president of the US Donald Trump decided to withdraw the country from the agreement. As he has stated, TPP will give more power to multinational corporations. As a result, the United States has lost its impact in the Asia-Pacific region and has missed out on opportunities to boost exports. According to studies, the US missed out on around $250 billion and $640 billion in economic growth over the following 15 years as a result of withdrawal from the TPP. This estimate is predicated on the idea that the Trans-Pacific Partnership would have increased economic growth in member nations by 0.5% to 1% year on average.

One more key global influence happened in 2018 when the United States imposed tariffs of 25% on steel imports and 10% on aluminum imports from all countries except Canada and Mexico. According to President Trump, the tariffs were required to protect American companies in the steel and aluminum sectors from unfair competition from overseas. As a positive effect, profits for US producers of steel and aluminum have increased as a result of the tariffs (Irwin, 2019). A 2019 analysis of International Economics found that US steel and aluminum companies saw an average 20% rise in earnings as a result of the tariffs. US producers of aluminum and steel have been prompted by the tariffs to invest in new buildings and machinery. According to the report, fresh investments in aluminum and steel industries totaled $1.1 billion and $1.7 billion, respectively, as a result of the tariffs. Even though we can see positive effects on the US economy and GDP, it’s worth mentioning that the cost of

steel increased by 14% and the cost of aluminum by 10% (Irwin, 2019). It has harmed consumers and businesses. Overall, the economy received a significant boost, but global trading was strained.

In 2018 global influences on the US economy kept its tension, as trade deputies of the US with China started. The United States blamed China for unfair trade practices, such as forced technology transfers and currency manipulation. So, the same year Donald Trump also imposed tariffs on $250 billion of Chinese goods (Yu, 2019). As a response, China did the same and made tariffs worth $110 billion of American goods. The restrictions have damaged the global supply chain system and resulted in a negative impact on the global economy (Yu, 2019).

Finally, switching to the current event that affects the whole globe and the United States of America. The Invasion of Russia into Ukraine started 2 years ago and significantly affected the US economy in 2022. The war has caused a number of economic challenges, including, for example, higher energy prices, supply chain disruptions, and changes in the financial market. The struggle has disrupted the exchange of goods with Russia and Ukraine, which is making it extra hard for US farmers to export their goods. For instance, The fee of wheat has expanded by 70% for the reason that the conflict commenced (Mbah, 2022). Ukraine is a primary exporter of wheat, and the war has disrupted exports. As wheat is the main product for producing other bakery goods, the food market received a shock of hire prices.
Now, covering the financial market, there is noticeable a drop of 10% in the S&P 500 index, since the war started. The drop happened due to the Federal Reserve's interest rate hikes and concerns about recession (Mbah, 2022). The stock market is an essential indicator to measure economic development, and it can be confirmed by just 1.9% GDP growth in the US.
Overall, such global events as the war in Ukraine, started by Russia negatively impacted the US economy and its GDP growth.

In the end, the worldwide influences on the US economic system over the last 30 years were important. Globalization, technological advancements, and the development of the monetary marketplace have all played a role in boosting the US economy. However, international events along with the 2008 economic disaster and the war in Ukraine have additionally had a negative effect on the US economic system.

3.4 Unemployment

The chapter will provide information for a general understanding of unemployment and trends in the US based on diverse research.

First of all, Unemployment is a crucial factor that it's reaching consequences for businesses, individuals, and the overall economy. It is defined as a percentage of people who are jobless or temporarily looking for work. In cases when unemployment reaches high values if causes negative economic outcomes, reduced tax venue, and high government expenditures. For individuals, unemployment could have a devastating effect on their monetary security, mental and physical health, and social well-being (Blinder, 1988). Unemployment can also have a full-size effect on businesses. When there are few employees to have, businesses may have issues filling open positions, which leads to decreased productivity and increased prices. And indeed, in general, all of these impact the whole economy (Blinder, 1988). When people are unemployed, they are not spending money on goods, which can cause a decline in consumer spending. In further it slows economic growth.

3.4.1 Types of unemployment

It's important to understand the types of unemployment before analyzing trends in the USA. There are different types of unemployment, each with its own causes and consequences.

The first one to be investigated is frictional unemployment.

Frictional unemployment happens when workers have to transition between jobs. It's temporary unemployment and is considered a natural indicator of the economy. This kind of unemployment doesn't come from structural problems or economic downturns, rather, it happens at times when the economy is doing well overall (Wright, 1983).

There are several causes of frictional unemployment. The major cause is job search, when workers look for a new job they can have a temporary period of unemployment. Another cause is labor entry, which occurs when people migrate to a new country or graduate students looking for opportunities (Wright, 1983).

Frictional unemployment can cause both negative and positive effects. This type of unemployment can drive the overall economy to more efficiency. As it can allow citizens to find workplaces that match their skills and educational background. On the negative side, frictional unemployment can reduce economic output because less economic activity is

being produced. However, government policies can help to minimize negative consequences.

The second main type of unemployment is structural. This type of long-term unemployment occurs when a country is experiencing structural changes in the economy. It's often associated with improvements in technology, consumer demand, and other structural changes (Herz, 2011).

For example, new advances in technology can lead to the automation of certain jobs. And workers with outdated skills struggle to find new jobs in a technologically advanced workplace. Regarding the structure change of the economy, it's also a major cause. For instance, the economy is a constantly changing process, and some industries may have a decrease, while others grow. These declining industries can create a struggle for workers, and as a result, unemployment increases. One more factor contributing to structural unemployment is a change in consumer demand. A drop in demand for goods and services in some industries may be caused by changes in customer preferences. As a result, workers in industries that are failing may lose their jobs (Herz, 2011).

