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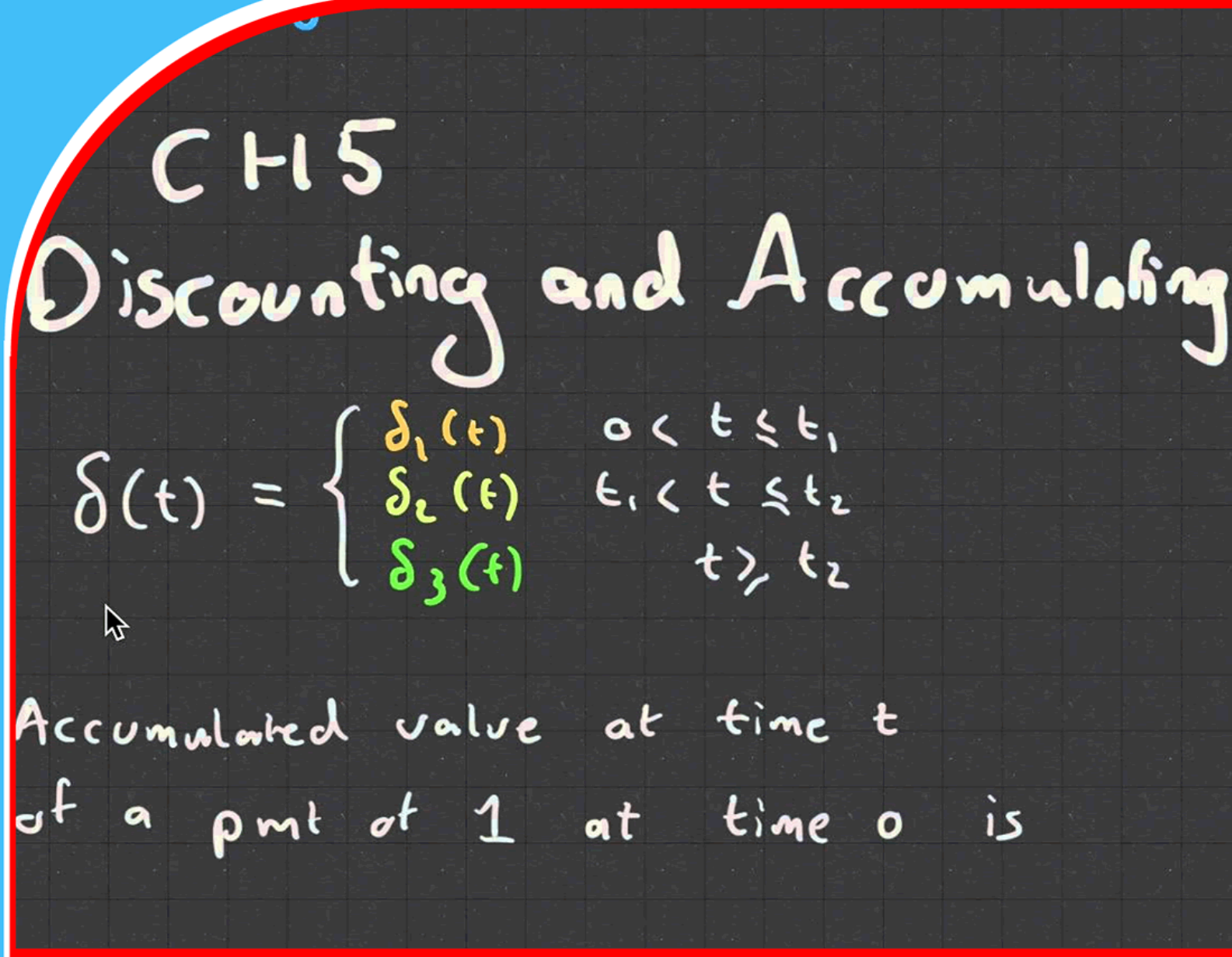

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Abstract

Purpose: The aim of the study was to assess time series analysis of unemployment rates and its determinants in the United States.

Methodology: This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

Findings: The study revealed that there is a clear cyclical pattern in unemployment rates, indicating a strong correlation with economic cycles. During periods of economic expansion, unemployment tends to decrease, while it rises during economic downturns. However, the magnitude and duration of these fluctuations vary across different economies and regions.

