

Biden versus Trump through Science

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ABSTRACT

This study aims to provide an informative and unbiased scientific comparison of the Biden and Trump presidencies for the American public, global media, and scholars. Using modern technology and utilizing official data sources from the U.S. Government, Federal Reserve, World Bank, and United Nations, the study ran hypothesis testing and Welch t-tests on various societal indicators like war casualties and economic metrics like debt and unemployment. Empirical evidence suggested that debt growth and death tolls are better (lower) during a trump term, however in terms of unemployment the difference is not statistically significant, even though numerically unemployment is slightly lower during a trump term. Finally, a Million scenario analysis took place according to which financial prosperity in the United states is probable on the short term.

Keywords: Unemployment Rate, Government Debt, Wars, United States of America, Trump, Biden

INTRODUCTION

Background and Statement of the Problem

The role of the President of the United States has an immense influence globally, impacting not only the 340 million U.S residents, but also extends its influence to the lives of around eight billion people worldwide (Burns, 2019).

Hence, the decision between a Republican and a Democratic president, even though it is a personal choice for U.S citizens, yet has significant consequences for non-Americans around the world. Surprisingly, even within American nationalist circles, opinions frequently rely on subjective sentiments rather than objective data. Furthermore, some individuals shape their opinion and form their views based on biased media outlets that openly support either the Democratic or Republican party.

Purpose, Research Questions and Significance of the Study

Indeed, the influence of Pathos is already prominent in the media and charismatic speeches of candidates and presidents which effectively appeal to emotions. However, the primary objective of this study is to focus on Ethos, leveraging the credibility and trust associated with the esteemed journal you are perusing. It also relies on logos, placing faith in the capacity of scholars to draw conclusions based on historical facts and rigorous analysis. By emphasizing Ethos and logos, the study aims to provide a solid, rational, and trustworthy foundation for its findings.

The initial three research questions related to finance present inherent challenges, particularly due to the complexity of establishing a ceteris paribus environment in recent years, greatly influenced by the COVID-19 pandemic, which disrupted the financial system from 2019 until 2022 (Gee & Asmundson, 2023).

To maintain data objectivity, an effective approach has been adopted – examining the first three years of each president's first term. This control variable enhances the credibility of the results by ensuring that they are rooted in the performance of the individuals rather than being excessively influenced by global events. Accordingly,

data are handled with care and delicacy, especially given that the United States, as the global leader in research and development has influence beyond its borders more than any country in the world (Beainy and Kamel, 2023).

The first research question examines individual welfare, focusing on which of the two presidents achieved greater progress in reducing unemployment, while not directly addressing other far-reaching effects, such as decreased crime rates and an overall enhancement of safety and quality of life within American Society (Purnomo, Supriyo et al. 2023).

The second research question adopts a long-term perspective (Rienks, 2023), emphasizing that the debt incurred today will ultimately be shouldered by future generations (Galbraith, 2023). In fact, the present debt is a burden that will be paid by our children tomorrow.

Transitioning from the micro-level of analysis that considers 340 million individuals, to the macro-level that encompasses the lives of 8 billion people globally, the final research question investigates war casualties worldwide during each of the presidents' tenure. This broad perspective aims to assess the global impact of these mandates on the backdrop of a larger population.

In addition to its distribution to global media outlets, the study's importance lies in its ability to offer valuable data from an impartial, third-party perspective. Much like an individual residing on Earth may struggle to perceive its roundness compared to an astronaut viewing it from afar, those deeply entrenched within a conflict or division may have difficulty discerning the reality. However, an impartial third party can provide a clearer, unbiased perspective, especially when using accurate data sourced from trusted institutions headquartered within Washington, D.C.