Most of the time structural unemployment needs to be regulated by policies from the government. One of the first steps, that governments usually take is investing more in education and training. This helps workers acquire new skills to are beneficial to the employees. Also, as a solution, governments provide help for labor unions. The unions are responsible for negotiations to make better wages and benefits for their members. As well, governments can create retaining programs for workers to transition to more growing industries (Herz, 2011).

Overall, structural changes are often slow to reverse, making structural unemployment a challenge for policymakers to tackle. It is a more difficult problem to solve than frictional unemployment.

Now, the focus of the thesis switches to cyclical unemployment. It is a type of unemployment that happens because of fluctuations in economic activity. Compared to structural and frictional unemployment, which are more long-term, cyclical unemployment is connected to the economic rises and falls associated with the business cycle (Cyclical and Noncyclical Unemployment Differences among Demographic Groups, 1984).

The business cycle includes 4 main phases, these phases are expansion, peak, recession, and trough. In the expansion phase, the economy expiriences growth and employment increases. While, in the contraction and recession phase, economic activity slows down, leading to decrease in demand for goods and services, whichresults in increased unemployment.
Change in govermnet policy can also contribute to cyclical unemployment.
As a response goverment can take several stepts to fight this type of unemployment. Governments can change fiscal policy to increase spending or cut taxes,it may boost economic activity and job creation (Cyclical and Noncyclical Unemployment Differences among Demographic Groups, 1984). Also, it's possible for govermetns to ifluence monetry policy. By forcing central banks to put down interest rates to make affordable for businesses to borrow and invest, which stimulates economic activity. All things considered, cyclical unemployment is a temporary issue that usually goes away as the economy grows again.

3.4.2 Trends of Unemployment in the USA

The section will cover unemployment trend of the USA over the period of 30 years, from 1993 to 2022. It will study all ups and downs, to understand what made American employment what we see today.
Over the past few decades, there has been a significant fluctuation in the unemployment rate in the United States.The journey from the '90s tech boom to the Great Recession and the recent curveball from COVID-19.

The first preiod to be investigated is from the year of 1993 to 2000.The unemployment rate in the United States was 5.4% during the 1990s, which is quite low number. The factor of contribution was economic growth driven by technological advancements and globalization. The expansion created more job oppurtionties in interent related technolody sector .From the data avilabale on the Bureau of Labor Statistics the IT sector in the United States added an average of 225,000 jobs per year between 1993 and 2000 (Christian, 2002). For example, companies as Amazon, Yahoo, Google and ebay apperared during that time. Accoridng to the esttimated data in 1990s Amazon hired 31,000 workers, Yahoo 20,00, Google

15,000.These companies have continued to grow in the years since the 1990s, and they have continued to hire a large number of workers () ().

Globalization also played a big role in reducing unemployment, becasue increasing conntctivity in the global economy led to increased trade and investment, which created more jobs in 1990s.

The factors listed above allowed to the unemployment rate drop from 6.1% in 1993 to 3.9% in 2000, which is 2.2% drop According to the Bureau of Labor Statistics (BLS), the amount of Americans who received new jobs increased by 11.3 million between 1993 and 2000, it's a signifciat increase by 27.4% (). Overall,The 1990s were a period of economic imporvement for many Americans, and the low unemployment rate contributed to this success.

Year	Unemployment Rate
1993	6.9%
1994	6.1%
1995	5.6%
1996	5.4%
1997	5.0%
1998	4.5%
1999	4.2%
2000	3.9%

Table 5Unemployment Rate in the US from 1993 to 2000 ()

The next essential time period is 2001-2008.In the year of 2001 the most important event to mention is terrorist attack. Thecatastrophe on the 9th of September influenced unemployment, and made it increase significantly.The attack was organized by a banned group, where a terrorist took control of a plane and crashed it into a building in downtown New York (The Macroeconomic Impacts of he 9/11 Attack, 2009).As a result of the action, the huge decline in demad of airline industy caused job losses.This also affected Tourism, as people were wary of flying, and hotels and cafes suffered losses accordingly.Just in several months we can see a spike in the unemployment rate, which rose from 4.0% in August 2001 to 4.73% in December 2001 (The Macroeconomic Impacts of he 9/11 Attack, 2009).

Despite of terrosit attacks, the US ecnomy started to recover in 2002. To help economy to rexover the Federal Reserve lowered interest rates to historic lows, making it more affordable for borrow money. Thanks to low interest ratesthe the rise in the housing market appeared in 2002. Homeowners felt richer and were more inclined to spend money as property values rose.As a result of that , the unemployment rate recovered throughout the 2002-2006 period. By 2006, the unemployment rate had fallen to 4.6% (Rothstein, 2016).

As discussed in the early chapters, fiscal policy allowed the housing bubble to grow. But, by 2007, there was a decline in the market and traces of an impending default. Banks issued loans to businesses and consumers more scrupulously. And unemployment, which was low in 2006, began to gradually increase in 2007 (Rothstein, 2016).
And 2008 saw a high percentage of unemployment due to the financial collapse.In October 2008, the unemployment rate, which had been essentially unchanged in the months preceding the crisis at 5%, rocketed up to 9% (Rothstein, 2016).The Great Recession was the greatest economic downturn since the Great Depression and officially ran from December 2007 to June 2009.