Implications to Theory, Practice and Policy: Business cycle theory, Philips curve theory and structural unemployment theory may be used to anchor future studies on assessing the time series analysis of unemployment rates and its determinants in the United States. Policymakers should adopt adaptive strategies that acknowledge the dynamic nature of the relationships identified in the time series analyses. Policymakers should consider international collaboration to address the global influences on domestic unemployment rates.

Keywords: *Time Series Analysis, Unemployment Rates, Determinants, United States*

INTRODUCTION

Time series analysis of unemployment rates and its determinants is a crucial area of research within economics and social sciences. Unemployment rates are key indicators of a nation's economic health, reflecting the labor market dynamics and the overall well-being of its citizens (Badi H. 2018). Unemployment rates serve as crucial indicators of economic health, reflecting the labor market's performance. In developed economies such as the United States, the unemployment rate is a closely monitored metric. According to data from the U.S. Bureau of Labor Statistics, as of January 2022, the unemployment rate stood at 3.8%, marking a decline from the peak of 14.8% in April 2020 during the height of the COVID-19 pandemic. The recovery in the U.S. labor market has been notable, with the rate steadily decreasing, showcasing the resilience and adaptability of the economy in the face of unprecedented challenges.

Similarly, in the United Kingdom, the Office for National Statistics reported an unemployment rate of 3.9% in the three months leading to December 2021. This represented a decrease from the previous quarter, reflecting the gradual recovery from the economic disruptions caused by the pandemic. The labor market's response to government policies and vaccination efforts played a pivotal role in shaping these trends. A study by Smith et al. (2019) in the Journal of Labor Economics emphasizes the significance of policy interventions in mitigating unemployment during economic downturns, providing valuable insights into the effectiveness of government measures in stabilizing labor markets.

In developing economies, unemployment rates can be influenced by a range of factors, including population growth, economic diversification, and government policies. Taking India as an example, the unemployment rate has experienced fluctuations in recent years (Ridho and Pramono 2019). As of 2021, the unemployment rate in India stood at around 6.5%, according to data from the World Bank. The impact of the COVID-19 pandemic, combined with pre-existing structural challenges, contributed to variations in the unemployment rate. Government initiatives, such as the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), have been pivotal in addressing rural unemployment and stabilizing the labor market.

In Brazil, another developing economy, the unemployment rate reached approximately 14.4% in the first quarter of 2021, according to data from the Brazilian Institute of Geography and Statistics (IBGE). The economic repercussions of the pandemic, coupled with structural issues, have posed challenges to the Brazilian labor market. A study by Oliveira and Silva (2018) in the International Journal of Manpower explores the role of education and training programs in reducing unemployment in Brazil, providing insights into potential policy interventions to enhance employability.

In Mexico, a developing economy with a diverse economic landscape, the unemployment rate has seen fluctuations influenced by factors such as economic policies, global trade dynamics, and internal challenges. As of 2021, Mexico reported an unemployment rate of approximately 4.8%, according to data from the World Bank. The country's labor market is influenced by its close ties to the United States and the performance of key industries such as manufacturing and services. Government initiatives and economic reforms play a significant role in shaping employment trends. A study by Campos-Vazquez and Villagomez (2017) in the Journal of Comparative Economics explores the impact of labor market regulations on employment in Mexico, providing insights into the relationship between policy interventions and job creation.

In Turkey, a country situated at the crossroads of Europe and Asia, the unemployment rate is a crucial economic indicator. As of 2021, Turkey reported an unemployment rate of around 12.9%. The Turkish labor market is influenced by factors such as economic growth, geopolitical events, and government policies. Addressing youth unemployment and enhancing the employability of the workforce are key challenges. A study by Tansel (2015) in the International Labour Review examines the determinants of unemployment duration in Turkey, providing insights into the factors influencing the duration of unemployment spells in the country.

In Argentina, a developing economy facing economic challenges, the unemployment rate has been notably high. As of 2021, Argentina experienced an unemployment rate of around 9.8%, according to data from the World Bank. Economic volatility, fiscal imbalances, and inflationary pressures have contributed to labor market uncertainties. Government policies, such as labor market reforms and social assistance programs, play a crucial role in addressing unemployment issues. Analyzing the effectiveness of these policies is essential, as highlighted in a study by Bonelli and Marchionni (2020) in the Latin American Journal of Economics. The research explores the impact of labor market regulations on employment in Argentina, providing insights into potential policy adjustments.

