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An Analysis of Demand-Pull Inflation in the United States Post-Pandemic

Isabella A. Moynihan
iam006@bucknell.edu

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by

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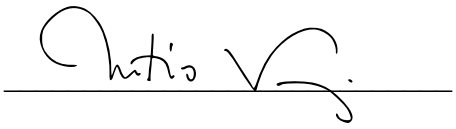
Adviser: 

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1. Introduction

The COVID-19 pandemic led to a global shutdown of the economy resulting from both demand and supply shocks. The pandemic created massive supply chain problems that restricted the supply of products in several sectors. Likewise, the pent-up spending power of households resulting from the stay-at-home orders led to increased demand for goods disrupting the supply chains (Barclay et al., 2022). The significant decline in output and employment in the immediate aftermath of the pandemic led to a fast reaction from the government. Large fiscal rescue packages were implemented to maintain consumers' purchasing power and avoid a complete collapse of the economy. The recovery was fast by all measures, and by 2022 the level of employment was above the peak from before the pandemic.

At the end of 2021, the acceleration of inflation, which had been dormant for more than four decades, became the main topic of macroeconomic debates. The debate has revolved around the influence of cost-push versus demand-pull causes of inflation. There is less evidence for the wage-price spiral, a central component of 1970s inflation (Tobin, 1974). The wage-price spiral involves a feedback loop between wage increases covered by price boots; thus, subsequent wage settlements respond to past wage patterns and price inflation (Tobin, 1974). Cost-push theories emphasize the role of supply-side factors, particularly the price of energy commodities, in generating inflation. In contrast, demand-pull theories imply that higher levels of spending should be seen as the root cause of inflation (Vernengo, 2006). Moreover, exogenous and endogenous money supply highlights that the different relationships between inflation and monetary stock measures can explain the root causes of inflation differently (Vernengo, 2006).

The debate has more specifically been about whether the fundamental causes of the recent acceleration of inflation were caused by the supply chain problems related to the pandemic or by the fiscal and monetary expansion that followed the pandemic and allowed for the recovery. For those who believe that cost-push factors caused inflation, the persistence of inflation results from the continuing supply-side problems and shutdowns that disrupted global trade. Moreover, the war in Ukraine added to the disturbances, leading to higher energy and food prices since Russia and Ukraine are large producers of natural gas, grains, and fertilizers. These conditions have led to the most rapid increase in inflation since the 1980s.

The dominant view in the United States, at least in policy circles, has been that inflation resulted from excess demand and an overreaction of the Federal Reserve and the Treasury in stimulating the economy. Lawrence Summers, an early critic of the stimulus, argued that the last fiscal stimulus package was excessive. Summers (2022) argues that there was too much stimulus, and the economy would overheat. He supposes that this inflationary process has more emphasis on demand, and greed is irrelevant when considering the inflation level. Although that view was initially in the minority, by the end of 2021, it became more prominent in policy circles. By March 2022, this view became dominant within the Federal Reserve, which started to hike the short-term interest rate.

The Federal Reserve's monetary policy reflects the logic of the Phillips Curve. In this view, changes in demand and spending in the economy are the primary determinant of inflation in the short run (Dale et al., 2022, 53). The Phillips Curve assumes that inflation would accelerate if the output is beyond potential output. In other words, the so-called output gap that measures the difference between potential and actual output would be negative. Therefore, the Federal Reserve attempts to curb inflation by employing tight monetary policy and raising

interest rates to reduce demand. Since the Federal Funds Rate serves as the base rate upon which other lending rates are built, the Federal Reserve uses it as a trigger point to help control the overall inflationary pressure and maintain what they consider a healthy equilibrium (Dale et al., 2022, 51). Accordingly, the Federal Reserve exercises control over the money supply and inflationary pressure by influencing the overall demand for borrowing in the economy.

However, inflation has persisted, and although it might be early to provide a complete picture, it seems that monetary tightening might not be an adequate solution (Appendix A). It would be particularly the case if the causes of inflation were ultimately connected to supply-side factors. This thesis will examine whether the output gap between potential output and actual output is negative and significant and the extent to which the demand-pull views of inflation are correct (See Appendix B). That would require measuring potential output, which will be done following several alternative methodologies.

My thesis focuses on the United States recovery from the pandemic and the corresponding inflation it has brought on. First, I am investigating the influence of demand-pull factors on the current era of accelerating inflation in the Pandemic recovery economy of the United States. Second, I will utilize various theories from the macroeconomic discipline to examine whether the economy is beyond its output capacity limit. Third, I will calculate measures for capacity utilization, potential output, and unemployment, for the so-called natural rate of unemployment, or the Non-Accelerating Inflation Rate of Unemployment (NAIRU), in the United States economy. Finally, some critical analysis of the conventional interpretation of those variables will be provided (Vernengo, 2006).

My thesis argues that despite the relatively fast recovery from the Pandemic Crisis, there is evidence that the economy is not at full capacity and that the labor market is not at full

employment. My thesis intends to understand to what extent the economy can be seen below full capacity. A low-capacity utilization after the pandemic and the persistence of some slack in the economy (see Appendix C) would make it hard to justify the tightening of monetary policy. Accordingly, I seek to understand practical alternatives to the conventional tight monetary policy of the Federal Reserve, as it appears to not deal with the fundamental causes of inflation.

The remainder of this paper is organized into 5 sections. Chapter Two reviews the literature on the history of inflationary processes, previous understandings of cost-push and demand-pull inflation, and the policy implications of tight monetary policy. Chapter Three details the datasets and methods of the econometric analysis that will be used to calculate unemployment, output, and capacity utilization to better understand the real conditions of the United States labor market and economy. Chapter Four outlines a discussion of these findings in relation to the downtown of the Keynesian Consensus, deindustrialization, and output hysteresis. Chapter Five concludes the study by summarizing the findings. The Bibliography contains all used materials and references. The Appendices present tables and graphs to help explain the econometric analysis.

2. Literature Review

This chapter investigates the literature on inflationary processes in the United States, the critical differences between supply and demand-driven inflation, and the policy implications of the Federal Reserve's response to the current post-COVID inflationary acceleration. By the end of 2021, the acceleration of inflation, which had been dormant for more than four decades, became the main topic of macroeconomic debates. Although there was a relatively fast recovery from the Pandemic Crisis, there is evidence the economy is not at full capacity and the labor market is not at full employment. Accordingly, it seems that monetary tightening might not be an adequate solution. This chapter investigates the literature surrounding conventional tight monetary policy and its impact on Americans.

2.1 Brief History of Inflation

Historically, inflation was understood as long-term trends, price revolutions, and short-term hyperinflations. The dominant interpretation of the long-term processes of price revolutions is by monetarists as they emphasize demographic forces in which money is endogenous. Accordingly, price revolutions begin in periods of prosperity and end in crises like the Great Depression. Likewise, one of the crucial characteristics of the hyperinflationary process, for the monetarist interpretation, is a rise in the money supply precedes a rise in price level (Vernengo, 2006). Famously, post-WW1 Germany experienced hyperinflation as a result of the dominance of purchasing power parity. The rise in domestic price level preceded and caused the depreciation of the Deutschmark, explaining the exchange rate determination in that period (Vernengo, 2006). Thus, the chain of causality runs from the exogenous money supply to the

price level and then to the exchange rate, making it impossible for a rise in the price level to be related to the increase in the money supply.

In the old quantity theory tradition, inflation results from an exogenous increase in the money supply. The older version proclaims that inflation is always a monetary phenomenon. However, in modern versions there is an output-inflation trade-off; the policymakers' objective is to maintain full employment to control inflation. The modern version affirms that monetary policy determines inflation in the long run but, in the short run, affects the unemployment level (Vernengo, 2006). Therefore, the trade-off between inflation and unemployment and the willingness of governments to exploit it are seen as the primary explanation, in the quantity theory tradition, for the persistence of inflation in developed countries.

The predominance of the full employment objective as the main target of macroeconomic policy implied eventual trade-offs between full employment and inflation. The Phillips Curve implies an empirical relationship between inflation and the level of unemployment and a level of unemployment at which prices are stable (Vernengo, 2006). Freidman named this the natural rate, implying that prices are stable whenever the interest rate or unemployment rate is at its natural level. The natural rate is the gravitational center around which the bank rate fluctuates, and real and monetary shocks cause deviations in the bank rate from equilibrium.

According to the heterodox tradition, inflation results from a conflict over income distribution. Conflict over income shares arises in several social environments, between capital and labor, between landowners and peasants, between different groups of workers, and between producers in different sectors of the economy, such as those that produce tradable and those that produce for the domestic market (Vernengo, 2006). There are three main alternative schools of thought: Marxists, post-Keynesians, and structuralists. The Marxist model assumes that conflict

is a direct function of effective demand, which depends on the exogenous money supply (Vernengo, 2006). Accordingly, inflation increases profits by reducing workers' real purchasing power because they cannot protect themselves against it. It differs from the conventional monetarist story because that understanding describes excess demand affecting the balance of power between workers and capitalists and only indirectly the price level (Vernengo, 2006). Thus, in the monetarist approach, demand affects prices directly. The post-Keynesian approach understands inflation through a conflict model where excess demand is irrelevant. In this view, money supply is endogenous, so inflation is endemic to the economic system. The structuralist view emphasizes the role of distributive conflict within a cost-push framework. For structuralists, inflation originates on the supply side and accompanies development because the development process increases the possible sources of supply-side constraints in the economy (Vernengo, 2006). Thus, a supply-side shock generates a process of chronic inflation. Heterodox authors understand inflation as rooted in distributive conflict, supply-side shocks, and propagation mechanisms. Accordingly, monetary and fiscal policies have limited effects on inflation but are influential tools to affect the level of activity in the economy. Heterodox authors see money as endogenous; thus, stabilization relies on income policies rather than macroeconomic austerity.

The orthodox school of thought emphasizes a demand-pull, whereas the heterodox emphasizes a cost-push understanding of inflation. Consequently, the main distinction between conventional wisdom and all unorthodox views of inflation depend on whether an extraneous element forces inflation into the system that would otherwise work perfectly, generally in the form of government's excessive money printing, or if social conflicts and structural limitations and ultimately resolved by inflation, typically but allowing cost to increase (Vernengo, 2006).

2.2 The Great Inflation: Last Inflationary Processes in the United States

Inflation is endemic to modern democratic industrial societies and characterized by three types: excess demand inflation, the wage-price spiral, and shortages that lead to price increases in important commodities (Tobin, 1974). The last significant inflationary acceleration in the United States was the Great Inflation of the 1970s. While the public diagnosed this inflationary process as resulting from excess demand, Tobin argued the Great Inflation was a combination of the wage-price spiral and significant price increases arising from shortages.

Tobin supposed that the United States, in part, suffered from severe inflation arising from significant increases in commodity prices. From 1970-1974, the depreciation of the dollar by 16 percent, in the foreign exchange markets, made imports significantly more expensive for Americans (Tobin, 1974). Therefore, combined with booms in Europe and Japan, the dollar's depreciation increased foreign demand for U.S. products, like essential agricultural and industrial commodities, because these U.S. commodities became cheaper for foreign countries to purchase. The rise in foreign demand alongside the drop in foreign imports led to a sharp increase in the prices facing American producers and consumers, which was further reinforced by the wage-price spiral.

Likewise, the wage-price spiral involves a feedback loop between wage increases covered by price boosts; thus, subsequent wage settlements respond to past wage patterns and price inflation (Tobin, 1974). Therefore, price inflation from the dollar depreciation of the Vietnam war was permanently built into the ongoing wage-price spiral that worsened and reinforced the inflationary process. While the wage-price spiral does not impose any collective loss on the nation or on the urban nonagricultural sector of the economy in which it occurs, it is relational, so distributional changes are constantly and unevenly occurring (Tobin, 1974).

Tobin argued that the wage-price spiral is highly resistant to unemployment, recession, and economic slack because wages and prices rise more rapidly when demand is strong rather than decline when demand is weak. Accordingly, Tobin (1974) advocated that it would take significantly more time and pain to overcome wage-price inflation built into the economy as the setbacks to real wages reflected in higher prices of food, fuel, and other commodities could not be reversed. Thus, Tobin disagreed with the classical remedy the Federal Reserve employed to address the Great Inflation. Since the Fed supposed inflation arose from excess demand, they restricted aggregate demand by tight monetary policy and fiscal austerity. Tobin (1974) believed this was a mistake because it would not succeed without years of economic stagnation, high unemployment, and lost production, with much more severe consequences for real economic welfare than inflation itself.