The United States had significant economic instability and unpredictability between 2001 and 2008. The financial crisis, the housing bubble, and the September 11 attacks all had a major impact on the rise in unemployment. The economy has taken years to recover, and the unemployment rate reached a peak of 9.63% in 2009. These crises' lasting impacts are still being felt today.

Year	Unemployment Rate
2001	4.7%
2002	5.7%
2003	5.9%
2004	5.5%
2005	5.1%
2006	4.6%
2007	4.6%
2008	5.7%

Table 6Unemployment Rate in the US from 2001 to (2023)

After the peak in2009, the USA started to recover slowly in the following years.From 9.6% in January 2010 to 8.1% in December 2012, the enmployment rate lowered by 1,5% (2023). A significant decrease is visible, but still the unemployment rate remained on high level, with nearly 15 million Americans unemployed. Moreover, the unemployment rate for African Americans has remained high compared to the national average numbers. By the year of 2012, it was still gradual recovery for americans and it required more years to come back to normal level (Shierholz, 2012).

From next year in 2013 the more steady recover was noticed, and already by the 2015 reached a lower rate of jobless citizens of 5.3%.This was significant progress for the country, as 5 years after the peak of unemployment in 2009, it fell by as much as 4.7 percent.Due to the ongoing economic growth and globalization, millions of new jobs were created during this period. (Austin, 2013).

The next period became even more memorable forthe USA , as in the period from 2016 to 2018, unemployment fell to historically low levels. Positive changes were observed in all demographic groups. This allowed the United States to reduced unemployment to 3.9% in 2018 across the country (Schneider, 2018).In general, the period from 2013 to 2018 turned out to be successful for Americans. During these 6 years, there has been a slow decline in unemployment to record percentages.

Year	Unemployment Rate (%)
2009	9.2
2010	9.6
2011	8.9
2012	8.1
2013	7.3
2014	6.2
2015	5.3
2016	4.9
2017	4.3
2018	3.9

Table 7Unemployment Rate in the US from 2013 to 2018 (2023)

The US labor market continued to improve up to 2019, with the unemployment rate reaching the lowest point of 3.7% in December.The good labor market performance in 2019 provided a storng foundation for continued economic growth in the future years.
However,an unexpected combination of circumstances occurred, the COVID-19 pandemic spread across the whole country. The pandemic led to severe economic downturns, which immediately increased the unemployment rate.The unemployment rate peaked at 8% in April 2020, as millions of workers were forced to isolate themselves at home and businesses also closed. Due to job losses, the overall demand for goods and services dropped, which led to further closure of enterprises and businesses. The leisure and hospitality sector suffered the most, with unemployment in the sector reaching 39.1%.

By 2021, despite the events in 2019, the unemployment rate began to gradually stabilize. The unemployment rate began to improve due to several factors. Firstly, after the peak of the viral pandemic, businesses began to open again. Secondly, the state has organized financial assistance to citizens leading entrepreneurial activities. As a result, by the January 2021, the enemployment rate lowered to 5.5%.

In 2022, the percentage of people unemployed has decreased even more, and was almost close to the record before the pandemic. A large number of people were actively looking for work and found it. In December 2022, the percentage of 3.6% of the unemployed was recorded, which is a low indicator compared to other years.
Overall, the US labor market saw significant changes throughout the period from 2019 to 2022. Early on, there was consistent progress, and in 2019, the unemployment rate hit a historic low of 3.5%. But the COVID-19 pandemic brought about a severe recession. However, the US labor market proved to be resilient by the dramatic turnaround in the unemployment rate by 2022, which dropped to 3.6%.

Year	Unemployment Rate (%)
2019	3.7
2020	8.1
2021	5.4
2022	3.7

Table 8Unemployment Rate in the US from 2019 to 2022

4 Empirical analysis

4.1 Data

There is quite enough data on economic indicators in the United States. The data studied in the bachelor thesis is collected from the World Development Indicators database. It includes data on unemployment and annual GDP growth for the last 30 years. In total data includes 60 observations. The time series from 1993 to 2022 is a suitable period for empirical analysis.

Unemployment rate and GDP growth are essential indicators for measuring economic development in any country. Where GDP growth reflects on the economic activity of citizens, how they are doing business, and how they demand certain goods and services. Also, it covers trading outside of the borders of the country. Consequently, it shows a real reflection of political implementations and future perspectives for changes in a country.

While the unemployment rate can reflect citizens' social activity. It represents the percentage of people who are stuck in a financial crisis, without work. Indeed, the unemployment of people can be caused due to many factors. But it's one of the major indicators for politicians, in cases when unemployment is high it demonstrates a gap in the economy.

4.2 Hypothesis

To test Okun's law, which states that there is an inverse relationship, where an increase in GDP leads to a drop in the unemployment rate. Based on previous research, test the work of Okun's law in the case of the United States of America. The justification for the examinationis that a negative fluctuation in GDP leads to a slowdown in economic activity and an increase inan inactivepercentage of the population.

4.3 Variables

Unemployment Rate. It shows the percentage of people who are currently without access to official income. Citizens may be unemployed for various reasons, changes in the country, voluntary decision, improvement of skills etc.In Okun's law, the percentage of unemployment depends on economic performance and is a key factor. In the anallysis data used for the unemployment rate is from the 50 states of the United States of the America.

Real Gross Domestic Product Growth. This is the sum of all completed products and services within the United States. GDP most accurately reflects the economic situation in the country. In the case of the USA, 50 states were taken with data for the last 30 years.