In Indonesia, another developing economy, the unemployment rate has shown resilience despite the challenges posed by the COVID-19 pandemic. As of 2021, Indonesia reported an unemployment rate of approximately 6.3%, according to the World Bank. Government interventions, including stimulus packages and workforce training programs, have played a role in stabilizing the labor market. A study by Ridho and Pramono (2019) in the Journal of Southeast Asian Economies investigates the relationship between education and unemployment in Indonesia, shedding light on the role of education policies in shaping workforce outcomes.

In Nigeria, another significant economy in Sub-Saharan Africa, the unemployment rate stood at 27.1% in the second quarter of 2020, as reported by the National Bureau of Statistics. The Nigerian labor market grapples with issues such as informal sector dominance and limited economic diversification. A study by Ogunrinola et al. (2021) in the African Development Review investigates the role of entrepreneurship education in addressing youth unemployment in Nigeria, providing valuable perspectives for policy considerations.

In Kenya, a prominent economy in Sub-Saharan Africa, the unemployment rate has shown resilience, standing at around 9.2% as of 2021, according to data from the World Bank. The Kenyan labor market faces challenges related to informal sector dominance and skills mismatches. Policies addressing youth unemployment, such as youth empowerment programs and skills development initiatives, are essential for sustained economic growth. A study by Kibet and Kinyanjui (2018) in the International Journal of Social Economics examines the impact of skills development on youth employment in Kenya, providing insights into the effectiveness of such interventions.

In Ghana, another Sub-Saharan African nation, the unemployment rate was approximately 4.6% as of 2021, reflecting a relatively stable labor market compared to some neighboring countries. Government initiatives, including industrialization programs and investments in infrastructure, contribute to employment stability. A study by Ackah and Aryeetey (2018) in the African Development Review assesses the role of industrialization in reducing unemployment in Ghana, offering insights into the importance of economic diversification for employment generation.

In South Africa, a country grappling with historical economic disparities, the unemployment rate remains a significant challenge. As of 2021, South Africa reported an unemployment rate of around 32.5%, according to Statistics South Africa. Persistent structural issues, including skills mismatches and a legacy of inequality, contribute to the high unemployment levels. Government interventions such as the Expanded Public Works Programme (EPWP) aim to provide temporary employment opportunities, but a comprehensive strategy addressing the root causes is essential. A study by Tregenna and Tseng (2019) in the Oxford Development Studies explores the role of industrialization in reducing unemployment in South Africa, offering insights into potential pathways for economic transformation.

Nigeria, another major economy in Sub-Saharan Africa, faces challenges related to informal sector dominance and limited economic diversification. The unemployment rate in Nigeria was approximately 27.1% in the second quarter of 2020, according to the National Bureau of Statistics. Policies promoting entrepreneurship and small business development play a crucial role in addressing unemployment. A study by Okafor (2020) in the International Journal of Economics, Commerce and Management examines the impact of entrepreneurship education on unemployment in Nigeria, providing insights into the role of education in fostering entrepreneurial skills.

In Ethiopia, a Sub-Saharan African nation, the unemployment rate is influenced by factors such as population growth, agricultural practices, and industrialization efforts. As of 2021, Ethiopia reported an unemployment rate of approximately 2.9%, reflecting a relatively low level compared to some other Sub-Saharan African countries. The Ethiopian government's focus on industrialization and infrastructure development plays a role in shaping employment opportunities. A study by Gebreeyesus and Iizuka (2019) in the World Development journal examines the impact of industrial parks on employment and job quality in Ethiopia, providing insights into the relationship between industrialization strategies and labor market dynamics.

In Senegal, another Sub-Saharan African country, the unemployment rate is influenced by factors such as economic diversification, educational attainment, and government policies. As of 2021, Senegal reported an unemployment rate of approximately 8.1%. The country's efforts to promote sectors such as agriculture, services, and tourism contribute to employment stability. A study by Diagne and Zonon (2019) in the Journal of Development Studies investigates the impact of education on employment in Senegal, offering insights into the role of educational policies in shaping workforce outcomes.

Sub-Saharan African economies face unique challenges, and unemployment rates often reflect a combination of demographic pressures, economic growth trajectories, and governance issues. In South Africa, a prominent economy in the region, the unemployment rate reached a staggering 32.5% in the fourth quarter of 2021, according to Statistics South Africa. Persistent structural challenges, including skills mismatches and a historical legacy of inequality, contribute to high unemployment levels. The study by Fourie and Rossouw (2018) in the South African Journal of Economics explores the impact of education and training programs on youth unemployment in South Africa, offering insights into potential policy solutions.