In Tobin's view, what was needed was Presidential leadership—in open, candid understanding with business, labor, agriculture, and consumers—to establish realistic moderate guideposts for wages and prices. Tobin (1974) explained that there was a need for a new social contract for the economy along the following lines: (1) Monetary and fiscal policy would be geared not to increase unemployment, but to keep it from rising and to achieve, not to thwart, the 4 percent a year growth in production of which our economy is capable, (2) Workers' take-home pay would be increased by cutting Social Security payroll taxes and by making the structure of those taxes more equitable and progressive. This tax cut would provide part of the demand stimulus needed under (1). (3) Labor, for its part, would consent to a general wage guidepost of 8 or 9 percent, and Washington would expect an exact comparable moderation in business and agricultural price setting

2.3 The Recent Debate of Cost-Push Versus Demand-Pull Inflation

The macroeconomic debate surrounding the recent acceleration of inflation has centered around the influence of cost-push versus demand-pull. Cost-push theories emphasize the role of supply-side factors, including, in particular, the price of energy commodities, in generating inflation; on the other hand, demand-pull theories imply that higher levels of spending should be understood as the root cause of inflation (Vernengo, 2006). More specifically, the debate has been about whether the fundamental causes of the recent acceleration of inflation were caused by the supply chain problems related to the pandemic or by the fiscal and monetary expansion that followed the pandemic and allowed for the recovery. For those who believe that cost-push factors caused inflation, the persistence of inflation results from the continuing supply-side problems and shutdowns that disrupted global trade. Furthermore, the war in Ukraine added to the disturbances, leading to higher prices of energy and food prices, since both Russia and Ukraine are significant producers of natural gas, grains, and fertilizers. These conditions have led to the most rapid increase in inflation since the 1980s. However, the dominant view in the United States has been that inflation resulted from excess demand and an overreaction of both the Federal Reserve and the Treasury in stimulating the economy.

Accordingly, alternative theories emphasize the old classical political economy tradition, according to which distribution is determined by social variables and historically developed institutions (Vernengo, 2006). Heterodox economists argue the integral contradictions of the functioning of the market economy are essential to understanding the inflationary process (Vernengo, 2006). For heterodox economists, there is an understanding that the supply side effects have played a more prominent role. However, fundamentally inflation is seen as resulting in too much demand that was exploited by greedy corporations (Vernengo, 2022). Thus, they

hold an oligopolistic view of inflation: corporations should be regulated and price controls are the solution[1]. Heterodox authors see money as endogenous, so stabilization relies on income policies rather than macroeconomic austerity (Vernengo, 2006). Accordingly, heterodox economists believe that monetary and fiscal policy have limited effects on inflation.

For progressives, there is an understanding that the supply-side effects played a more significant role but that inflation results from too much demand that can be exploited by greedy corporations that have increased their profit margins (Vernengo, 2022). Thus, corporations should be regulated and price controls are the solution.

Krugman argued that there were two central issues to understanding inflation[2]. First, the supply chain had skewed demand, leading to an increased demand for durable goods (Krugman & Summers, 2022). Accordingly, the private sector had a huge financial incentive to respond to this through higher prices. Second, in the labor market, the employment ratio to quits ratio and rapidly rising wages. Krugman maintained the behavior of wage and price setters determines short-term and medium-term expectations; therefore, mortgages and exchange rates are the main mechanisms that influence inflation expectations.

In contrast, the orthodox school of thought emphasizes demand-pull, whereas the heterodox emphasizes cost-push views of inflation. Thus, the main distinction between cost-push and demand pull is whether an extraneous element forces inflation into the system that would otherwise work perfectly, in the form of government's excessive money printing, in the demand pull view, or if structural limitations that are endogenous to the economic system lead to cost to increases, in the cost-push view. For orthodox economists, the government largely explains

[1] Progressive economists, like Isabella Weber (2023), argue that corporations drive inflation as there has been a sharp increase in profits and a general rise in prices. This ideological argument is conflict driven.
[2] Krugman (2016) considers himself a follower of Tobin as he believes his economic rationale is guided by the character of the "imaginary James Tobin."

inflation, and it is an external political process that affects a well-functioning economy. Consequently, they understand the recent acceleration of inflation arising from the excessive fiscal expansion in the face of the pandemic, and the increase in spending, and demand, associated with a fast recovery (Vernengo, 2022). Since the culprit of inflation was the government, austerity and monetary restraint are needed.

For fiscal conservatives, there is a view that inflation was caused by the excessive fiscal expansion in the face of the pandemic, and the increase in spending, and demand, explains a fast recovery (Vernengo, 2022). Lawrence Summers (2021) argued the fiscal stimulus packages were excessive: the first round of fiscal stimulus totaled 14% of GDP and was five to six times greater than the stimulus from the Great Recession. Thus, the extraordinary monetary measures of the government, and considerable savings overhang, seemed to be overdoing the requisite response for Summers. In this view, the reason for inflation was the government, so continued austerity and monetary restraint are needed. Moreover, firm-side indicators are highly significant for predicting wage inflation, and the current level of vacancies and quits observed in the labor market corresponds to a degree of labor market tightness previously associated with unemployment rates below two percent (Domash & Summers, 2002). Summers (2022) believes that labor markets will remain very tight unless there is a considerable slowdown in labor demand. Although this view was initially in the minority, by March 2022, this view became dominant within the Federal Reserve. Accordingly, the Federal Reserve's response has been monetary tightening by raising the overnight interest rate.

2.4 The Monetary Policy of the Federal Reserve and the Impact of Tightening

The Federal Reserve's monetary policy reflects the logic of the Phillips Curve. In accordance with this view, changes in demand and spending in the economy are the primary

determinant of inflation in the short run (Dale et al., 2022, 53). The Phillips Curve assumes that if the actual output is beyond potential output inflation, then inflation accelerates. In other words, the so-called output gap that measures the difference between potential and actual output would be negative. Therefore, the Federal Reserve is attempting to curb inflation by employing tight monetary policy, and raising interest rates, to reduce demand. Since the Federal Funds Rate serves as the base rate upon which other lending rates are built, the Federal Reserve uses it as a trigger point to help control the overall inflationary pressure and maintain what they consider a healthy equilibrium (Dale et al., 2022, 51). The Federal Reserve exercised control over the money supply and inflationary pressure by influencing the overall demand for borrowing in the economy.

Moreover, the Phillips curve implies that there is an empirical relationship between inflation and the level of unemployment and that there is a level of unemployment at which prices are stable (Vernengo, 2006). Freidman named this the natural rate, implying that prices are stable whenever the interest rate or unemployment rate is at its natural level (Vernengo, 2006). Accordingly, the natural rate is the center around which the overnight interest rate fluctuates. In this view, real and monetary shocks cause the overnight interest rate to rise or fall. In Friedman's view, money is exogenous, and shocks lead to deviation from the natural rate.

The Federal Reserve continues to enact policy based on calculations and theories that may not fully reflect the true conditions of the economy. Inflation has persisted, and while it might be early to provide a full picture, monetary tightening might not be an adequate solution. This is significant because inflation affects some social groups more than others, and low-income individuals are disproportionately burdened. For lower-income households, a large portion of their expenses goes toward necessities -food, energy, and housing- which have seen some of the

largest increases in 2021 (Dam & Siegal, 2022). For example, lower-income families spend an average of 11 percent of their budget on food, compared with higher-income households, which spend 7 percent on food (U.S. Bureau of Labor Statistics, 2022).[3]

Moreover, with significant disposable incomes, higher-income families can more readily absorb the rising cost of necessities. As a result, they spend more on retirement accounts, mortgages, and investments and less on necessities squeezing budgets around the country (Dam & Siegal, 2022). Furthermore, retirement savings and investments tend to outpace inflation in the long run, adding an extra layer of defense. High inflation tends to worsen inequality or poverty because it significantly impacts income and savings for poorer or middle-income households more than wealthy families (Gill & Nagle, 2022).

2.5 Existing Gaps in Literature

Existing studies conducted by economists defend the conventional demand-pull inflation story; thus, the policy response of the Federal Reserve is to curb excess demand by raising the short-term interest rate. However, research suggests that the unemployment gap may be an insufficient metric of labor demand conditions, and other indicators are required. Historically, the Federal Reserve utilizes the unemployment gap as a proxy for labor market slack in its inflation forecasts (Domash & Summers, 2002). Accordingly, the literature lacks a comprehensive understanding of inflation as the unemployment gap appears inadequate.

Specifically, in the post-COVID economy, the unemployment gap does not fully capture the tightness of the labor market because it is hard to measure since there are high levels of instability and uncertainty surrounding the NAIRU (Domash & Summers, 2002). Also, the

[3] According to Dean Baker, the aid of the stimulus checks led low-income households to have greater levels of disposable income that made them better off than pre-pandemic levels

composition of unemployed workers, short-term versus long-term, drastically affects the tightness in the labor market. Finally, the unemployment rate does not include people who are unemployed- people who are not actively searching for a job but would rejoin the workforce if the job market were stronger- or employed people who are looking for work (Domash & Summers, 2002). Accordingly, utilizing conventional measures of unemployment does not fully capture the entire picture of the labor market; thus, it necessitates alternative metrics.

Consequently, this honors thesis approaches the topic of accelerating inflation from a heterodox approach by studying capacity utilization in the United States economy. A low-capacity utilization after the pandemic and the persistence of some slack in the economy would make it hard to justify the tightening of monetary policy. Understanding whether the economy is at its potential output level and whether interest rate hikes that can throw the economy into a recession are the right policy tool to deal with inflation is imperative. Therefore, there is reason to be skeptical that the Federal Reserve's policy prescriptions are addressing the real culprit, or culprits, behind persistent inflation.

3. Data and Methods

The data utilized in this study was obtained from the publicly available datasets of the Federal Reserve Economic Data, Congressional Bureau Office, U.S. Bureau of Labor Statistics, and the Economic Policy Institute. They provide data on capacity utilization, output, and unemployment. The Federal Reserve Economic Data (FRED) consists of economic time series data from national, international, private, and public sources. The data comes from notable sources like the Board of Governors, Bureau of Economic Analysis, Bureau of Labor Statistics, and the United States Census. FRED's data is separated by category: money, banking, finance, population, employment, labor markets, national accounts, production and business activity, prices, international data, United States regional data, and academic data. Likewise, the Congressional Bureau Office (CBO) supports the Congressional budget process by producing independent analyses of economic and budget issues. The CBO regularly publishes budgetary and economic outcomes projections based on the assumption that current federal spending and revenue laws will generally remain in place (CBO, 2023). The CBO's economic forecasts cover the major economic variables—gross domestic product, unemployment, inflation, and interest rates—along with other useful economic indicators. Also, the U.S. The Bureau of Labor Statistics (BLS) measures labor market activity, working conditions, price changes, and productivity in the U.S. economy to support public and private decision-making. Most BLS data comes from surveys, nearly all of which are voluntary. Finally, the Economic Policy Institute (EPI) is a think tank that conducts original research and analysis on the economic status of working America publicly available.

This chapter intends to understand to what extent the economy can be seen as below full capacity. A low-capacity utilization after the pandemic and the persistence of some slack in the economy (see Appendix C) would make it hard to justify the tightening of monetary policy. Therefore, I surveyed macroeconomic theory to assess different methods to understand the degree of slack in the labor market and economy as a whole. First, I looked at alternative measures of unemployment and their relation to measures of full employment. Second, I looked at measures of total capacity utilization, and potential output. To provide an accurate picture of the situation of the economy, there is a need to reconsider the mainstream idea that potential output level and growth are compatible with constant inflation, which corresponds to the NAIRU, as it is assumed in the acceleration of inflation within the Phillips Curve model framework (Fontonari et al., 2021).

The unemployment rate is the percentage of the labor force actively seeking work. It is a mathematical measure of unrest, defining the percentage of the workforce that cannot find employment (Dale et al., 2022). Likewise, the labor force participation rate is a vital economic indicator because it measures the percentage of the labor force currently working or actively seeking work (Dale et al., 2022). This pool is working or seeking work, thus, participating in the labor force. It provides a different insight into the overall labor conditions of an economy. My thesis supposes we should view them in tandem because it provides a more robust understanding (see Appendix D). I analyzed the effects of a lower level of capacity utilization on the level of unemployment. Alternative measures of unemployment that include the discouraged and marginally attached to the labor market are analyzed.

Capacity utilization is an important economic indicator because it measures the extent to which production capacity is employed. Accordingly, it is an indicator of efficiency as it

represents the amount of output produced relative to the total output possible at a given cost of production (Dale et al., 2022). There are many methods to calculate the potential output and the deviation of output from potential or the deviation of capacity utilization from its normal level, which is associated with potential output.

One way of estimating potential output can be achieved by calculating the rate of capacity as a ratio of actual output to potential output. We have:

$$Rate\ of\ capacity\ utilization\ =\ \frac{Actual\ Output}{Potential\ Output}$$

The overall capacity utilization rate might provide information about how close to full capacity the economy is and, as a result, about the degree of inflationary pressure in the economy. It is often believed to be a predictor of inflation because, historically, approximately 82% capacity utilization will result in a low unemployment rate and relatively stable prices (see appendix D) (Dale et al., 2022). Thus, capacity utilization is crucial to predicting and understanding inflation, and whether that level can be seen as a full capacity is analyzed[4]

A typical approach to measuring potential GDP is the peak-through method, and another is the Hodrick-Prescott filter. Both were utilized to determine whether the economy is close to full employment and whether the output gap, the difference between actual and potential output, is positive. Hence, excess demand can be seen as a cause of inflation.