The **GDP defleator** was applied to obtain Real Domestic product growth. The following formula will be used:

Real GDP = Nominal GDP / GDP deflator

4.4 Methods and Software

In the empirical analysis**, SAS Studio software** will be used.

SAS Studio isa Statistical Analysis System, which stands for statistical analysis. This programming language is used to process, analyze, and visualize data and build statistical models.

First of all, **correlation analysis** will be proceeded , which aims to measure the strength and direction of the relationship between two variables.

Secondly**, time series** which aims to understand and analyze data points collected over time pireod with vizualization.

Then analysis will proceed through **linear regression**which aims to to describe the correlation between an independent and possibly dependent variable. Which is the classical version of Okun's law. This model can be expressed as the following formula:

$\Delta ut = \beta 0 + \beta 1 \Delta yt + et$

Here, Δut is a fluctuation in the unemployment rate. While, Δyt is a change in GDP. And $\beta 1$ is Okun's coefficient. In other words,$\beta 1$is the rate of change in GDP, which affects the

unemployment rate. The ratio of - β0/β1represents unemployment threshold, so it shows to what degree the economy has to improve to have the stable unemploymet rate.

4.5 Time series

First, I uploaded the data for the Nominal Gross Domestic Product in current US dollars from the World Development Indicators website. Also, I downloaded the GDP Deflator for all the 30 years. After, dividing the Nominal GDP by the GDP deflator I have obtained with the **Real Gross Domestic Product**. Finally, to obtain the Real GDP Growth I've divided each year by the previous, the procedure was made for all the 30 years.

In the 1994 year we can see the increase up to 4% of the GDP growth rate, which is visible in the graph. In the 1995, there is a drop, and it's lower than3.0%. However, the gradual climbing appears in the 4 years in a row. From 1996 to 1999, the GDP growth rate was growing steadily, even though there was stagnation at 4.3% in 1997 and 1998, it continued to growth in the next year. The increase reached its peak on the 1999, with the percentage of growth around 4.6%.

Already in 2000, we can see the drop by 0.5%, the GDP growth rate downgraded to 3.9 %. The graph illustrates the downhill, which means that follwoing years met a decline in growth. A dramatic drop appeared in 2001, it was slowed by 3% due to economics instability and terttosit attacs. After one year, we can see the recvory by almost 1%. And the recvory percentage got dobled in 2003. So, in 2004 the GDP growth rate reached 3.7%, it was a peak for the begining of the 2000s. As housing market was on boom these years.

As it's visible on the graph, after 2005 there is only a dramatic decline in GDP growth rate. In the 2006 the housing market bubble was close to burst, so we can see a 0.7% decline. The same amount of the decline is noticable in 2007. In 2007 compared to 2004, we are able to see the 2% decline in economic growth in 4 years. However, the same amount of the decline by 2% happend in just one year, from 2007 to 2008. Analsysis in the priveous section states that the burst of the market bubble was in 2008. It was a casue for the GDP growth rate to drop to 0.1%. The lowest point was -2.7% in 2009.

After reaching the lowest point the graph illustrates rocker recovery rate of the US economy. In 2010 the negative percetnage swithed to 5.1% increasefrom -2.7% to 2.6%. Then increase in the economic outcome contiuted with lower rate of . And form the 2010 to 2015 the GDP growth rate in the USA was fluctuating between 2% and 3%. Only, changes by 0.5% are noticed during that time period. In 2016 the rate dropped to 1.6%, however two year later it increased up to 3% again. 2018 was the last year of stable economic growth, as in 2019 the virus pandemic started and influenced the country negatively. Consequently, we are able to see a negative GDP rate, which was -2.8% in 2020. The same drop close to -3% of GDP rate happened 10 years ago in 2009.

However, already in 2021 there was a rocket change in GDP growth. When the rate reached 5.6%. It was the highest point of economic development of the US for the last 30 years. If we compare two years, 2020 and 2002, we are able to see the 8.4% difference, which highlights a significant fluctuation.