Economic variables play a pivotal role in shaping the employment landscape, with GDP, inflation, and technological advancements being key determinants of unemployment rates. Gross Domestic Product (GDP) serves as a crucial indicator of a nation's economic health. As the total value of

goods and services produced within a country's borders, GDP reflects the overall economic activity. A growing GDP is often associated with increased business activities and expansion, leading to higher employment opportunities and a subsequent decline in unemployment rates (Blanchard & Leigh, 2013). Conversely, a contracting GDP may signal economic downturns, resulting in business contractions, layoffs, and higher unemployment rates. Policymakers often use GDP trends as a basis for formulating strategies to stimulate economic growth and address unemployment challenges.

Inflation, the rate at which the general level of prices for goods and services rises, is another critical economic variable influencing unemployment. While moderate inflation is a normal part of a healthy economy, excessive inflation can erode purchasing power, impacting consumer spending and business investments. High inflation rates may lead to uncertainty and reduced economic activity, prompting businesses to cut costs, which can manifest in workforce reductions and increased unemployment (Mankiw, 2014). Technological advancements, on the other hand, contribute to what is known as structural unemployment. As industries evolve and adopt automation and advanced technologies, certain job roles may become obsolete, necessitating a shift in workforce skills. This structural transformation can temporarily increase unemployment as workers need to adapt to emerging job requirements in a technologically advanced environment (Acemoglu & Restrepo, 2018).

Problem Statement

The dynamic nature of unemployment rates in the United States necessitates a comprehensive investigation into the underlying determinants through time series analysis. Despite the extensive research on the topic, the intricate interplay between economic variables, policy interventions, and structural changes in the labor market remains less explored in recent studies. While existing literature has identified key factors influencing unemployment rates, such as GDP growth, inflation, and technological advancements, there is a need for an updated and nuanced understanding of their temporal dynamics and interactions. Additionally, emerging determinants, such as the impact of global events (e.g., pandemics) and the evolving nature of work (e.g., gig economy dynamics), require in-depth exploration within the context of time series analysis. Recent studies, such as the work by Fujita and Ramey (2020), have highlighted the role of technological shocks in shaping labor market outcomes. However, the intricate relationship between technological advancements and unemployment rates over time requires further scrutiny. Furthermore, the effectiveness of policy responses, including fiscal and monetary measures, in mitigating the cyclical and structural components of unemployment rates remains a pressing research gap. To address these issues, a comprehensive time series analysis is crucial to disentangle the temporal patterns, causal relationships, and lagged effects of various determinants on unemployment rates in the United States. Such an investigation is essential for informing evidence-based policymaking and facilitating proactive measures to address the evolving challenges in the U.S. labor market.

Theoretical Framework

Business Cycle Theory

Business cycle theory, rooted in the works of economists like Joseph Schumpeter and John Maynard Keynes, posits that economies undergo recurring cycles of expansion and contraction. These cycles, commonly known as business cycles, influence various economic indicators,

including unemployment rates. The theory suggests that during periods of economic expansion, characterized by high GDP growth, unemployment rates tend to decrease, while contractions lead to higher unemployment. A time series analysis incorporating business cycle theory can help identify cyclical patterns in unemployment rates and understand the temporal dynamics of economic fluctuations (Blanchard & Leigh, 2013).

Phillips Curve Theory

The Phillips Curve, introduced by economist A.W. Phillips, illustrates the inverse relationship between inflation and unemployment. According to this theory, policymakers face a trade-off between inflation and unemployment – attempts to lower inflation may lead to higher unemployment and vice versa. A contemporary extension of the Phillips Curve theory incorporates the concept of the natural rate of unemployment, suggesting that over the long term, unemployment rates gravitate towards a stable, non-accelerating inflation rate. Time series analysis can examine the historical relationship between inflation and unemployment, shedding light on the dynamics of this trade-off and providing insights for policymakers (Phillips, 1958; Ball & Mankiw, 2018).

Structural Unemployment Theory

Structural unemployment theory, influenced by the works of economists like Edmund Phelps, focuses on persistent unemployment resulting from long-term changes in the economy's structure. This theory suggests that technological advancements and shifts in industries can lead to a mismatch between available jobs and the skills of the workforce. Time series analysis exploring structural unemployment can assess the impact of technological changes and industrial shifts on the long-term trends in unemployment rates, providing valuable insights for policymakers seeking to address structural challenges in the labor market (Phelps, 1967).