[4] The debate about the declining level of capacity utilization in the United States is reviewed by Gahn (2020), which is the source for some of the views in this work.

The next sections will first analyze the labor market and how tight it is under different assumptions about the level of labor force participation, the employment-population ratio, and alternative assumptions about capacity utilization and the output gap.

3.1 The Labor Market

The unemployment rate is the ratio of the total unemployed to the labor force and varies with changes in the size of the labor force. As a result, the rate of unemployment can be an imprecise measure of the situation in the labor market. In order to analyze the limitations of the current level of unemployment, the rate of unemployment can be decomposed into elements that make explicit changes in the participation rate, that is, the share of the population that is part of the labor force and has actively searched for employment in the last two weeks. The participation rate (PR) is defined as the labor force (LF) divided by the total working age population (POP), and LF is composed of the employed (E) and the unemployed (U)[5]. We have:

$$PR = \text{LF/POP and } LF = E + U$$

From these two definitions we get:

$$PR = \frac{E}{POP} + \frac{U}{POP}$$

As the unemployment rate (u) is defined as the ratio of unemployed to the labor force the formula above can be rewritten as:

$$PR = \left(\frac{E}{POP}\right) + \left(\frac{U}{LF}\right) * \left(\frac{LF}{POP}\right) \text{ or}$$

$$PR = \left(\frac{E}{POP}\right) + (u * PR)$$

Solving for u, we obtain:

[5] For further details see Table A in the appendix.

$$u = 1 - \frac{\frac{E}{POP}}{PR}$$

In other words, the unemployment rate is positively related to the participation rate and negatively related to the employment-population ratio. Therefore, if the participation rate goes down, as it has gone in the last two decades, then the unemployment rate goes down, assuming that the employment-population level does not change, even if the conditions in the labor market have not improved.

If the unemployment rate remained at its average from 1989 to 2007, then it would be 9.6%, which is not close to full employment. This level of unemployment is 6.15% greater than the current unemployment rate. It appears the decline in the labor force participation rate is camouflaging the true unemployment rate.

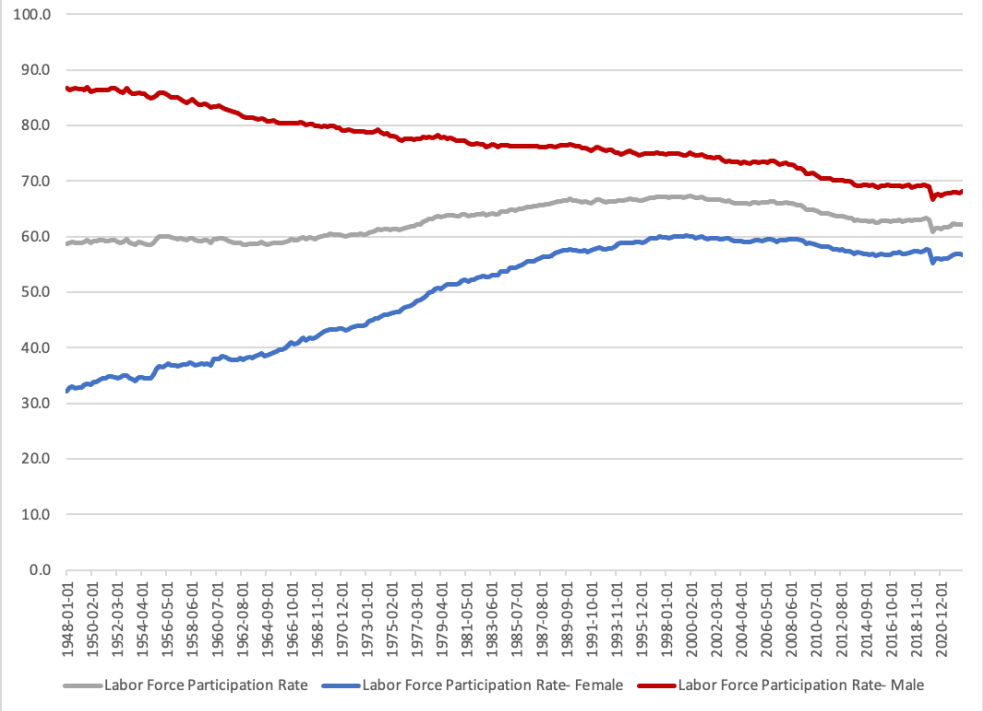
Conversely, we can calculate the unemployment rate if the labor force participation rate were at the December 2022 level of 62.3% and the employment-population ratio was at its average level from 1989 to 2007, which was at 62.9%, again above the current level. The answer is the unemployment rate would be -0.96%, a negative rate, which would be impossible. It means that this level of unemployment would require getting all of the unemployed employed and then getting people outside the labor force into the labor force and employed. Accordingly, the number of discouraged people is so large that people outside the labor force must get back in to achieve this.

The number of people employed relative to the population is decreasing, and the employment-population ratio has not recovered to pre-pandemic levels (see appendix F). It could help explain why our unemployment rate is negative. Perhaps, people are leaving the labor force

at greater rates due to discouragement from stagnating wages, and a lack of opportunities individuals deem meaningful.

3.1.1 Labor Force Participation Rate by Gender

FIGURE 1
Labor Force Participation Rate by Gender



The graph uses FRED data, over the period of 01/01/1948 to 12/2022. It plots labor force participation rate by gender.

Generally, we can see that the labor force participation rate increased until its peak in the 1990s, then plateaued until the great recession in 2007. Since 2007, labor force participation has not recovered to the previous levels. For men, labor force participation has steadily declined since the 1950s, with more rapid decreases in participation since the Great Recession. However, over the past 50 years, women have experienced a greater percentage change in labor force participation. From 1950-1970, women's low levels of labor force participation can be attributed

to sexism and the socialization of traditional gender roles. The traditional gender divisions meant women were to stay home and tend to the family, and the men were supposed to provide for their families. Since the 1970s, women have entered the labor force at higher rates; thus, traditional gender roles are diminishing. The increased labor force participation rate can be attributed to the feminist movement gaining support in the late 1990s and gender equality and equal pay becoming a more mainstream idea.

Men participated in the labor force at higher rates than women at all points in time. Potentially, before the 2007 crash, men's and women's participation rates would have equalized with one another. However, this trend has not continued since the Great Recession, and there has been a continued decline in labor force participation for women, thus reversing the original trend of increasing women's labor force participation. More women than men lost their jobs from February to May 2020, 11.5 million versus 9.0 million (Kochhar, 2020). The COVID-19 downturn is the first of eight downturns in the past five decades in which women have lost more jobs than men[6] It appears there is something else going on in the economy, as we would have predicted women would continue to enter the labor force at higher rates.

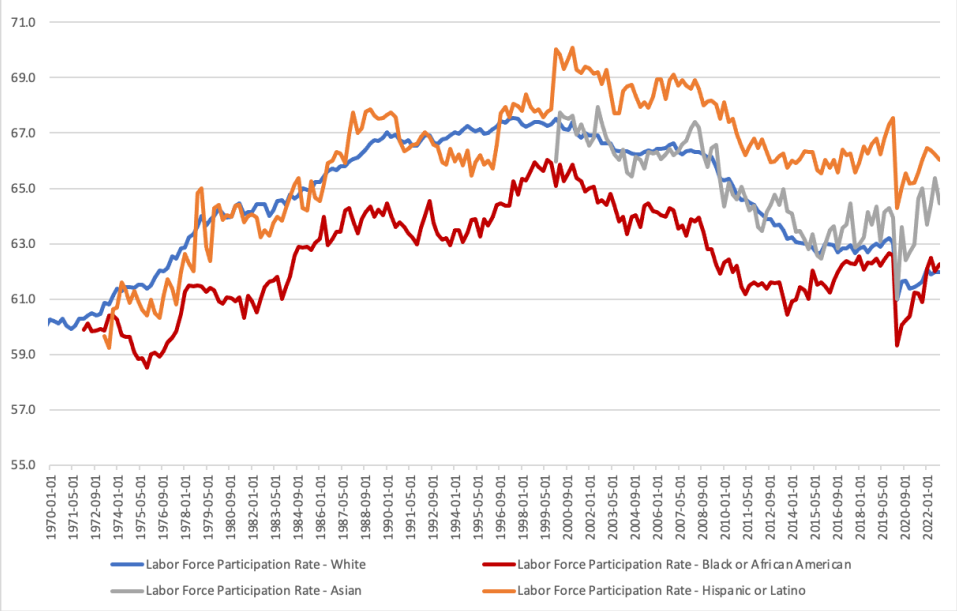
This could be attributed to the fact that pre-pandemic women were more likely than their spouses or partners to carry a more significant burden on parenting and household responsibilities (Barroso & Menasce Horowitz, 2021). Thus, the pandemic has highlighted the uneven division of household chores and responsibilities among couples, particularly as many schools and daycare centers were closed (Barroso & Menasce Horowitz, 2021). The COVID

[6] Kochhar, R. (2011, July 6). *V. A Brief History of Employment Trends in Recessions and Recoveries*. Pew Research Center. Retrieved March 10, 2023, from https://www.pewresearch.org/social-trends/2011/07/06/v-a-brief-history-of-employment-trends-in-recessions-and-recoveries/

pandemic has exacerbated existing household gender divisions that have led to a gendered recovery having lasting impacts on the labor market

3.1.2 Labor Force Participation Rate by Race/Ethnicity

FIGURE 2
Labor Force Participation Rate by Race/Ethnicity



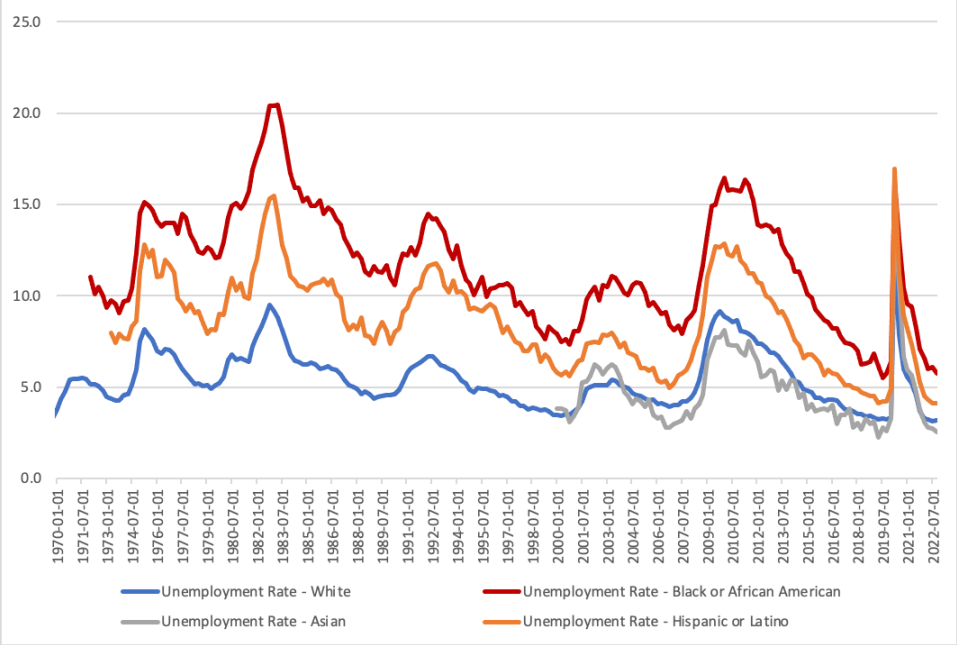
The graph uses FRED data, over the period of 01/01/1970 to 12/2022. It plots labor force participation rate by race and ethnicity.

The highest labor force participation rate is for Hispanic or Latinos, then Asians, then Black or African Americans, and finally, whites. Historically, whites would expect to have the highest levels of labor force participation due to the greater opportunities associated with whiteness in America. However, another story to explain this could be that minority groups do not have the luxury of continuing to be part of the labor force as lower socioeconomic status is associated with minority status in the United States. Thus, labor force participation for these groups results from economic necessity. However, for Asians, the high labor force participation can be potentially explained by the fact that Asian Americans have a significantly higher median

annual income than all American adults (PEW Research Center, 2012). This contributes to the high levels of labor force participation among Asian men and women. Finally, since the Great Recession, no racial group has returned to those levels of labor force participation.

3.1.3 Unemployment Rate by Race/Ethnicity

FIGURE 3
Unemployment Rate by Race/Ethnicity



The graph uses FRED data, over the period of 01/01/1970 to 12/2022. It plots the unemployment rate by race and ethnicity.