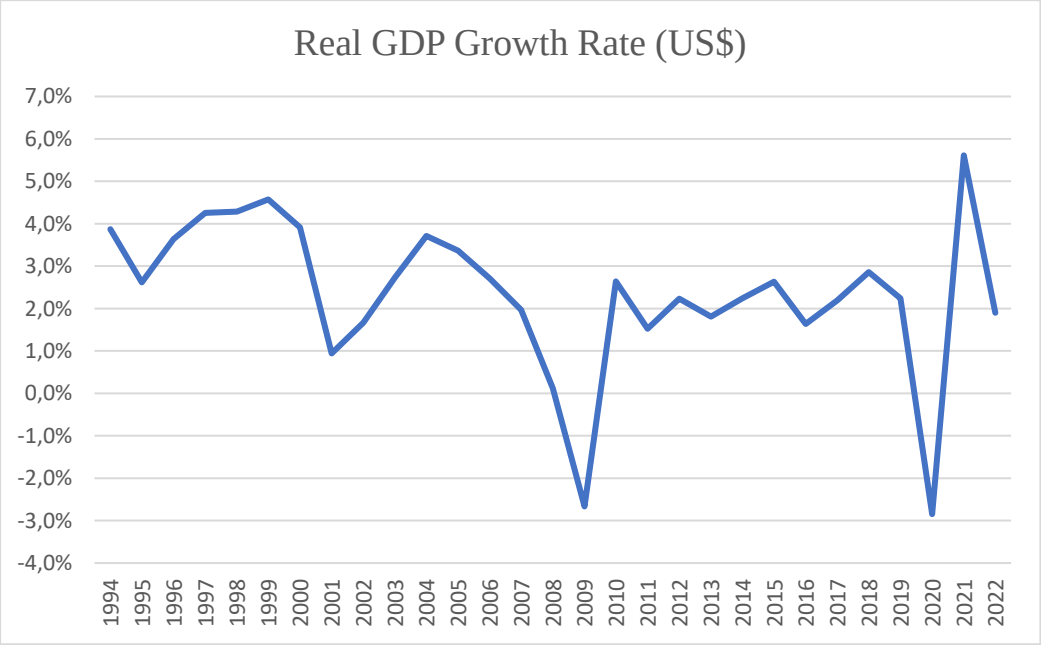

figure 1 Real GDP Growth Rate 1993-2022 Source: own creation

The second time series is related to the **Total Unemployment Rate** of the USA. The data for the unemployment rate is used from the World Development Indicators. The period is 30 years, from 1993to 2022 years.

In the graph, the unemployment rate was 6.1% in 1993, which was the highest value for the next period of 15 years. We can see a gradual downslide for the following 8 years. Where in 1995 the rate went below the 6% line, then continued to decrease, and reached 4% in 2000. The decline in 2000 compared to 1994 is 2%.
However, in the timeline of 2001 and 2007, there is a noticeable hill. In 2003 the unemployment rate reached 5.99% and it was a peak point. Then, it started to decrease again to 4.6% in 2007, which resulted in the hill. The dramatic changes are more significant in the next period.

From 2008 and up to 2015 there are dramatic fluctuations caused by the housing bubble burst. In 2008 the unemployment rate reached the line of 6%. The climbing rate continued to grow in 2009 and increased by 50% compared to 2008, consequently, it overcame the line of 9%.In 2010 the value remained at the historical highest point of9.63% for the last 30 years. Finally, the graph provides information about the decrease in 2011 with a rate of 8.95%. The unemployment rate continued to drop in further years, as a result in 2014 it was close to the 6% line. On average the decline was 0.5% annually and remained until 2019. The graph perfectly illustrates the smooth and gradual down slide from 2011 to 2019. In 2019 the unemployment rate had fully recovered to the lowest value of 3.57%

If we look at the graph, we can see an important jump in the unemployment rate in the year 2020. So, in 2020 the rate has reached 8% in just one year, it is a 4.5% increase compared to 2019.Dramatically, a year later the rate of citizens without work dropped to the historic low of 3.65% in 2022.

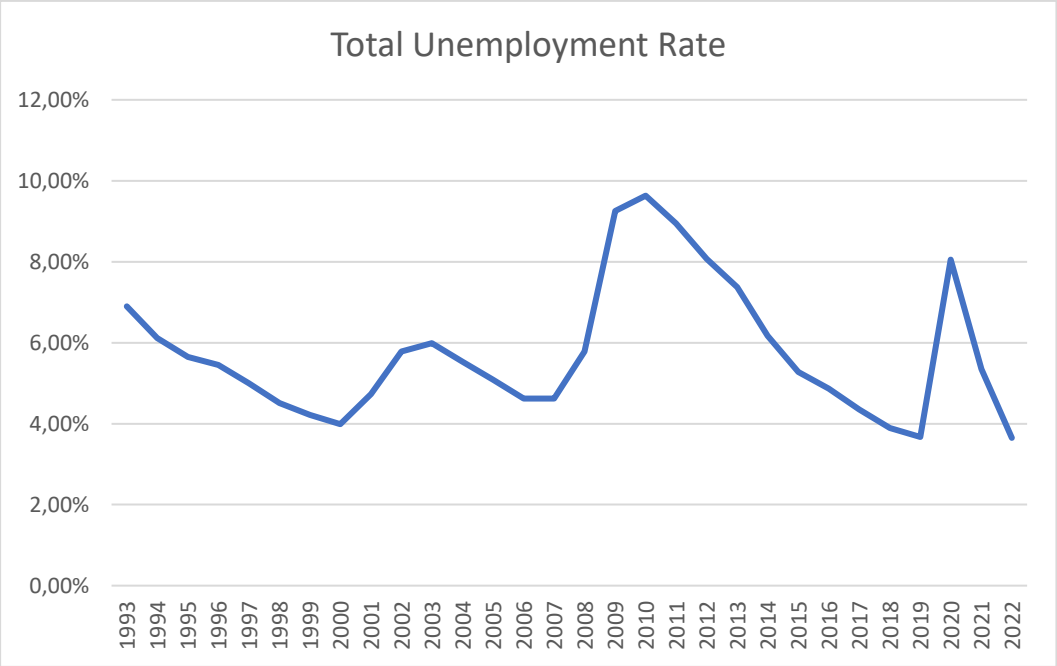

figure 2 Total Unemployment rate 1993-2022 Source: own creation

The graph shows a chain index of the Unemployment Rate in the United States of America from 1993 to 2022.
The chain index suggests a general downward trend in the unemployment rate from 1993 to 2000, with some minor fluctuations. The chain index values range from 0.89 to 0.96, indicating that the unemployment rate decreased between 1% and 11% from one year to the next during this period.

During 2001 and 2007, the chain index values range from 0.91 to 1.22, indicating that the unemployment rate fluctuated between decreasing by 9% and increasing by 22% from one year to the next. There seems to be a significant increase in the unemployment rate between 2001 and 2002, as indicated by the chain index of 1.22. There's also a substantial decrease between 2004 and 2005, followed by a slight decrease in 2006 and a minor increase in 2007.