LITERATURE REVIEW

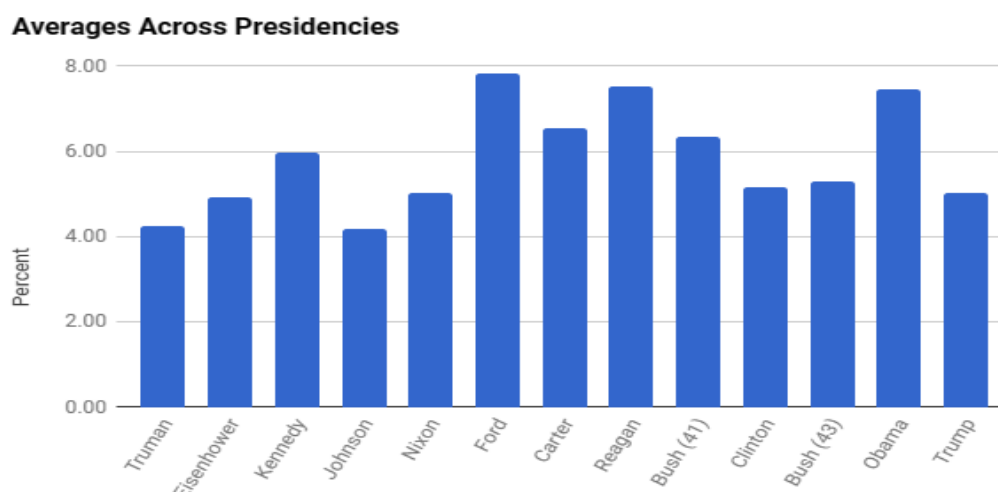
Literature and Context

This section reviews the historical evolution of the American unemployment rate, the American debt, and the war casualties in the core conflicts of the century.

Unemployment rates from Reagan (1981-1989) to Trump (2017 – 2021)

Unemployment rates are not only indicators of the general state of the economy, but also a reflection on presidency success (Stiglitz, Sen et al. 2009). They are often associated with economic health and presidential job approval (Wood 2007).

Graph 1: Unemployment Average Rates Across Presidencies



Source: Lunsford (2021)

Under President Reagan (1981 – 1989), the unemployment rate broke 10 percent for the first time since World War II, hitting 10.8 percent due to the ensuing spike in oil prices. It had returned to an average around 7 percent 1989 by the time President Reagan concluded his tenure (Healey and Strobel 1991).

Bush's administration (1989 – 1993) experienced a stable 18 months of unemployment, hovering around 5 percent. However, rates started to rise in July 1990, which peaked in June 1992 at an average of 6.8% (Pollin 2005).

Clinton (1993 – 2001) took office amid a period of robust economic growth, as seen by the continuous drop in the unemployment rate during his presidency. It finished up at an average about 5 percent, having begun at an average around 7 percent (Stricker 2003).

Under President Bush (2001- 2009), the terrorist attacks on September 11, 2001, instigated economic uncertainty, which contributed to an increase in the unemployment rate. June 2003 saw a drop, which continued through the summer and fall of 2007 until a dramatic increase happened in 2008, reaching a peak of 7.8 percent. When Bush concluded his tenure, the average was about 6 percent (Hungerford 2012).

The unemployment rate was still rapidly rising when Obama (2009 – 2017) took office. It peaked in October 2009 at 10%, lingered just below that mark for the next year, and then started a gradual slide at the end of 2010, that continued until early 2016 and broke past the 7% barrier at that time (Wibisono 2023).

Trump's administration (2017 – 2021) first years in office experienced consistent, low unemployment. In March 2020, the COVID-19 epidemic caused a sharp increase in unemployment to reach 14.8% before it declines to reach an average of 5 percent (James 2021). Excluding Covid period, unemployment in President trump's first tenure was one of the lowest in modern American history, which has significant positive impact on the stability of the international financial system (Kamel, Beainy, & Bteish, 2025).

Evolution of US debts under presidential term from 1981 till 2021

Before World War II, American national debt was around 33 Billion due to the Great Depression in 1920 and the Roosevelt's programs for unemployment and social security pensions (Kelly 2008, Johnson and Kwak 2012).

During World War II (1939–1945), the United States spent much on its own military and lent money to the United Kingdom and other nations to help mitigating the cost of war. The United States owed \$285 Billion at the end of that war, resulting in the expansion of American economy. However, the post-war pattern of declining national debt persisted.

The Vietnam War initiatives to support poverty, finance education and enhance transportation, all contributed to a subsequent rise in debt within a few decades (Kelly 2008).

The government debt was still growing at the beginning of the 1980s due to significant tax cuts and a rise in defense spending. The National debt was \$2.7 Trillion at the end of Ronald Reagan administration mandate (Aizenman and Marion 2011).

President Bill Clinton oversaw tax increases, cut defense expenditure, and the United States experienced an economic boom that slowed down the expansion of the National debt that has reached \$5.6 Trillion by 2000 (Warnock 2010).

Following the September 11, 2001 terrorist attacks, debts expanded in the new century. The economy stagnated as more money was spent on Iraq War and Homeland security. Moreover, the Government borrowed a significant sum of money from Social Security and Medicare (Kelly 2008).