The unemployment rate provides a different picture of what is occurring in the labor force for different racial groups. The high unemployment for Blacks or African Americans results from the history of slavery and different historical attachments to the formal economy. Blacks have been historically shut out of the economy through structural racism and a lack of formal economic opportunities. Accordingly, the narrowing of the white-black racial unemployment gap near the peak of the business cycle is driven by a reduction in the rate of job loss for Blacks rather than increases in hiring (Couch & Fairlie, 2010). When the economy is

weak and begins to grow, Blacks are disproportionately hired from the ranks of the unemployed, and as the growth continues, the rate at which Blacks move from unemployment to employment declines, which is offset by an increase in movements from nonparticipation to employment as the business cycle becomes stronger (Couch & Fairlie, 2010). Accordingly, Blacks with a stronger attachment to the labor force, the unemployed, are the first hired. Blacks who are non-participants tend to be hired late in the business cycle when labor demand is particularly strong. It helps explain the variation in the unemployment rate among Blacks.[7]

Employment among immigrant workers decreased more sharply than among U.S.-born workers in the COVID-19 recession, a 19% drop compared with 12% (Kochhar, 2020). In the Great Recession, immigrants lost jobs slightly slower than U.S.-born workers (Kochhar, 2020). Among the U.S.-born, Hispanic workers were likelier than non-Hispanic workers to have lost jobs from February to May 2020 (Kochhar, 2020). Among the foreign-born, employment losses have been equally sharp for Hispanic and non-Hispanic workers, -19% for each group. Overall, Hispanics are relatively young and less likely to have graduated from college, two factors that put them at a higher risk of unemployment in economic downturns (Kochhar, 2020). Also, 44% of Hispanic immigrants in the workforce were estimated to have been undocumented in 2016, which likely made them more vulnerable to job cuts (Kochhar, 2020).

The general picture of unemployment camouflages more profound inequalities within the labor market. Many measures suggest that the conditions of the working class are far from indicating the same full employment position of the Golden Age of capitalism in the 1950s and

[7] It is worth noting, “the lowest monthly unemployment rate for adult (over 20 years old) Black women at 4.2% in over 50 years and a return to their pre-Great Recession employment to population ratio are the benefits of pursuing full employment, not "tight" labor market” (William Spriggs, 2023).

1960s, which would be required to argue that the labor market is tight and that inflation results from excess demand coming from higher wages and a strong labor market.

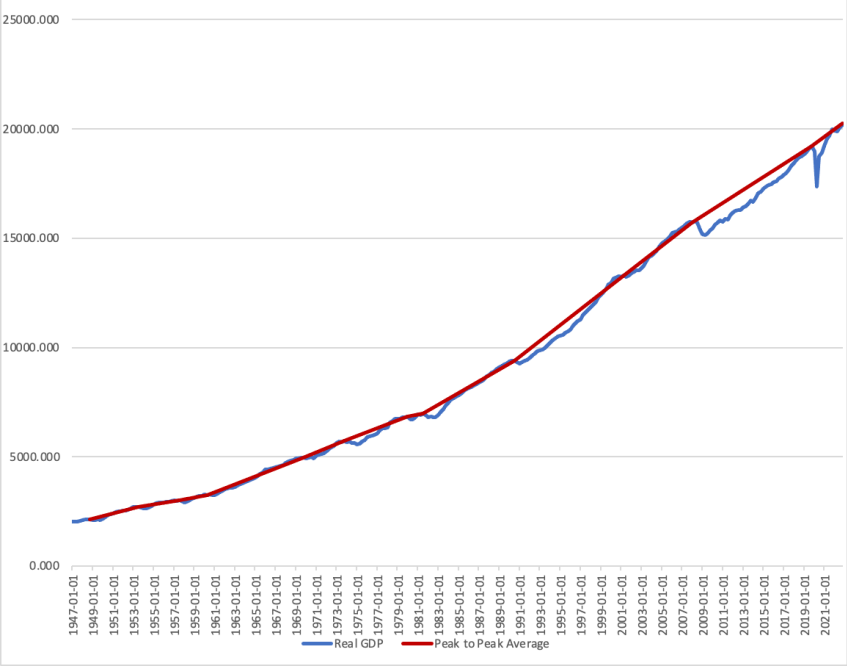
3.2 Potential GDP and the Output Gap

An alternative way to look at the question of excess demand would be to try to see if the economy has been above its potential or maximum GDP. There are two main ways to measure the level of potential output through aggregate production. First, one would use the peak-trough method, which assumes that each peak in the business cycle represents the maximum capacity or potential of the economy. By connecting the peaks, one can measure potential GDP, and the difference between actual and potential GDP thus measured would constitute the output gap. Measures of potential GDP, output gap, and inflation are shown below.

3.2 The Output Gap

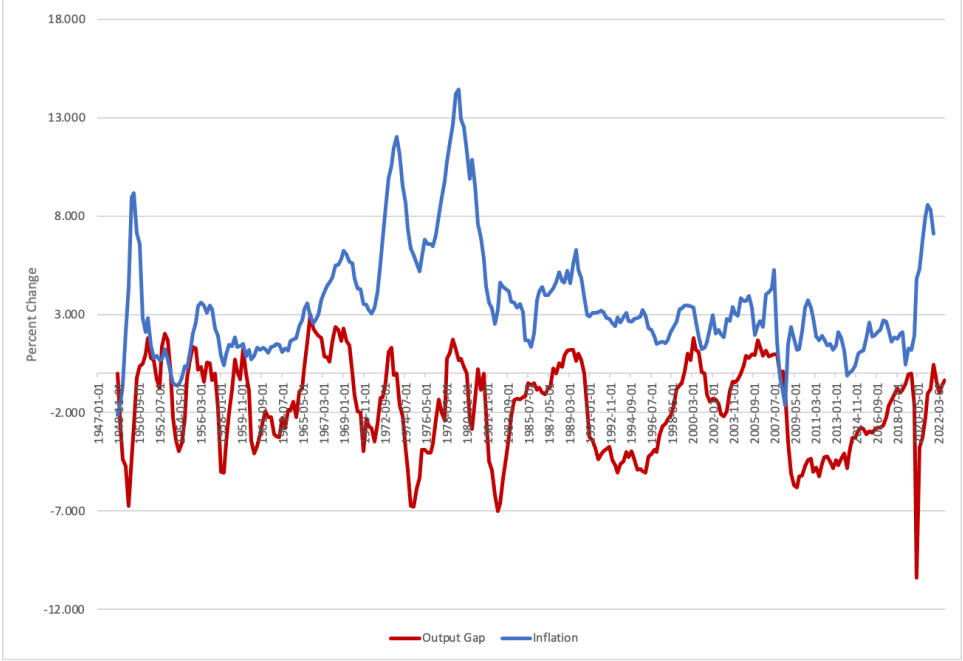
3.2.1 Peak-to-Peak Potential GDP

FIGURE 4
Peak-to-Peak and Actual GDP



The graph uses FRED data, over the period of 01/01/1947 to 12/2022. I utilized real GDP data and dates of recessions from the past 70 years. From each peak, before a recession, to the next peak I found the equation of each line. I then pieced the peak-to-peak lines together, generating real potential GDP.

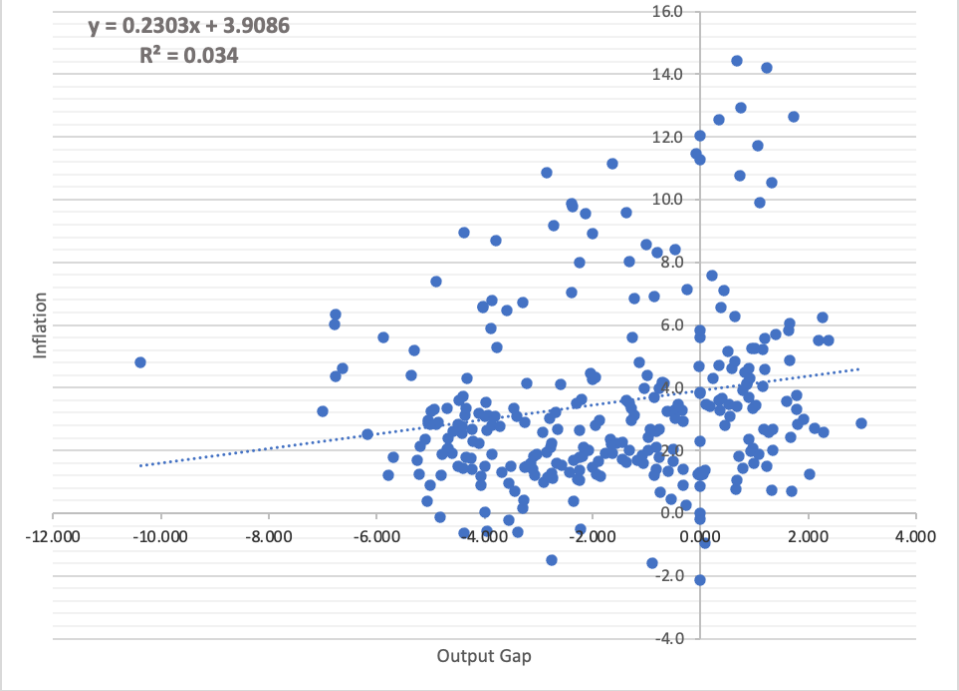
FIGURE 5
Peak-to-Peak Calculations: Output Gap and Inflation



The graph uses FRED data, over the period of 01/01/1947 to 12/2022. It plots the percent change in the output gap alongside inflation.

In the mainstream view, a positive output gap creates inflation. On average, it appears that the rate of change of the Consumer Price Index (CPI), or the level of inflation, is inversely correlated to the output gap. This suggests some inflationary impact when the output gap is positive. As inflation hawks like Summers suggested, it has become moderately positive in the post-pandemic period. However, the correlation between the output gap and inflation is relatively weak and not statistically significant (see figure below). There is enough reason to be skeptical about this notion of potential GDP, which assumes that the maximum level attained is the maximum possible level attainable. From the output gap and inflation data, there appears to be a weak positive correlation with an r-squared value of .0347.

FIGURE 6
Peak-to-Peak Calculations: Output Gap and Inflation Linear Regression



The graph uses FRED data, over the period of 01/01/1947 to 12/2022. It plots the linear relationship between the output gap and inflation.

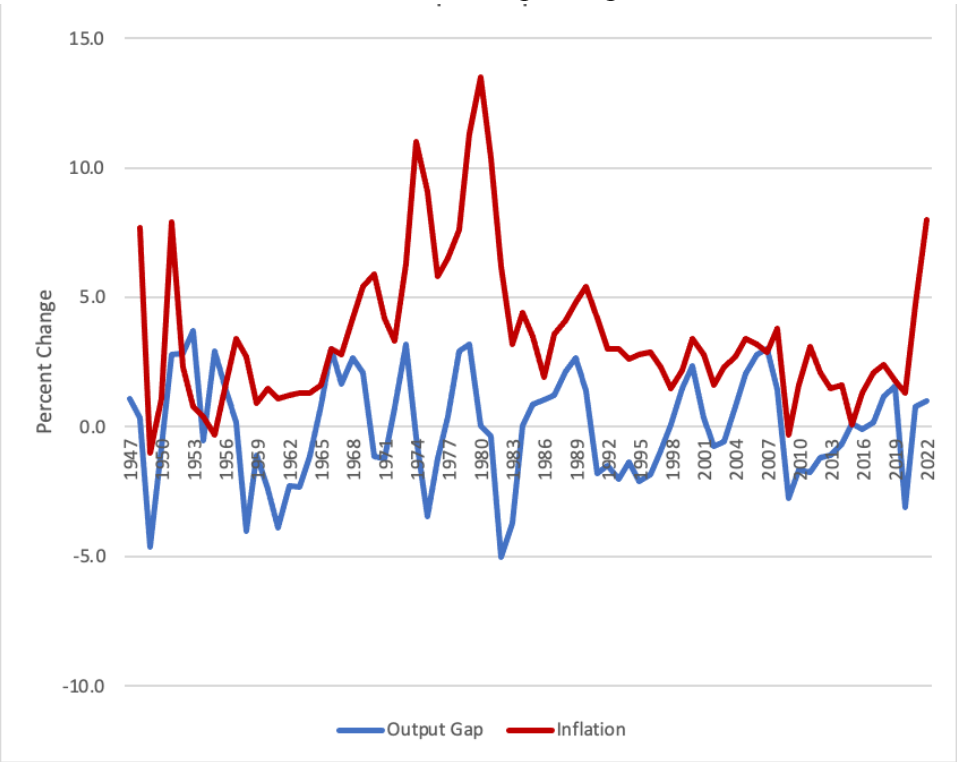
3.2.2 Hodrick Prescott Filter

An alternative way to measure potential GDP is to use the Hodrick-Prescott (HP) Filter calculation. A traditional HP filter, a well-established filter for looking at potential output, allows us to extract trend components from time series data. The HP filter is a symmetric weighted average plus several significant adjustments near the sample's beginning and end (De Jong & Sakarya, 2016). The representation allows us to carry out a rigorous analysis of the properties of the HP filter without using the ARMA-based approximation that has been used previously in the literature[8] (De Jong & Sakarya, 2016). As a result, it is more accurate than the hand peak-to-peak

[8] ARMA stands for auto-regressive moving average. It's a forecasting technique that is a combination of AR (auto-regressive) models and MA (moving average) models. An AR forecast is a linear additive model where the forecasts are the sum of past values times a scaling factor plus the residuals.

calculations. Furthermore, when the sample size is large, the HP filter asymptotically approaches a symmetric weighted average under some regularity conditions (De Jong & Sakarya, 2016). The graph below shows the output gap when potential GDP is measured with HP Filter and inflation as measured by CPI.