In 2009, the chain index of Unemployment Rate reaches 1.6, which indicates a 60% increase compared to 2008. However, then the chain indexes tended to decrease up to 2015 with chain index of 0.84.

Then the increase started in 2020 where the chain index was 2.20, which shows a change in unemployment by 120% compared to 2019. But again, the chain index dropped below 1, as there was a decrease in unemployment rate in 2021 and 2022.

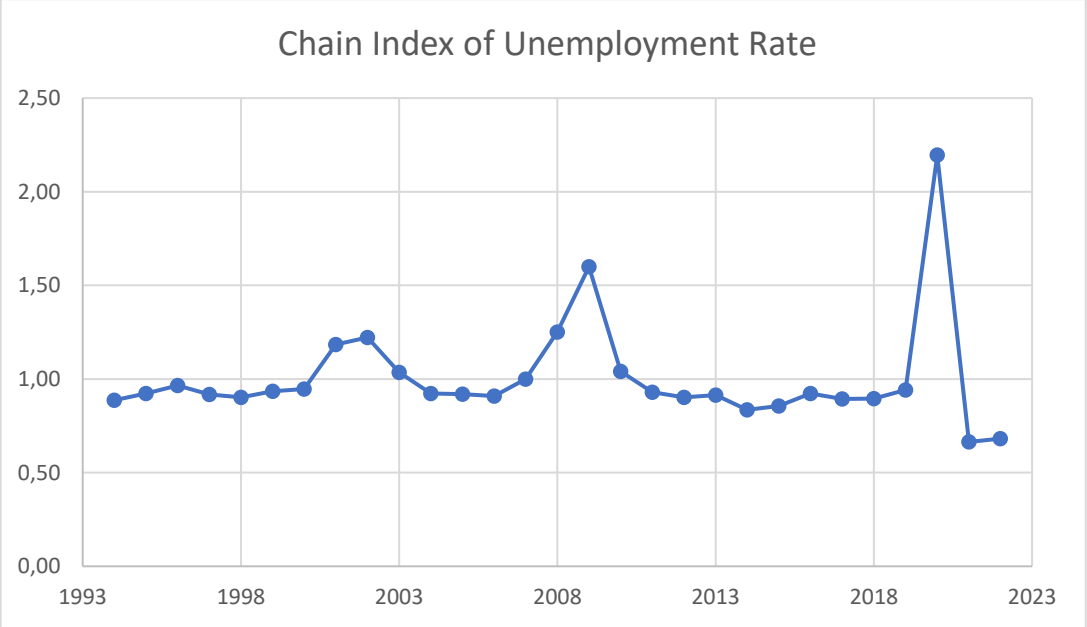

figure 3 Chain Index of Unemployment Rate 1993-2022 source: own creation

4.6 Descriptive Statistics

The descriptive statistics were made in the Statistical Analysis System. It contains two main variables Unemployment Rate and GDP Growth Rate. The data illustrated in the descriptive table are in percentages. The period of the data is 30 years, from 1993 to 2022, therefore, it contains 30 observations for each variable.

Variable	Mean	Std.Dev	Min	Max	Median	N
Unemployment Rate	5.760	1.655	3.700	9.600	5.400	30
Real GDP Growth Rate	2.363	1.809	-2.800	5.600	2.600	30

Table 9Descriptive statistics source: own creation

First of all, we focus on the mean values of the variables. The Unemployment Rate has a mean value of 5.76 for these 30 years. At the same time, the mean value of GDP Growth rate equals 2.36. Consequently, the difference between the mean values of the two variables

is -3.39. Overall, the data suggests that there is a moderate relationship between the GDP growth rate and the unemployment rate. This means that as the GDP growth rate increases, the unemployment rate tends to decrease. However, for a more in-depth investigation, we will do a regression analysis in a further section,

Now, focusing on the StandardDeviation of the Unemployment Rate we can see it equals 1.65%. It illustrates the low changes in the labor market for the last 30 years. Even though there were several years of recession, where the unemployment rate rocketed, however, overall stability made the most contribution to the low fluctuation rate. Regarding the GDP Growth Rate, the value of its standard deviation is 1.8%. The value also seems to be relatively low, which shows quite stable growththroughout time. The difference between the standard deviations is also extremely low and equals -0.154.

The minimum percentage for the Unemployment rate is 3.7. The lowest point for the last 30 years in our data appeared in 2022, whichhappened quite recently. About the maximum value, we can see it's 9.6, and it happened in 2010 after the economic crisis. So the difference between the highest and lowest value is5.9.
While the lowest value for the GDP Growth Rate is negative -2.8. Here the minimum rate happened in 2020 after theCOVID-19 pandemic crisis.
The maximum value for the GDP growth rate of the USA is 5.6 in 2021. The difference between the two extremes of GDP Growth Rate is 8,4, which points to diverse economic conditions in the US over the 30 years.

The median of the unemployment rate is 5.4, which is slightly lower than the mean of 5.7. This means that there were a few very high unemployment rates that pulled the mean up.
The median GDP growth rate is 2.6, which means that half of the GDP growth rates were higher than 2.6 and half were lower. This is slightly higher than the mean of 2.3, which means that there were a few very high GDP growth rates that pulled the mean up.
Overall, the data suggests that the GDP growth rate and unemployment rate are positively correlated, which means that they tend to move in the same direction.