The Government deficit reached over \$8.1 Trillion by 2005. Between December 2007 and June 2009, the United States went through a recession marked by high unemployment rates, the deflation of the housing bubble, and

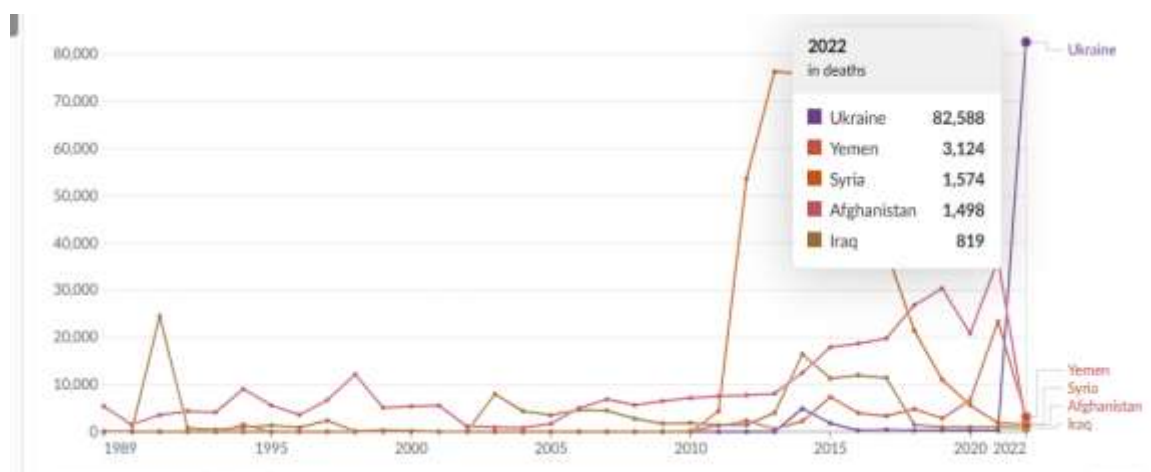
significant Government bailouts. In few years, the unemployment rate virtually doubled from 5.8 percent to 9.3 percent, while house values fell down by around 20% (Holton 2023).

To boost the economy and achieve a financial recovery, President George W. Bush signed the Troubled Asset Relief Program into law in 2008. It was around a \$700 Billion program. Well ahead, the \$831 Billion American Recovery and Reinvestment Act of 2009 was passed by President Barack Obama. The National debt has increased to \$12.3 Trillion by the end of 2009 (Maniam 2014).

The United States is by far the most indebted country in the world's history (Hall, Payne et al. 2021). Although debt has been a problem since America's founding, its rapid growth will endure to encourage Presidents to create better programs for spending control (Siddiqui 2020).

Evolution of Wars Casualties in the most important conflicts of the century

Graph 2: Evolution of the number of casualties in Wars against Ukraine, Yemen, Syria, Afghanistan, and Iraq from 1989 till 2022



Source: War and Peace - Our World in Data

What is historically proven is that wars are the main and direct cause of the increase in casualties worldwide (Taylor 2023). The graph above shows the evolution of the number of victims resulting from the most substantial wars of recent decades. The role played by the United States in these wars is detailed below.

Since World War II, there have been 15 Presidents for the United States of America, all of whom have presided America through wartime situations, confronting varying stages of conflicts (Geys 2010). Most of them, such President Trump who took office in January 2017, or President Biden who took office in January 2021, inherited wars that their predecessors started or left behind (Hanhalo and Semerak, 2023). Both have inherited decisions to continue the Wars against al-Qaeda and other Islamic jihadist groups in Iraq, Syria, Pakistan, Yemen, Libya, Somalia, North Africa and elsewhere (Hanhalo and Semerak, 2023).

The United States, under Presidents Obama and Trump, supported the Saudi-led coalition against the Iran-backed Houthis, although President Biden reversed this support in 2021 (Stewart 2023). However, since February 2022, Houthi forces and allied Iraqi Shiite militia have launched missiles and drone strikes against targets in the United Arab Emirates (UAE), who is member of the anti-Houthi coalition. These strikes required U.S forces to fire back in order to defend their military bases that are stationed in the UAE. This was the first time the U.S has used Patriot missiles since the 1991 Gulf War (Moqbel, 2023).