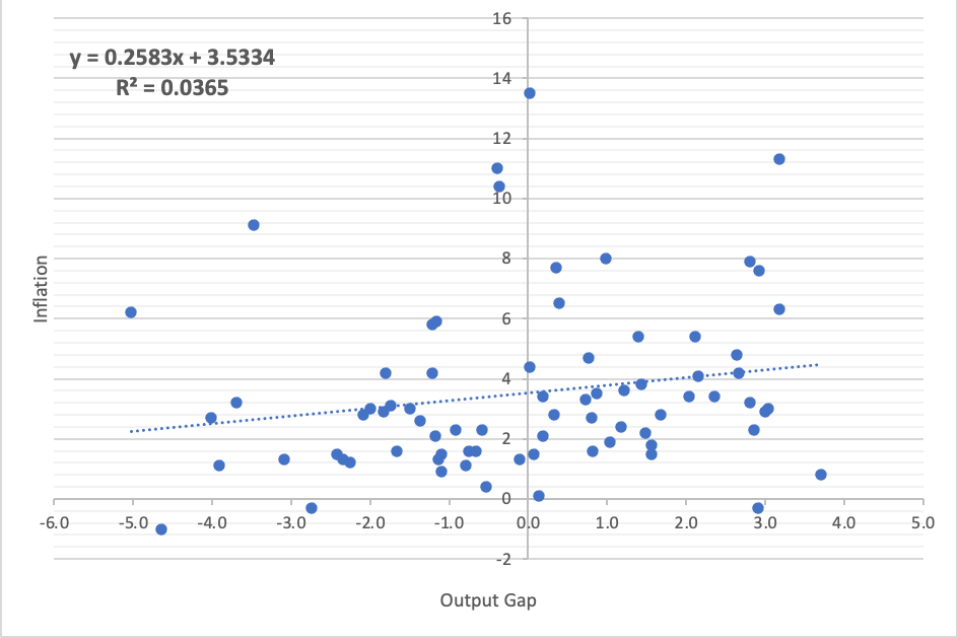
FIGURE 7
Hodrick Prescott Filter: Output Gap and Inflation



The graph uses FRED data, over the period of 01/01/1947 to 12/2022. It plots the percent change in the output gap alongside inflation.

FIGURE 8

Hodrick Prescott Filter: Output Gap and Inflation Linear Regression



The graph uses FRED data, over the period of 01/01/1947 to 12/2022. It plots the linear relationship between the output gap and inflation.

As can be seen, the HP filter of the output gap and inflation yields gives us a slightly stronger R-squared value of .0365, but also not a strong correlation between inflation and the output gap. This is still a weak positive association between the output gap and inflation. It appears that the variation in the output gap cannot fully explain the levels of inflation and its acceleration in 2021.

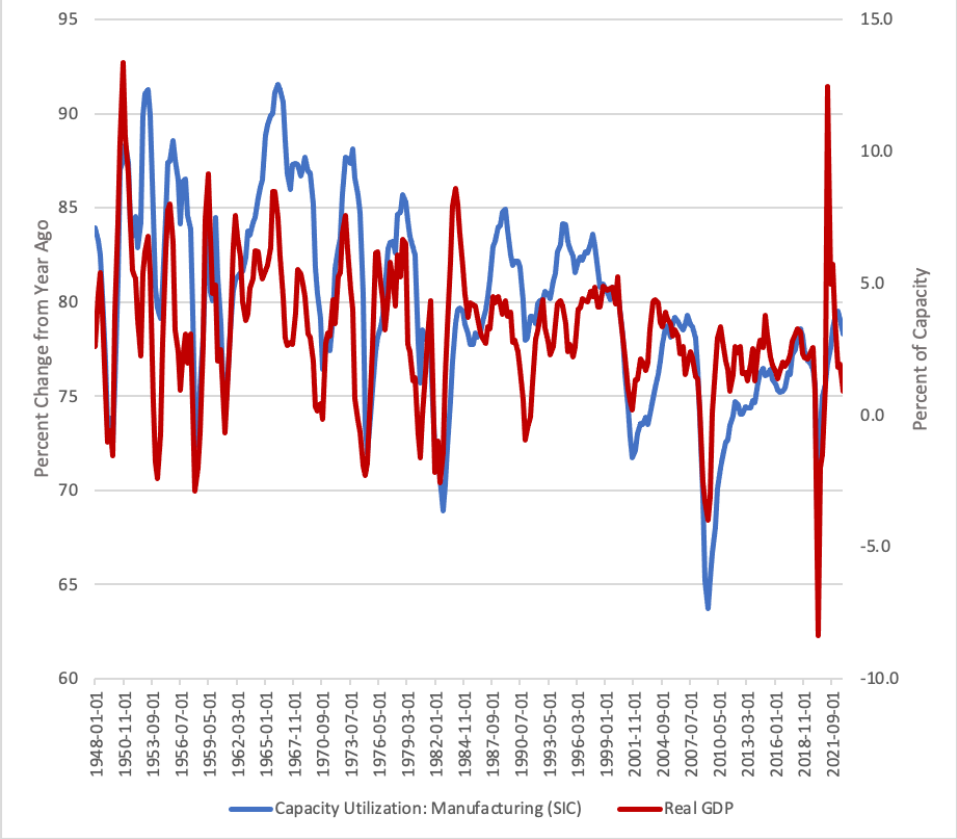
It is worth noting that the HP filter is a problematic measure because it is essentially an average, and there is no guarantee that it represents the maximum output potential of the economy. At any rate, the output gap does not seem, even in these measures, to be of the order of 3 to 5% of GDP, as suggested by Larry Summers (Summers & Wolf, 2021).

3.3 Capacity Utilization

Turning to capacity utilization, it provides a story suggesting that the economy is not close to its normal level. Gahn (2020) argues there has been a declining trend of capacity utilization in the US since the 1970s; however, no consensus has emerged on the empirical evidence about these results from a reduction of the normal level of capacity utilization associated with potential output or simply a deviation from the normal level. It is clear that capacity utilization has trended down, as shown in the figure below. However, it is clear that if the fall in capacity utilization represents a deviation of the actual level from the normal level, then it is also the case that GDP would deviate from potential output since capacity utilization is clearly correlated with changes in real GDP, as shown in the figure below.[9]

[9] It would be beyond the objectives of this thesis to identify whether the declining trend in capacity utilization implies a persistent decline of the US economy's normal utilization rate or just a deviation.

FIGURE 9
Capacity Utilization and Real GDP



The graph uses FRED data, over the period of 01/01/1948 to 12/2022. It plots the percent change in the capacity utilization alongside real GDP.

There are three phases that can be interpreted from the GDP growth and capacity utilization graph. The first period from 1948 to 1973, before the Great Inflation, had the highest average capacity utilization and was accompanied by the greatest growth in real GDP. This is the so-called Golden Age of Capitalism or the Era of the Keynesian Consensus. Next, from 1974 to 2008, 2008 marked the beginning of the Great Recession, and there were lower levels of capacity utilization and lower real GDP growth. Finally, from 2009 to 2022, the decline seems more pronounced; the economy is growing at slower rates than it did and is behind the lower level of

capacity utilization. In addition, there is worse performance in the labor market than in the previous period.

More specifically, comparing the means of the average-to-peak ratios of actual utilization observed between 1972 and 2002 with the ones observed between 2003 and 2017, these ratios have increased in the most recent period in 70 out of 102 sectors, which corresponds to 64.8% of the industrial production (see appendix E) (Haluska et al., 2021). These results show stability in the size of seasonal fluctuations, which does not support the thesis that normal utilization has decreased (Haluska et al., 2021). These data show a decrease in the size of seasonal fluctuations, which, to the extent that the firms 'conventions regarding what is the typical sectoral average to peak demand pattern were modified by this recent trend (which we find unlikely), would in fact indicate that normal utilization had increased, instead of decreased (Haluska et al., 2021). The average-to-peak ratio seems to have decreased only in 2008 – perhaps suggesting an increase in volatility – but quickly returned to its previous levels, higher on average, than in the preceding period (Haluska et al., 2021). Therefore, there is no clear evidence for supposing that the normal degree of utilization has decreased in the US economy (Haluska et al., 2021).

A general reduction in the normal capacity utilization rate cannot explain the decline in actual utilization. In contrast, the successive slowdown in the rates of growth of effective demand in the United States since the beginning of the 2000s could explain the long-lasting deviations between actual and normal utilization if the process of adjusting productive capacity to demand converges slowly as proposed by the Sraffian Supermultiplier model (Haluska et al., 2021). One possible explanation is that the output level has been persistently below the potential level, which would explain the weaker performance of some variables in the labor market.

There seem to be similar patterns in capacity utilization and the labor market. Accordingly, the variation in the rate of growth is correlated to the change in the level of capacity utilization; likewise, the low unemployment rate is related to the discouraged people who have left the labor force entirely. In other words, the change in policy, starting with the collapse of the Keynesian Consensus in the 1970s, seems to be behind the decline in capacity utilization and real GDP growth, and not supply-side changes in the technological capabilities of the US economy.

4. Discussion

This section discusses my main argument, if the persistence of disguised unemployment, and a labor market that is considerably less tight than it is often assumed in the official figures, is connected with the declining rates of GDP growth and deviation from the potential level, bringing down the average measures of real GDP and, hence conventional measures of the GDP gap. Both arguments point to an economy with spare capacity, and inflation cannot be associated with excessive demand.

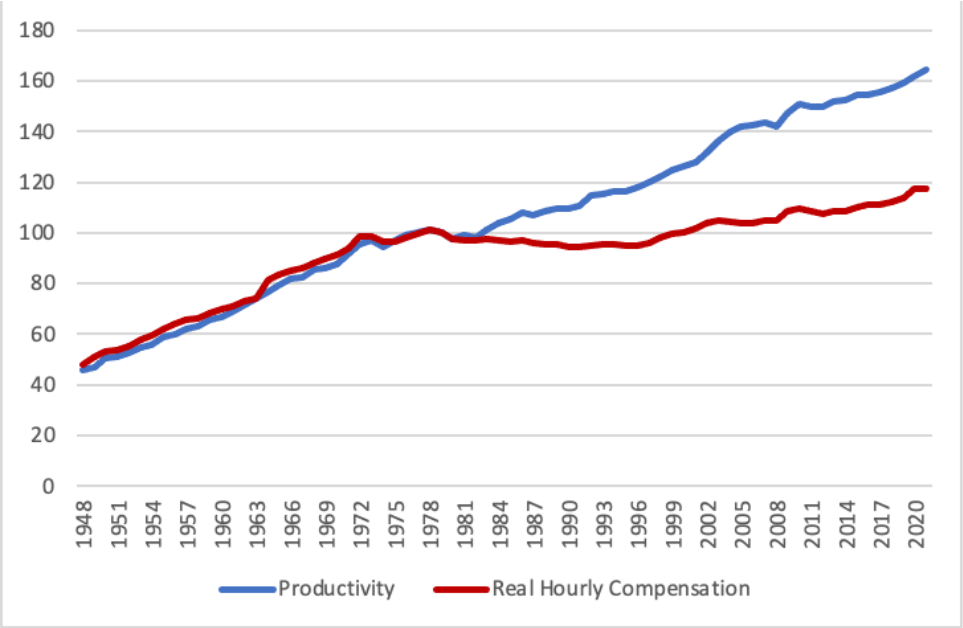
4.1 The Decline of Keynesian Consensus and Deindustrialization

Post-World War II was associated with relatively high output growth rates and stable prices. Price stability was reflected through an implicit social agreement: maintenance of full employment, the social legislation that protected workers' rights through the expansion of the welfare state, and the strengthening power of trade unions (Vernengo, 2022). In addition, the Keynesian Consensus required wages to increase at the same pace as productivity gains to control inflation. That is, reductions in costs associated with increased productivity were passed on in wages, not in lower prices or private gains.

However, this Consensus collapsed in the 1970s when Milton Friedman, and Monetarists alike, blamed the government and the excesses of the Keynesian Welfare State for the inflation acceleration of the 1970s and believed that austerity and monetary restraint, which would cause higher unemployment, were necessary for stabilization (Vernengo & Perez, 2023). The neoliberal Consensus provided a new social and institutional foundation for the accumulation process. While real wages increased with productivity in the postwar era, from the 1980s this trend has decoupled as wage stagnation has created the conditions for price stability. During the Keynesian

consensus era, productivity grew at around three percent per year, while in the neoliberal era, the pace slowed to about half a percent per year (Vernengo, 2022). The slowdown in productivity is accompanied by lower growth of output and employment. Instead of the accumulation associated with output growth, financial accumulation has become the norm.