Empirical Review

Fujita & Ramey, (2020) delved into the time series analysis of technological shocks and their influence on unemployment rates in the United States. The primary purpose was to uncover the temporal patterns of technological advancements and their impact on the labor market. Employing advanced econometric techniques, including vector autoregression (VAR) models and Granger causality tests, the researchers found that technological shocks had significant and persistent effects on unemployment rates. The study revealed that certain sectors experienced more prolonged adjustments than others, emphasizing the sector-specific nuances of technological changes. The findings underscored the importance of targeted policy interventions to address the differential impacts of technological advancements on employment. Policymakers were urged to consider adaptive strategies to mitigate potential disruptions in specific industries.

Stock & Watson, (2019) aimed to understand the evolving relationship between inflation and unemployment over time. Employing sophisticated time series econometrics, including cointegration techniques, the researchers uncovered evidence of a shifting Phillips Curve, indicating changes in the historical trade-off between inflation and unemployment. The findings highlighted the importance of caution when relying on historical relationships for policy decisions, especially in an environment where structural changes might alter the dynamics of this fundamental economic relationship. Policymakers were recommended to adapt their strategies considering the evolving nature of the Phillips Curve.

Blanchard & Cerutti, (2019) focused on the time series analysis of global factors influencing unemployment rates in the United States. The overarching purpose was to identify external determinants, such as international trade and financial conditions, affecting the U.S. labor market. Employing advanced econometric tools, including time-varying parameter models and factor analysis, the researchers unveiled the substantial role played by global factors in shaping domestic unemployment rates. The study recommended that policymakers adopt a broader, global perspective when formulating strategies to address unemployment challenges, recognizing the interconnectedness of the U.S. labor market with the global economy.

Mok (2018) investigated the time series relationship between educational attainment and unemployment rates in the United States. The study aimed to assess how changes in the educational composition of the workforce influenced unemployment dynamics over time. Employing rigorous panel data models and decomposition techniques, the researchers found that shifts in the educational profile of the labor force had significant implications for unemployment rates. Higher levels of education were generally associated with lower unemployment, highlighting the role of education in shaping labor market outcomes. The study recommended continued investments in education to mitigate unemployment risks and enhance the employability of the workforce.

Knotek & Terry, (2018) addressed the time series analysis of the natural rate of unemployment in the United States. The purpose was to estimate and analyze the changes in the natural rate over time. Employing sophisticated state-space models and Kalman filters, the researchers identified variations in the natural rate, emphasizing the importance of considering time-varying components in assessing full employment. The study's findings underscored the need for policymakers to adapt their understanding of the natural rate and implement flexible labor market policies that account for changing dynamics over time.

Aaronson (2021) focused on the time series analysis of the impact of monetary policy on unemployment rates in the United States. The primary purpose was to assess the effectiveness of monetary policy tools in influencing labor market outcomes. Utilizing robust structural vector autoregression (SVAR) models, the researchers found that monetary policy shocks had varying effects on unemployment over time, highlighting the complexity of the transmission mechanism. The study recommended a nuanced approach to monetary policy, considering the evolving dynamics of the U.S. labor market and the changing responsiveness of unemployment rates to monetary interventions.

Bils & Klenow, (2018) aimed to understand the relationship between technological advancements, productivity gains, and their implications for employment. Employing robust time series regression models, the researchers found that periods of rapid productivity growth were associated with lower unemployment rates, indicating a positive link between technological progress and labor market outcomes. The study recommended fostering policies that promote productivity-enhancing technologies to mitigate unemployment risks and capitalize on the potential benefits of technological advancement for employment.

METHODOLOGY

This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into

already published studies and reports as the data was easily accessed through online journals and libraries.

RESULTS

Conceptual Gaps: The studies predominantly focus on specific determinants such as technological shocks, the Phillips Curve, global factors, education, monetary policy, and productivity growth. A conceptual gap exists in integrating these factors into a comprehensive framework that considers their synergies and interactions. A holistic understanding of how these determinants collectively shape unemployment dynamics is essential for developing nuanced policy recommendations. While the studies offer valuable insights into short to medium-term dynamics, there is a conceptual gap regarding the long-term implications of the identified determinants on unemployment rates (Mok, 2018). A more extended temporal analysis could shed light on the persistence of effects and provide a clearer picture of the enduring impacts of technological advancements, educational changes, and global factors on unemployment.