With Russia's invasion of Ukraine in 2022, the United States increased its support for Ukraine, providing weapons, training, money, economic and political support (Kagan, 2023). In fact, under Biden's presidency a new cold war has been developed with Russia, Iran, North Korea, and China (Sullivan, 2023).

Hypothesis Development

To address the research inquiries through a quantitative approach, three hypotheses were formulated, all indicating that the accuracy of our assertions is unfounded and incorrect and that the disparity in impact between the two presidents is negligible.

Hypothesis One: The unemployment rate in the United States remains consistent during both President Trump's and President Biden's mandates.

The objective of the first hypothesis is to investigate whether either of the presidents exerts a significant influence on the lives of American individuals by examining the consistency of the unemployment rate in the United States during both President Trump's and President Biden's mandates.

Table 1: Focus of Hypothesis one

Hypothesis Number	Studies the impact on:
One	American Individual

Hypothesis Two: There is no significant difference in the United States debt between Donald Trump's presidency and Joseph Biden's.

The goal of the second hypothesis is to assess whether the United States, as a cohesive entity, undergoes substantial changes under either of the two presidents, specifically analyzing the United States debt during Donald Trump's and Joseph Biden's presidencies.

Table 2: Focus of Hypothesis two

Hypothesis Number	Studies the impact on:
Two	The United States as a country

Hypothesis Three: The loss of human lives due to war shows similarities between Trump's and Biden's administrations.

The aim of the third hypothesis is to scrutinize potential significant differences on a global scale, particularly in terms of the loss of Human lives due to war, by comparing the similarities in the loss of Human lives due to war between Trump's and Biden's administrations.

Table 3: Focus of Hypothesis three

Hypothesis Number	Studies the impact on:
Three	The World

Table 4: Hypothesis development summary

Hypothesis	Focus	Level of Analysis
One	Unemployment	Individual
Two	National Debt	National
Three	War Casualties	Global

RESEARCH METHODOLOGY

Data Collection and Sampling Method

All data were sourced from various entities headquartered within the United States capital (data sources are shared in detail in the references).

Initially, data related to unemployment rates were gathered from the U.S. Bureau of Labor Statistics, an official website of the U.S. government and double-checked through FRED, the Federal Reserve Bank of St. Louis.

Additionally, data related to Debt were collected on a quarterly basis from the federal reserve bank of Saint Luis, in addition to the U.S treasury department.

Finally, data related to the toll of human casualties was collected from the World Bank's official open data sources.

It is worth noting that the data used in this study was solely sourced from governmental and international entities, along with their authorized websites, which ensure the utmost accuracy in the input, which in turn provides reliability for the results.

Empirical framework and Data Treatment

We employ a transparent, data-driven design that compares the first three years of each president's first term (Trump: 2017-01-20→2020-01-19; Biden: 2021-01-20→2024-01-19) to limit confounding and anchor results in comparable windows. Official series are used throughout: the U.S. unemployment rate (BLS, monthly, seasonally adjusted), gross federal debt (FRED/Treasury, quarterly, current dollars), and battle-related deaths worldwide (World Bank, annual). Data are cleaned and aligned to a common frequency. To test the null that the two presidencies do not differ, we apply Welch's two-sample t-test to monthly unemployment means and quarterly debt dynamics—both the change in levels (Δ) and quarter-over-quarter growth, furthermore the study ran a t-test on all 3 hypotheses to detect, if present, a significance difference between the two periods, furthermore, using modern technology the study runs a 1,000,000 scenario analysis to analyze the possibility that President Trump will be able to reduce the government deficit, thus positively reducing debt growth.

As a first step, and with a purpose to determine the optimum method to test the hypothesis we conducted a two-sample F-test for variance

Table 4: 2 Samples F Test for Variance

	Debt T (millions \$)	Debt B (millions \$)
Mean	211,794,59.4	30,453,120.8
Variance	946,027	2,696,716
Observations	11.0	11.0
Df	10.0	10.0
F	0.4	
P(F<=f) one-tail	0.1	
F Critical one-tail	0.3	
	UN Rate T (%)	UN Rate B (%)
Mean	4.0	4.3
Variance	0.1	1.0

Observations	11.0	11.0
df	10.0	10.0
F	0.1	
P(F<=f) one-tail	0.0	
F Critical one-tail	0.3	
	Human Casualties (Per Quarter) T	Humans Casualties (Per Quarter) B
Mean	84,352.1	325,863.5
Variance	292	25,398
Observations	11.0	11.0
df	10.0	10.0
F	0.0	
P(F<=f) one-tail	0.0	
F Critical one-tail	0.3	

According to the above table, the best model to use for reliable results is T-test for 2 samples assuming non-Equal Variance, with T as an annotation referring to President Trump and B as an annotation referring to President Biden.