FIGURE 10
Productivity and Real Compensation in the US
(Index, 1979=100)

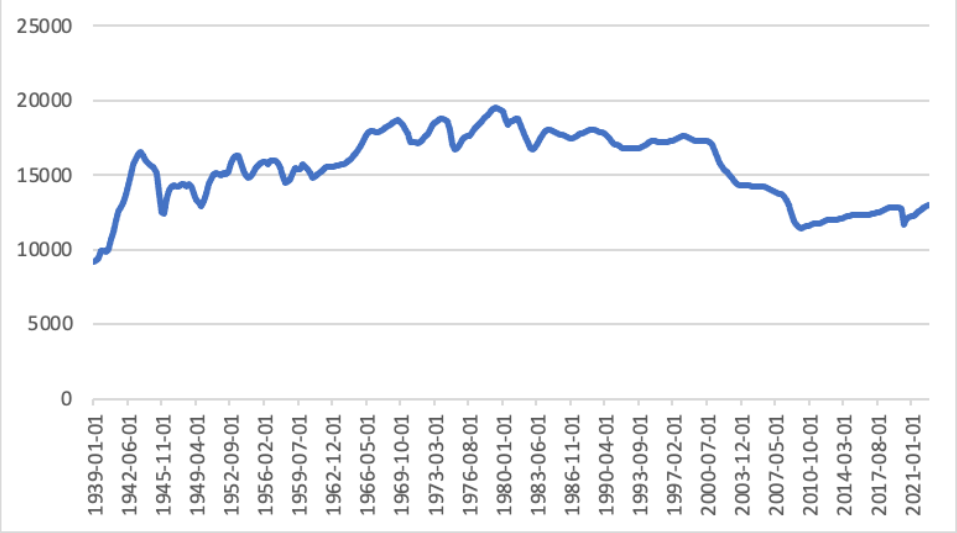


The graph uses EPI data, over the period of 1948 to 2021. It plots real hourly compensation (wages and benefits) of production/nonsupervisory workers in the private sector alongside the net productivity of the total economy. "Net productivity" is the growth of output of goods and services less depreciation per hour worked.

The end of the Keynesian Consensus had dire consequences for the manufacturing sector. Since the 1960s, manufacturing jobs have declined continuously (see appendix G). However, the decline precedes the North American Free Trade Agreement (NAFTA) and other Free Trade Agreements (FTAs), which are often associated with the process of deindustrialization in the United States (Vernengo, 2011). Thus, it appears the story is not simple as the absolute number

of manufacturing jobs glean a different picture of deindustrialization instead of their share in total employment.

FIGURE 11
All Employees, Manufacturing



The graph uses FRED data, over the period of 01/01/1939 to 12/2022. It plots all employees in the manufacturing sector.

From the 1960s to 1979, the fall in manufacturing employment as a percent of total employment steadily decreased. The rate of employment growth in the manufacturing sector was lower than in the economy as a whole; however, manufacturing employment grew steadily until 1979, peaking at around 19 million (Vernengo, 2011). From 1980 to 1994, manufacturing employment fell, and from 1994 to 2000, it grew slightly due to NAFTA implementation in 1994. However, after 2001, when China entered the World Trade Organization, manufacturing jobs collapsed, with only 11.5 million jobs in 2010 (Vernengo, 2011).

Deindustrialization post-1979 reflects the transition from the Keynesian welfare state to the neoliberal Consensus and financialization- lower wages and higher interest rates, with demand pushed by increasing the debt leverage of the private sector (Vernengo, 2011). The

decline in union membership was a crucial feature of deindustrialization as it transformed labor relations. Unions brought some democratic control to workers and were crucial parts of the local social life. Now that the degree of unionization is considerably lower, the working class has considerably less bargaining power. Thus, service sector employees can be more readily exploited due to their lack of countervailing power of organized labor. Moreover, the outsourcing of jobs has accelerated deindustrialization in the United States.

In a sense, lower rates of GDP growth and lower levels of capacity utilization, together with the weaker labor force indicators, result from the social changes that weakened labor and strengthened corporations since the 1970s and were exacerbated by the 2008-2009 Global Financial Crisis. One possible macroeconomic mechanism that would explain that is the notion of hysteresis.

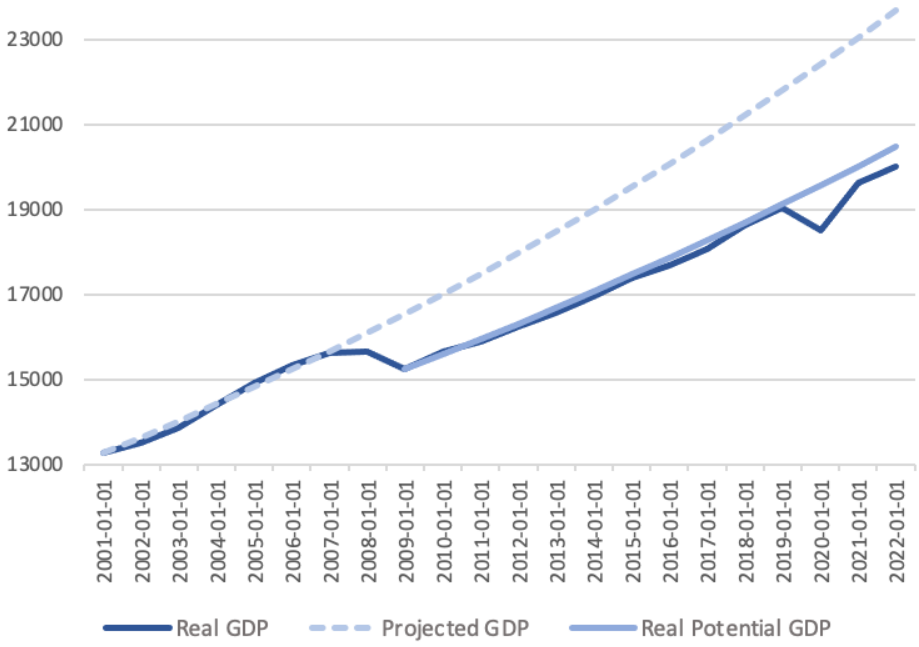
4.2 Output Hysteresis

In macroeconomic policy, the economy's supply side is characterized by a level of potential output that reflects the resources available for production. Potential output limits the achievable quantity of aggregate output, reflecting the limited labor, capital, and other real resources available at a given moment (Mason & Jayadev, 2022). Moreover, it supposes an output level consistent with target unemployment and inflation. Accordingly, the macroeconomic policy aims to minimize the deviations of actual from the potential output, avoiding positive output gaps that create inflation and negative output gaps that create excessive unemployment (Mason & Jayadev, 2022).

The conventional macroeconomic theory supposes that short-run variation in output and employment is driven by demand and long-run trends depend on the causally independent

growth of potential output; thus, business-cycle fluctuations do not have permanent effects on output or employment (Mason & Jayadev, 2022). Accordingly, short-run changes should not have lasting impacts on long-run forecasts for out. However, the inability of output to return to its previous trend after the financial crisis of 2007-2009, as shown in the figure below, indicates that demand-induced changes in output have enduring impacts.

FIGURE 12
Output Hysteresis: Great Recession



The graph uses FRED data, over the period of 01/01/2001 to 12/2022. It plots the real GDP, projected GDP, and real potential GDP.

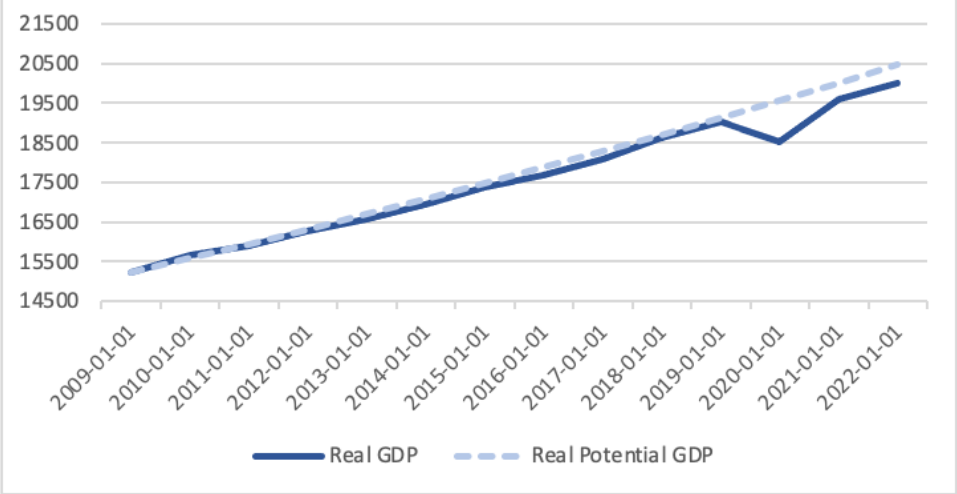
Consequently, there is a necessity for an alternative understanding of the impact of supply constraints. It appears that rather than limiting the level of output, supply constraints limit the output change rate, both in the aggregate and in its composition (Mason & Jayadev, 2022). That is, output changes resulting from demand gaps do not reflect actual resources before production; instead, supply constraints reflect the frictions or adjustment costs of moving from one growth

path to another (Mason & Jayadev, 2022). [10] Accordingly, supply constraints reflect a limited capacity for coordination by markets. Therefore, supply constraints operate on transition or adjustment speeds, not on the level of output as such (Mason & Jayadev, 2022). The transition between paths is associated with output gaps; the larger, the more rapid the transition between paths (Mason & Jayadev, 2022). This adjustment-cost view accepts hysteresis as a real phenomenon, rejecting the conventional potential-output view of supply constraints.

COVID-19 accelerated existing shifts in demand, as consumers shifted from in-person services to goods and supply purchases, as the pandemic and then the War in Ukraine disrupted specific production categories (Mason & Jayadev, 2022). The supply-side constraints can help explain the deviations of real GDP from potential GDP. While real GDP recovered relatively quickly, it has not reached pre-pandemic levels. Thus, the supply-side shocks have altered the GDP trajectory, and a cost-adjustment view of GDP is required to understand the output gap.

[10] This point is sometimes recognized in the Keynesian literature on hysteresis – for example, by Fazzari, Ferri, and Variato (2020) – but less often in mainstream work.

FIGURE 13
Output Hysteresis: COVID-19 Pandemic



The graph uses FRED data, over the period of 01/01/2009 to 12/2022. It plots the real GDP and real potential GDP.

Moreover, in 2021, the aid of stimulus checks and lower levels of uncertainty led over 47 million Americans to voluntarily quit their jobs, the Great Resignation (Fuller and Kerr, 2022). The Great Resignation accelerated structural grievances, leading the masses to leave their jobs. Five factors, exacerbated by the pandemic, combine to yield changes in the labor market: retirement, relocation, reconsideration, reshuffling, and reluctance (Fuller and Kerr, 2022). Workers retired in more significant numbers but did not relocate in large numbers; they reconsidered their work-life balance and care roles; they made localized switches among industries, or reshuffling, rather than exiting the labor market entirely; and, due to pandemic-related fears, they demonstrated a reluctance to return to in-person jobs (Fuller and Kerr, 2022).

Accordingly, COVID-19 accelerated existing structural problems associated with and led people to leave, or shuffle within, the labor force. The pandemic also exacerbated gender

disparities since, more often than not, women were overly burdened with childcare and other household tasks and more at risk of long-term unemployment. Finally, school closings and childcare responsibilities resulting from COVID were disproportionately placed on mothers' employment and labor force participation (See Section 3.1.1). This was not a new phenomenon, but the pandemic exacerbated existing household divisions of labor that have disproportionately overburdened women, leading to a gendered recovery in labor force participation for women. The impacts of COVID on different racial and ethnic groups vary based on different historical and cultural legacies.

However, this should not necessarily be seen as suggesting that the labor market is necessarily tight. Overall, the average earnings of employees rose less than consumer prices, even if, at the begging of the pandemic, they were growing slightly higher (Vernengo and Perez, 2023)[11].

Finally, inflation affects some social groups more than others; low-income individuals are disproportionately burdened. This can be explained by the fact that for low-income households, a greater portion of their expenses goes towards basic needs, which have experienced the largest price increases due to supply chain disruptions and the raising of the overnight interest. So, hiking the rates at which funds are lent, makes it more expensive to purchase these basic necessities. Also, the lack of disposable income for low-income households makes them disproportionately vulnerable to price changes due to these shocks.

[11] Some might argue that an explanation of inflation driven by the labor market is supported by cyclical differential wage gains from workers switching jobs. In November 2022, the year-over-year growth in nominal wages for United States' workers that switched jobs was 7.7%, compared with 5.5 % for workers who stayed in their current jobs (Mason & Jayadev, 2022). However, it is unclear that these circumstances imply a tight labor market.