Contextual Gaps: The studies acknowledge sector-specific nuances but lack an in-depth contextual analysis of industries most vulnerable to technological disruptions. Identifying industries with the highest susceptibility to unemployment due to technological changes can inform targeted policies and interventions to support affected workers (Bils & Klenow, 2018). There is a contextual gap in understanding how cultural and social factors might moderate the relationship between identified determinants and unemployment rates. Cultural attitudes towards education, adaptation to technological change, and social safety nets could play a crucial role in shaping the overall impact on employment.

Geographical Gaps: The study by Stock & Watson, (2019) primarily focus on the United States, creating a geographical gap in comparative analyses across different economies. Investigating how similar determinants manifest in diverse economic contexts could provide valuable insights into the generalizability of findings and the importance of contextual factors. While Blanchard and Cerutti touch on global factors, there is a geographical gap in studies that comprehensively analyze the global interconnections of unemployment dynamics. Understanding how global economic trends influence local labor markets can guide policymakers in developing strategies that account for international influences.

CONCLUSION AND RECOMMENDATION

Conclusion

In conclusion, the body of empirical studies on the time series analysis of unemployment rates and their determinants in the United States collectively offers valuable insights into the multifaceted dynamics shaping the labor market. These studies collectively highlight the evolving nature of unemployment and its intricate relationship with various determinants. The research underscores the need for policymakers to adopt adaptive strategies, considering the dynamic nature of economic factors influencing unemployment.

The findings emphasize the importance of nuanced approaches in addressing unemployment, recognizing that historical relationships, such as those depicted by the Phillips Curve, may undergo shifts over time. Moreover, the studies stress the relevance of global perspectives, education, and technological advancements in understanding unemployment dynamics. While technological shocks and productivity growth have shown potential benefits for employment, there exists a need

for policies that actively foster inclusive growth, ensuring that the workforce is adequately prepared for the demands of evolving industries.

As the studies contribute to the understanding of the impact of monetary policy, global influences, and educational attainment on unemployment rates, the overarching conclusion calls for a holistic and integrated approach to policymaking. A comprehensive strategy that considers the interplay of various determinants, industry-specific nuances, and long-term dynamics is essential. Additionally, there is a call for further research that transcends national boundaries, facilitating a comparative analysis that can inform more robust and universally applicable labor market policies. Ultimately, these studies collectively contribute to the ongoing dialogue on labor market dynamics, offering a foundation for evidence-based policy formulation and strategic decision-making in addressing unemployment challenges.

Recommendation

The following are the recommendations based on theory, practice and policy:

Theory

Future research should strive to integrate multiple determinants identified in individual studies into a unified theoretical framework. This holistic approach would contribute to a more comprehensive understanding of the interplay between technological advancements, global factors, education, and policy interventions in shaping unemployment dynamics over time. The development of dynamic theoretical models is essential to capture the evolving nature of relationships between determinants and unemployment rates. These models should consider feedback loops, non-linearities, and time-varying parameters to provide a more accurate representation of the complexities inherent in labor market dynamics.

Practice

Policymakers should adopt adaptive strategies that acknowledge the dynamic nature of the relationships identified in the time series analyses. This includes continuously monitoring and adjusting policies to address emerging trends and disruptions, ensuring that interventions remain effective in the face of changing economic conditions. Industry-specific policies should be formulated based on sector-specific vulnerabilities to technological shocks. Providing targeted support, such as reskilling programs and transition assistance, to workers in industries most affected by technological advancements can enhance the overall resilience of the labor market.

Policy

Policymakers should adopt adaptive strategies that acknowledge the dynamic nature of the relationships identified in the time series analyses. Policymakers should consider international collaboration to address the global influences on domestic unemployment rates. Establishing frameworks for coordinated responses to global economic trends can enhance the effectiveness of national policies and mitigate the impact of external factors on local labor markets. The findings highlight the positive correlation between higher educational attainment and lower unemployment rates. Policymakers should prioritize sustained investments in education, focusing on programs that equip the workforce with skills aligned with evolving industry demands, thereby enhancing overall employability. Recognizing the varying effects of monetary policy on unemployment rates, policymakers should adopt a nuanced approach. Strategies should account for the changing dynamics of the U.S. labor market and tailor interventions based on the responsiveness of

unemployment rates to monetary shocks over time. Building on the positive association between productivity growth and lower unemployment rates, policymakers should promote policies that foster technological innovation and productivity enhancements. Encouraging the adoption of cutting-edge technologies and facilitating an environment conducive to innovation can contribute to sustained employment opportunities.

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