RESULTS AND DISCUSSIONS

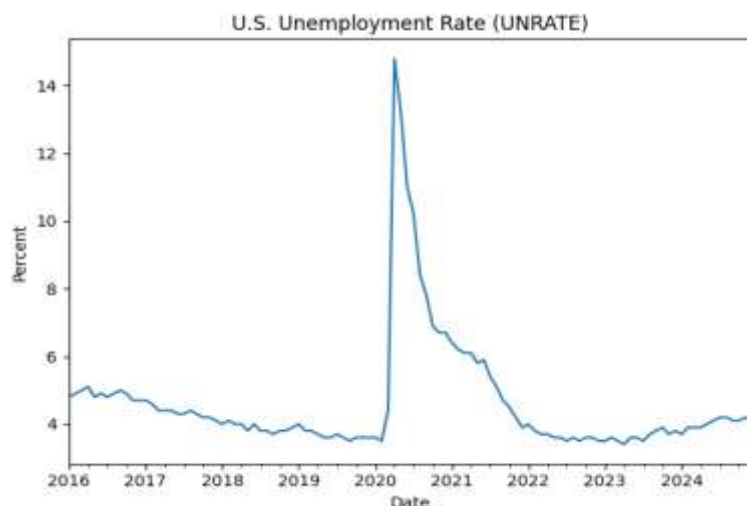
Results

Table 5: T-test Results

Notion	UN Rate T	UN Rate B	Debt T	Debt B	Humans Lost T	Humans Lost B
Mean	4.01	4.25	2.12	3.05	84.35	325.86
Observations	11.00	11.00	11.00	11.00	11.00	11.00
Hypothesized Mean Difference	0.00		0.00		0.00	
df	12.00		16.00		10.00	
t Stat	-0.76		-16.12		-5.00	
P(T<=t) one-tail	0.23		0.00		0.00	
t Critical one-tail	1.78		1.75		1.81	
P(T<=t) two-tail	0.46		0.00		0.00	
t Critical two-tail	2.18		2.12		2.23	

Referring to the Above, as the T Stat 0.76 < Critical 1.78 we fail to reject the null hypothesis one, according to which the unemployment rate in the United States remains consistent during both President Trump's and President Biden's terms.

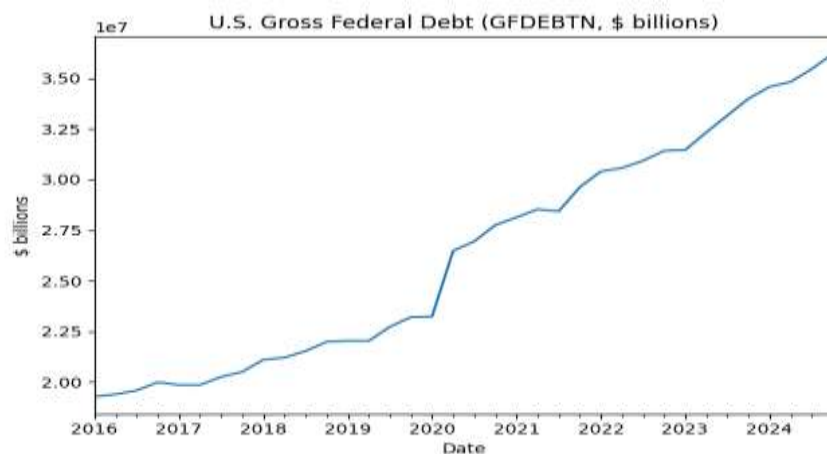
Figure 1: Unemployment Rate (%)



Source: Biden versus trump in numbers study

However, in Both the Debt Case and the War Human casualties, T stat for the former is $16.12 > \text{Critical } 1.75$ and for the latter $5 > \text{Critical } 1.81$, therefore we successfully reject both null hypothesis two according to which there is no significant difference in the United States debt between Donald Trump's presidency and Joseph Biden's and three, that states that the loss of human lives due to war shows similarities between Trump's and Biden's administrations.