5. Conclusion

The debate about the current acceleration of inflation is characterized by whether the fundamental causes resulted from supply chain problems related to the pandemic or the fiscal and monetary expansion following the pandemic. A third possibility, not discussed here, is the possibility that the behavior of oligopolistic firms drove prices. The dominant view understands inflation resulting from excess demand, an overreaction of the Federal Reserve and the Treasury in stimulating the economy. Accordingly, the Federal Reserve has continued to fight inflation by employing tight monetary policy and raising interest rates to reduce demand. However, inflation has persisted, and it seems that monetary tightening might not be an adequate solution, as it appears inflation is not the result of excess demand. Moreover, reasonable evidence supports the notion that the economy is not at full capacity, matching an understanding that we are not at a meaningful definition of full employment. Therefore, inflation cannot result from excess demand as we are not at the capacity and the employment limit.

The pandemic exacerbated pre-existing frustrations within the labor market- deindustrialization, a decline of unions, outsourcing of labor, and gendered care responsibilities - that led to the shrinking of labor force participation. Accordingly, the pandemic pushed these frustrations to the brink, and Americans exited the labor force at mass rates as a response. These underlying structural factors served as the impetus for the Great Resignation, not something new the pandemic brought on. Accordingly, the number of people employed relative to the population is decreasing, and the employment-population ratio has not recovered to pre-pandemic levels (see appendix F). The people outside the labor force are no longer counted in the pool of unemployed people, disguising the number of people out of work. This could potentially explain

why the unemployment rate we found is negative. Perhaps, people have left the labor force and not returned due to the exacerbated structural frictions COVID brought on.

Since GDP and capacity utilization are not at their potential, it is impossible to be at full employment; thus, the demand explanation of inflation vanishes. Unemployment would be much higher with normal levels of participation, like those experienced in the 1990s, so, it appears that the unemployment rate is disguising the actual labor market conditions. Similarly, the declining trend of capacity utilization in the US since the 1970s and a low low-capacity utilization after the pandemic makes it hard to justify the source of inflation as demand-side driven. Finally, the supply-side constraints can partially explain the deviations of real GDP from potential GDP. While real GDP recovered relatively quickly, it has not reached pre-pandemic levels. Thus, the supply-side shocks have altered the GDP trajectory, and a cost-adjustment view of GDP is required to understand the output gap.

There is a solid case to be made that the United States is not at full employment nor full capacity utilization. Those doubts should be reasonable enough that the solutions of the Federal Reserve are not addressing the real problem. Their monetary policy reflects the assumption that the current acceleration of inflation results from excess demand; thus, by raising the overnight interest rates, demand decreases. While the Fed has continued to hike interest rates, inflation has persisted after almost three years. Thus, their monetary policy does not seem to address the underlying cause of inflation.

The persistence of inflation appears to be resulting from the continuing supply-side problems and shutdowns that disrupted global trade. Moreover, the war in Ukraine added to the disturbances, leading to higher energy and food prices since Russia and Ukraine are significant producers of natural gas, grains, and fertilizers. These conditions have led to the most rapid

increase in inflation since the 1980s. There is reasonable doubt that we are at full employment; thus, the supply-side explanations of inflation can not be defended. Raising the Federal Reserve's Monetary Policy is not addressing the real culprit of the inflation acceleration.

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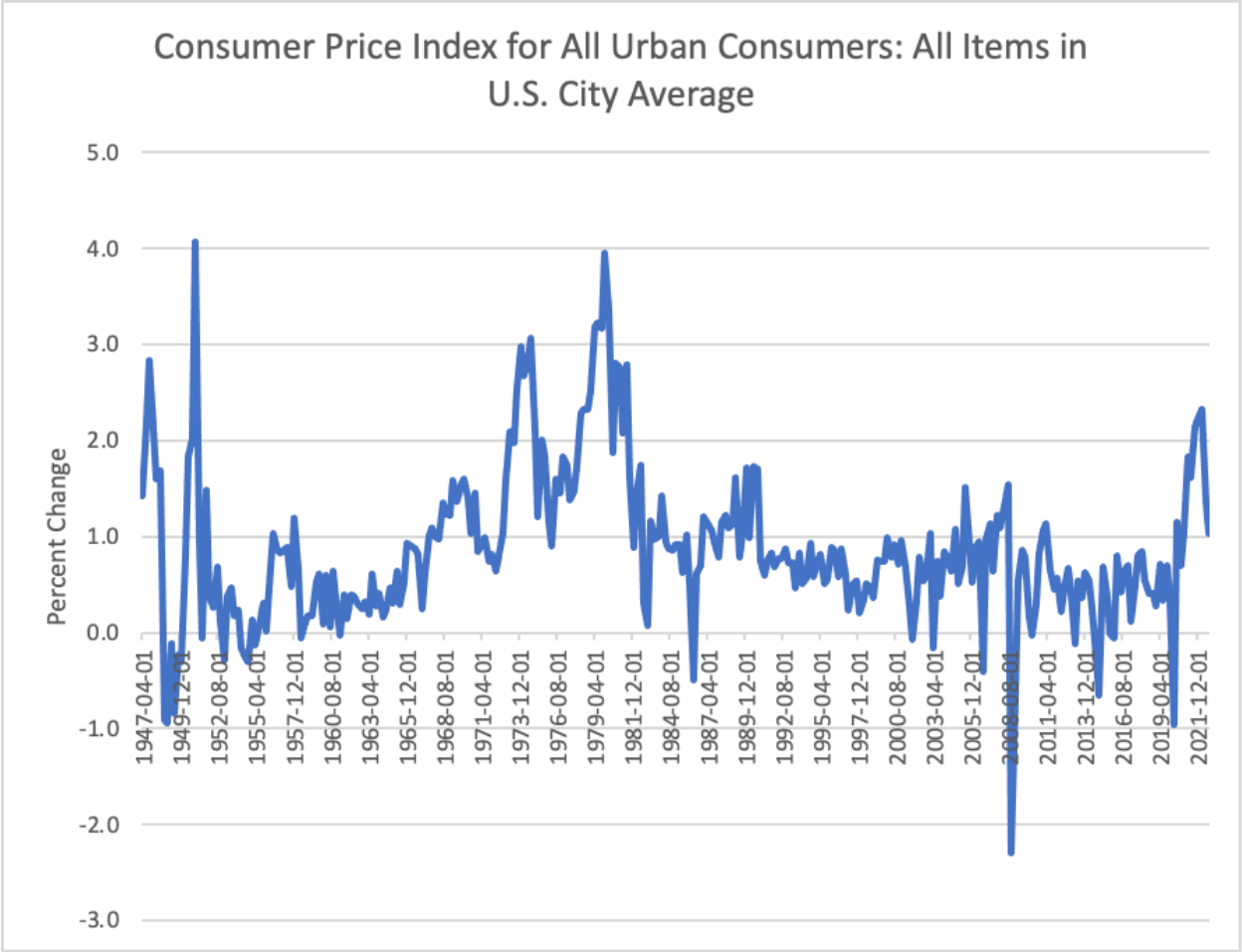
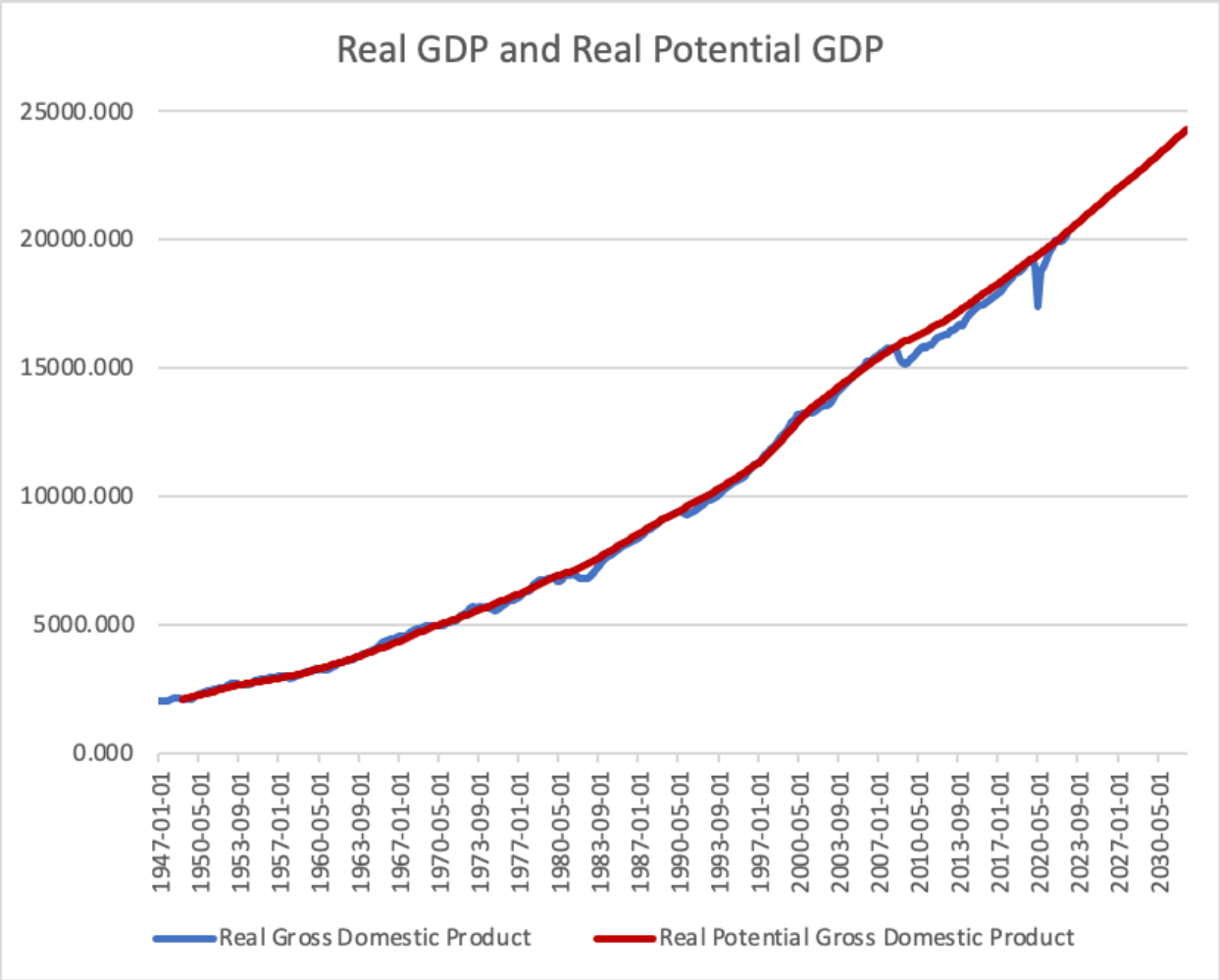
II. Appendix