4.7 Correlation Analysis

A correlation coefficient of -0.48231 between the GDP growth rate and the unemployment rate indicates a moderate negative correlation between the two variables. Once again it proves that as the Real GDP growth rate increases, the unemployment rate tends to decrease.The magnitude of the correlation coefficient-0.48231 suggests that the relationship between GDP growth rate and unemployment rate is not very strong.

H_0: There is no significant linear relationship between two variables.

H_1: There is a significant relationship between two variables.

Pearson Correlation Coefficients, N = 30		
	Unemployment Rate	Real GDP Growth Rate
Unemployment Rate Unemployment Rate	1.00000	-0.48231
Real GDP Growth Rate Real GDP Growth Rate	-0.48231	1.00000

Table 10 Correlation analysis source: SAS software

Accept H_1 as there is a significant relationship between Unemployment Rate and Real GDP Growth Rate.

4.8 Assumptions Check

The first step is the homoscedasticity check.

H_0: Variance of errors is constant.

H_1: Variance of errors is not constant.

Significance level = 0.01

The output p value is 0.0391, which is greater than 0.01 so H_0 must be accepted as variance of errors is constant.

Test of First and Second Moment Specification		
DF	Chi-Square	Pr > ChiSq
2	6.48	0.0391

Table 11 Homoscedasticity chech source: own creation

The next assumption to be checked is auto correlation. Which means that the error term for one data point is not independent of the error terms for other data points. Due to inflated standard errors misleading conclusions may occur. Commonly used test to analyze the residuals (errors) of the model to assess the presence of autocorrelation is **Durbin-Watson statistic.**

Durbin-Watson Statistics			
Order	DW	Pr < DW	Pr > DW
1	1.5340	0.1022	0.8978

Table 12 Autocorellation Test source: own creation

H_0: There is no first-order autocorrelation in the residuals.
H_1: There is a first-order autocorrelation in the residuals.

The Durbin-Watson statistic of 1.5340 is close to 2, which suggests no strong evidence of significant autocorrelation in the model. The P-value of 0.1022 is not statistically significant at alpha 1% level, further supporting the conclusion of no significant autocorrelation. Consequently, it's needed to accept zero hypothesis.

In **Normality** test the Kolmogorov-Smirnov test (KS test), named after Andrey Kolmogorov and Nikolai Smirnovis applied to assess **normality** in a dataset. The result of this test iditicates if the dataset accepts the normality assumption to obtain reliable results.

H_0: The data follows normal distribution.

H_1: The data does not follow normal distribution.

Significance level= 0,01

D = 0.12854318, this is the Kolmogorov-Smirnov statistic, which quantifies the difference between the observed data and the theoretical distribution. The p-value is 0.15 and it's greater than the significant level. Consequenlty, fail to reject the null hypothesis and prove thet residuals are normally distibuted.

Goodness-of-Fit Tests for Normal Distribution				
Test	Statistic		p Value	
Kolmogorov-Smirnov	D	0.12854318	Pr > D	>0.150
Cramer-von Mises	W-Sq	0.05169731	Pr > W-Sq	>0.250
Anderson-Darling	A-Sq	0.35934489	Pr > A-Sq	>0.250

Table 13Normal Distribution Test source: own creation

4.9 Regression Analysis

The next step in testing Okun's law in the United States of America is regression analysis. There will describe the relationship between two major variables GDP Growth Rate and Unemployment Rate.Analysis will quantify the strength and direction of the relationship between two variables. We will proceed with the ***classical model***As was stated in the previous chapter the equation of Okun's Law is;

$$\Delta ut = \beta 0 + \beta 1 \Delta yt + e,$$

Consequently, uploading the data in the Statistical Analysis System obtained the following tables:

Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.00185	0.00185	8.49	0.0070
Error	28	0.00611	0.00021815		
Corrected Total	29	0.00796			

Root MSE	0.01477	R-Square	0.2326
Dependent Mean	0.05752	Adj R-Sq	0.2052
Coeff Var	25.67840		

Parameter Estimates						
Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	Intercept	1	0.06795	0.00448	15.16	<.0001
Real GDP Growth Rate	Real GDP Growth Rate	1	-0.44151	0.15155	-2.91	0.0070

Table 14 Regression analysis source: own creation SAS Studio

The parameter estimates of the table above contains the parameters estimated via the OLS method.The parameter estimate of 'Real GDP Growth Rate' is the regression coefficient, which is -0.44151. This is the slope of the line and indicates how much impact a one-unit increase in the predictor would have on the 'Unemployment Rate'. Since it's negative, we can claim that the relationship between the variables is negative. We can also say it's statistically significant since the t-value is -2.91 and the corresponding p-value is less than the significance level, 0,01. So, we can conclude that there is a significant relationship between the GDP Growth Rate and the Unemployment Rate. This result is supported by the analysis of the variance table, where the p-value is 0.0070, which is less than the significance level. The R-squared value is 0.2326 and it points out that 23% of the variance of unemploymentis explained by the real economic growthfrom 1993 to 2022 years.

According to the regression table, we have obtained the following equation of Okun's law :

$$\Delta uit = 0.06795 - 0.441151x \text{ GDP change rate}$$

Consequently, Okun's coefficient equals -0.441.This means that for every 1% increase in the GDP growth rate, the unemployment rate is expected to decrease by 0.441%. The intercept value means that if GDP wont't change, the unemployment rate change is 0.06795 or 0.6%.