Figure 2: Gross Debt (Billions of \$)



Source: Biden versus trump in numbers study

According to the above, by using official data and running a technical analysis, we can conclude that President Trump had a better performance in terms of debt. Furthermore, due to unknown reasons which are not part of this study, wars are less likely to erupt within his presidency, thus quantitatively, the observed death tolls decline significantly under a tenure of President Trump.

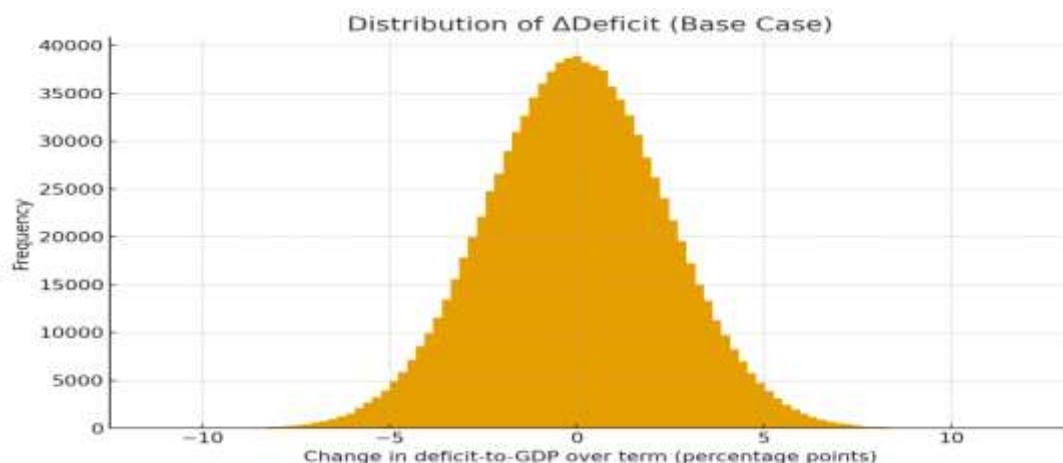
Table 6: Welch-t results

Indicator	Trump	Biden	Test	P value
Unemployment (mean, %)	3.9750	4.2111	Welch t, means	0.169
Debt (\$ bn, 3 yrs)	3354960	5868924	Welch t Quarter over Quarter	0.126

Source: Source: Biden versus trump in numbers study

However using Welch's tests, we do not find statistically significant differences in average unemployment or in the quarterly debt dynamics between the two presidencies—even though the absolute 3-year debt increase is numerically larger in the Biden window, and unemployment rates are percentage wise better during trump's presidency.

Figure 3: 1,000,000 regarding reduction of Deficit



Source: Monte Carlo Simulation study for IJSRMT (International Journal of Scientific Research and Modern Technology) .

As per the results of the above Montecarlo analysis, in over 50% of the 1,000,000 scenarios analyzed in the study, President Trump in his second term can reduce Government Deficit to GDP, which further supports the argument according to which the impact of President Trump is significantly positive in terms of debt reduction.

CONCLUSION

Contributions

In today's era, prioritizing numerical and empirical evidence allows us to draw conclusions based on mathematics and statistical tests rather than being influenced by politicians' discourse, especially when significant implications are at stake. In a world where media is used as a tool to shift public opinion, such quantitative scientific studies in the world's best journals promote critical thinking for individuals worldwide (Beainy and Kamel, 2023), promoting the latter would enhance proper decision making and the latter combined with democracy, according to which the decision is for the people, would render such articles as medications against Communism, discrepancy and uninformed irresponsible decision making which caused many voters in the past, especially Americans, regret their decisions.

LIMITATIONS

The World Bank's data on war-related losses were originally reported on an annual basis up to 2022, rather than being segmented into quarters. However, for quarterly results, the identical annual figure was utilized and divided into four equal parts.

The numbers in 2024 are sadly much higher, which is coherent with the study's results and supportive to its argument.

In the previous Decade, no years has been as bloody as 2023-2024, which further supports the need of such studies and the accuracy of its claims.

All other data related to Debt and Unemployment were extracted on a quarterly basis, did not vary in 2024 and are faithful presentations to Debt and Unemployment in the United States, according to the US Treasury Department and the US Bureau of Labor statistics.

Finally, the future outlook provided by the study through the Monte Carlo simulation is positive regarding the enhancement of the U.S Federal Budget balance, especially in the near term, yet as the stability of the U.S financial system is essential for the international financial system, especially developing countries that count on the U.S support to prosper (Beainy, 2023), another study ought to repeat the 1,000,000 scenario analysis on both medium and long terms.

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