5 Discussion and Potential upgrades

In the last section, the data related to the main issues has been critically analyzed. In the final stage of the empirical analysis, the general hypothesis must be accepted, which states there is an inverse relationship, where an increase in GDP leads to a drop in the unemployment rate.

First of all, the correlation coefficient of -0.48231 between the GDP growth rate and the Unemployment Rate proves the negative correlation between the two variables. It's the first sign of an exisitng relationship.

Secondly, In the regression analysis, both the intercept and Unemploymnt Rates apperad to be statistically significant with p-values of 0.0001 and 0.007. While, Okun's coefficient equals -0.441, consequently, in the specific case of the United States of America for every 1% increase in the GDP growth rate, the unemployment rate is expected to decrease by 0.441%. As key regression assumptions have been met, it proves the validity of the results.

Additionally, the section explores potential improvements for the analysis presented in this thesis, where I investigated the relationship between the GDP growth rate and unemployment rate using a classical regression model. While a classical regression model provided valuable insights, but, exploring alternatives like dynamic models could account for more robust findings.

The analysis employed annual data. Examining shorter timeframes (e.g., monthly) can show more dynamics in the relationship, particularly during periods of rapid economic change.

The current model focuses on GDP growth and unemployment. Adding additional variables, such as industry-specific growth rates or labor market participation indicators, could potentially enhance the model's explanation by having more spectrum.

By highlighting these opportunities for improvement, the research can be continued and improved further.

6 Conclusion

To sum up, the main practical goal of the research was to test Okun's law relationship, where higher rates of GDP Growth lead to lower rates of unemployment in the specific case of the United States of America. Resulting in the evaluation of the hypothesis about the inverse relationship in the period of 30 years, from 1993 to 2022. Additionally, the thesis aimed to analyze trends of key economic indicators(GDP and unemployment) of the USA via qualitative analysis.

In the first part for a general understanding of GDP and Unemployment fluctuations qualitative research was made, where reports of the US economists were analyzed. The combination of citations and tables with numerical data from the US statistics was used for the creation of an accurate picture of the economy in the last 30 years. As a result of the qualitative analysis, the reasons for the jumps in GDP and Unemployment in the US economy were understood. As, the entrances to various organizations, the great recession, government regulations, and covid 19 caused GDP growth rates to rise to +5.8 and fall to -2.8. Consequently, the US unemployment rate rose to 9.6% and subsequently dropped to 3.6% in the last 30 years. With a clear picture of the US economy in mind, it was reasonable to begin the practical part of the research.

The data in the empirical analysis of the GDP and Unemployment rate was taken from the World Development Indicators database. In order, to obtain the Real GDP Growth rate the deflator was applied, and rates recalculated. After data improvements, the descriptive statistics and correlation analysis proceeded to summarize data, identify patterns, and understand potential relationships between variables. While for the data visualization time series of chain indices was created. Regarding the assumptions of the regression, it was analyzed and stated that data of the Real GDP and Umpoyment Rates ensures the validity and interpretability of its results. Finally, the regression model was constructed, which proved the existing negative correlation between the Real GDP Growth Rate and the Unemployment Rate. Where variables appeared to be statistically significant.

According to the empirical results, the hypothesis is accepted, in the specific case of the United States of America (1993-2022) economic growth leads to lowered unemployment.

To conclude, for policymakers it's essential to enact policies that encourage business investment, innovation, and infrastructure development. Policymakers can foster an environment conducive to sustained economic growth. This, in turn, can lead to increased job creation and a decrease in the unemployment rate. The global economy is interconnected. The USA is a member of international organizations and conducts trade with all countries of the world. The analysis conducted in this country is useful for the rest of the world.

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7.1 List of tables

7.2 List of graphs

8 Appendix

Time Series of the Real GDP Growth Rate USA 1993-2022

Time	GDP (current US$)	GDP deflator	Real GDP	Real GDP Growth Rate
1993	6858559000000	65,79	104248333410	2,7%
1994	7287236000000	67,20	108448283240	3,9%
1995	7639749000000	68,60	111359270790	2,6%
1996	8073122000000	69,86	115560372220	3,6%
1997	8577554457000	71,07	120699544140	4,3%
1998	9062818202000	71,87	126108566790	4,3%
1999	9631174489000	72,88	132154840820	4,6%
2000	10250947997000	74,53	137543004440	3,9%
2001	10581929774000	76,21	138855630600	0,9%
2002	10929112955000	77,40	141210542840	1,7%
2003	11456442041000	78,92	145159084890	2,7%
2004	12217193198000	81,04	150751414990	3,7%
2005	13039199193000	83,58	156002418910	3,4%
2006	13815586948000	86,16	160343670800	2,7%
2007	14474226905000	88,49	163567392410	2,0%
2008	14769857911000	90,19	163767252860	0,1%
2009	14478064934000	90,77	159509487130	-2,7%
2010	15048964444000	91,86	163830370550	2,6%
2011	15599728123000	93,77	166369569190	1,5%
2012	16253972230000	95,52	170163939330	2,2%
2013	16843190993000	97,19	173298147060	1,8%
2014	17550680174000	99,01	177262820360	2,2%
2015	18206020741000	100,00	182060207410	2,6%
2016	18695110842000	101,00	185096010530	1,6%
2017	19477336549000	102,92	189245717260	2,2%
2018	20533057312000	105,40	194819731910	2,9%
2019	21380976119000	107,29	199289751970	2,2%
2020	21060473613000	108,69	193773805210	-2,8%
2021	23315080560000	113,57	205294597270	5,6%
2022	25439700000000	121,56	209268350510	1,9%