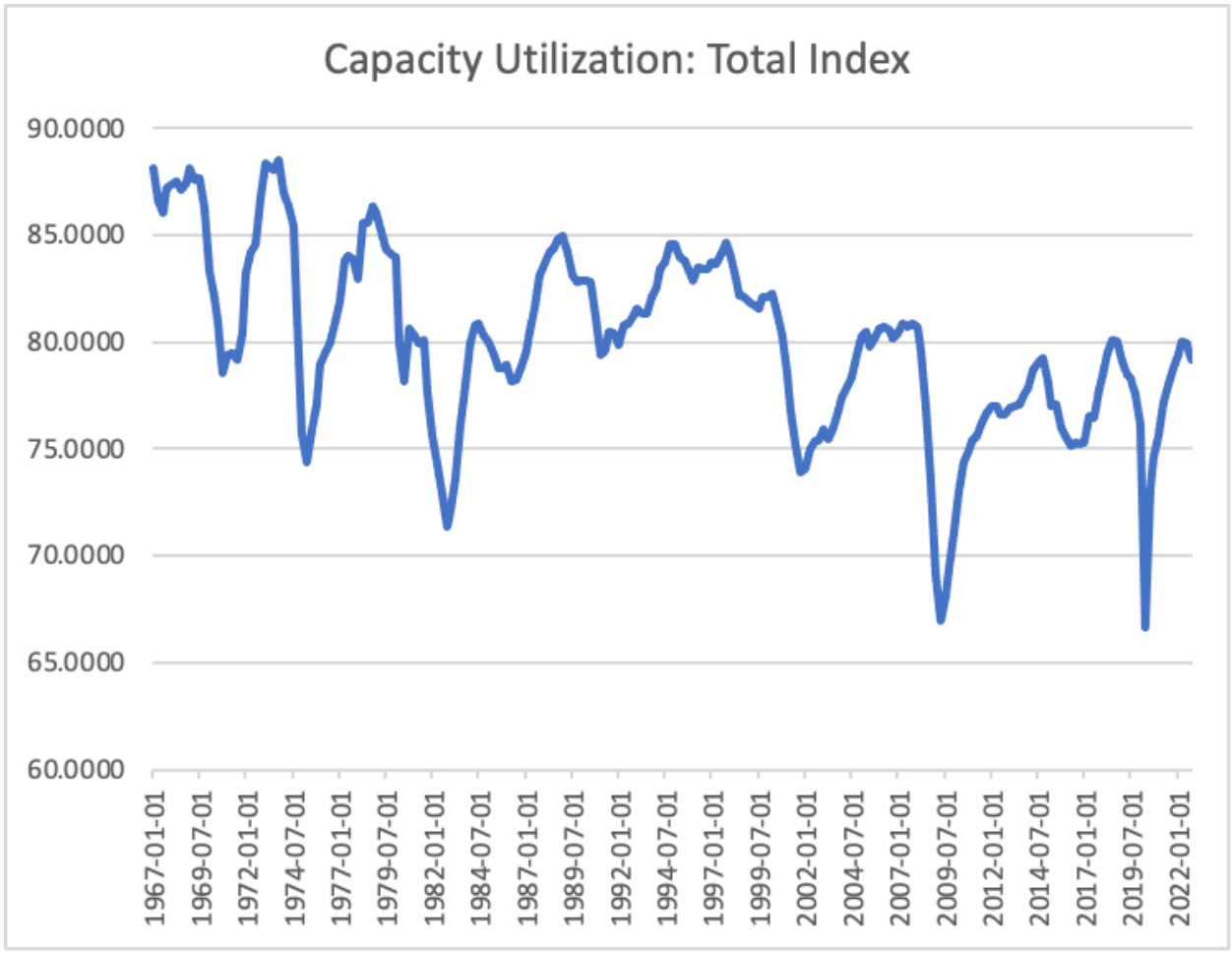
Appendix A



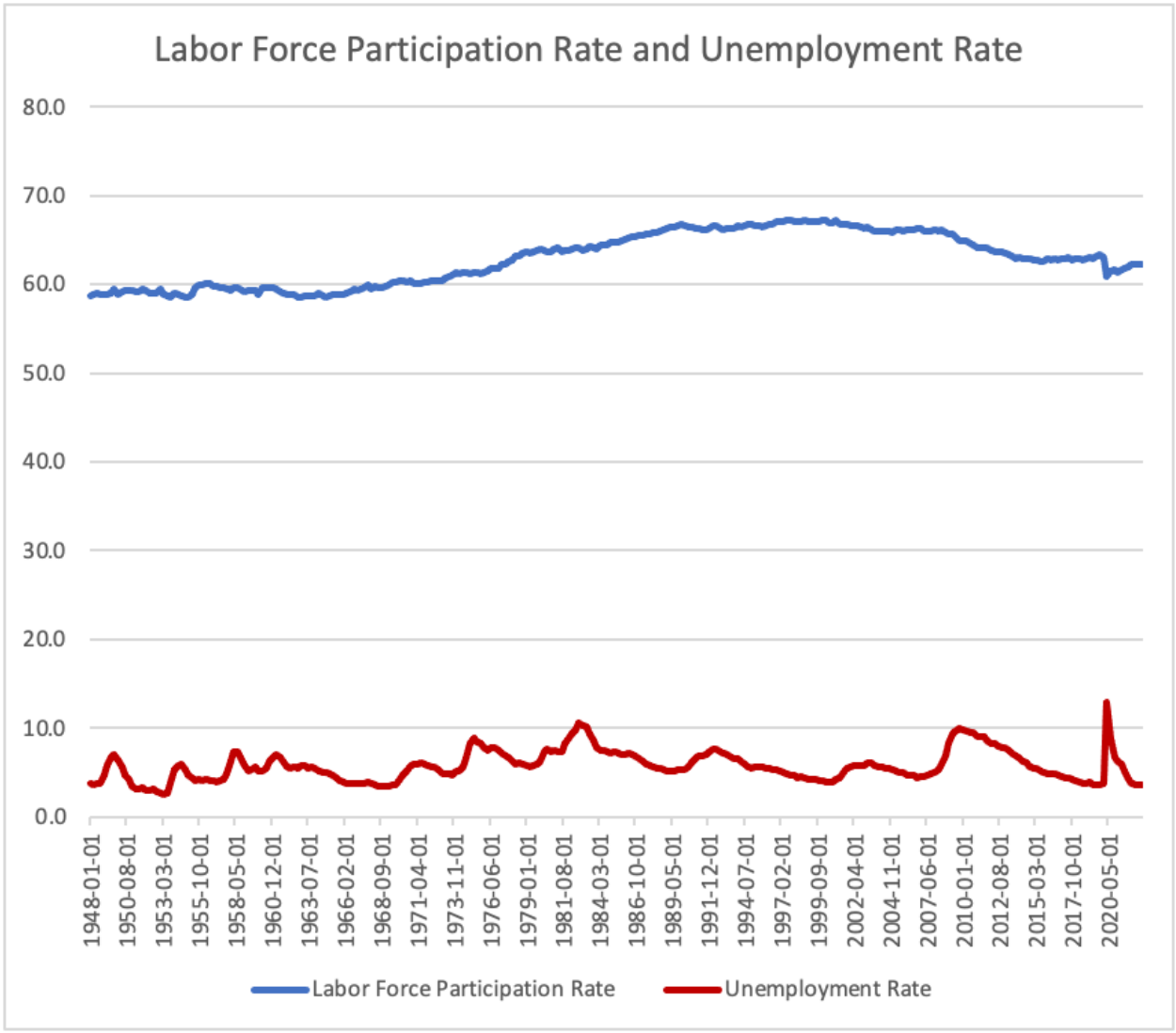
Appendix B


Real GDP and Real Potential GDP
25000.000
20000.000
15000.000
10000.000
5000.000
0.000
1947-01-01
1950-05-01
1953-09-01
1957-01-01
1960-05-01
1963-09-01
1967-01-01
1970-05-01
1973-09-01
1977-01-01
1980-05-01
1983-09-01
1987-01-01
1990-05-01
1993-09-01
1997-01-01
2000-05-01
2003-09-01
2007-01-01
2010-05-01
2013-09-01
2017-01-01
2020-05-01
2023-09-01
2027-01-01
2030-05-01
Real Gross Domestic Product
Real Potential Gross Domestic Product

Appendix C


Capacity Utilization: Total Index
90.0000
85.0000
80.0000
75.0000
70.0000
65.0000
60.0000
1967-01-01
1969-07-01
1972-01-01
1974-07-01
1977-01-01
1979-07-01
1982-01-01
1984-07-01
1987-01-01
1989-07-01
1992-01-01
1994-07-01
1997-01-01
1999-07-01
2002-01-01
2004-07-01
2007-01-01
2009-07-01
2012-01-01
2014-07-01
2017-01-01
2019-07-01
2022-01-01

Appendix D

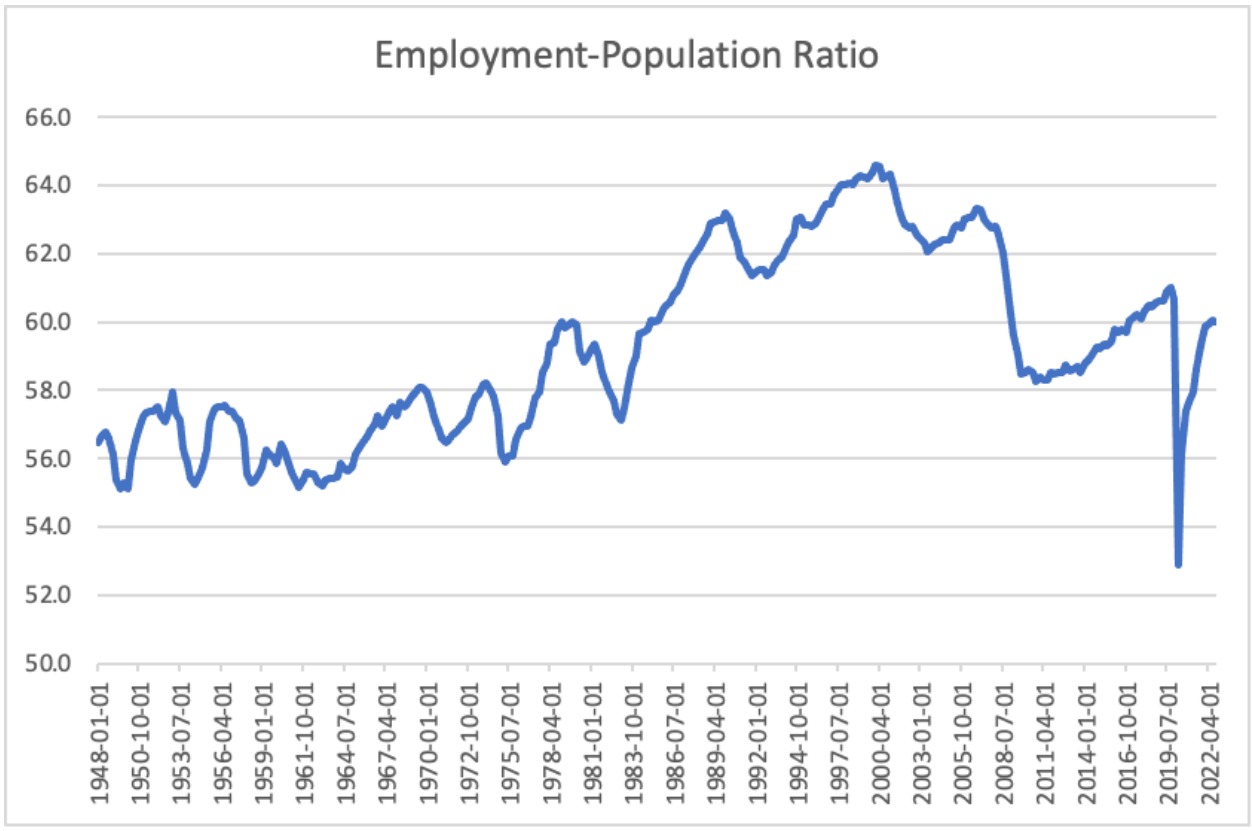

Labor Force Participation Rate and Unemployment Rate
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
1948-01-01
1950-08-01
1953-03-01
1955-10-01
1958-05-01
1960-12-01
1963-07-01
1966-02-01
1968-09-01
1971-04-01
1973-11-01
1976-06-01
1979-01-01
1981-08-01
1984-03-01
1986-10-01
1989-05-01
1991-12-01
1994-07-01
1997-02-01
1999-09-01
2002-04-01
2004-11-01
2007-06-01
2010-01-01
2012-08-01
2015-03-01
2017-10-01
2020-05-01
Labor Force Participation Rate
Unemployment Rate

Appendix E: Average capacity utilization by industry and by time period

Industry code	Industry description	Average 1972-2002	Average 2003-2017	Increased/ Decreased?	Weight (%)
B50001	**Total index**	**81.3**	**77.0**	**Decreased**	**100.0**
G321	Wood product	79.5	70.9	Decreased	1.4
G327	Nonmetallic mineral product	78.5	64.0	Decreased	2.2
G331	Primary metal	80.7	73.3	Decreased	2.6
G332	Fabricated metal product	77.5	77.7	Increased	5.5
G333	Machinery	78.9	74.6	Decreased	5.4
G334	Computer and electronic product	79.4	73.3	Decreased	5.0
G335	Electrical equipment, appliance, and component	83.6	79.1	Decreased	1.8
G3361T3	Motor vehicles and parts	77.4	71.2	Decreased	5.7
G3364T9	Aerospace and miscellaneous transportation eq.	73.5	75.8	Increased	4.4
G337	Furniture and related product	78.6	73.0	Decreased	1.2
G339	Miscellaneous	76.8	76.4	Decreased	2.8
G311	Food	83.0	80.7	Decreased	9.0
G312	Beverage and tobacco product	79.1	69.6	Decreased	2.8
G313	Textile mills	83.1	69.6	Decreased	0.3
G314	Textile product mills	83.7	69.7	Decreased	0.3
G315	Apparel	80.5	72.0	Decreased	0.2
G316	Leather and allied product	75.9	60.2	Decreased	0.1
G322	Paper	88.3	83.4	Decreased	2.5
G323	Printing and related support activities	84.3	70.0	Decreased	1.4
G324	Petroleum and coal products	85.5	84.0	Decreased	3.2
G325	Chemical	78.6	73.3	Decreased	12.3
G326	Plastics and rubber products	84.3	77.8	Decreased	3.6
GMFO	Other manufacturing	84.7	69.8	Decreased	2.1
G211	Oil and gas extraction	92.2	94.7	Increased	9.8
N2121	Coal mining	86.1	82.1	Decreased	0.8
G2122	Metal ore mining	79.6	73.6	Decreased	0.6
G2123	Nonmetallic mineral mining and quarrying	83.7	82.1	Decreased	0.9
G213	Support activities for mining	73.2	68.9	Decreased	1.6
G2211	Electric Utilities	88.4	82.0	Decreased	9.0
G2212	Natural gas distribution	80.3	80.1	Decreased	1.4

Source: FRED. Elaborated by the author

Appendix F



$$Employed\ Population\ Ratio\ = \frac{Labor\ Force\ Participation\ Rate}{Working\ Age\ Population{:}\ Aged\ 15{-}64{:}\ All\ Persons\ for\ the\ United\ States}$$

Appendix G

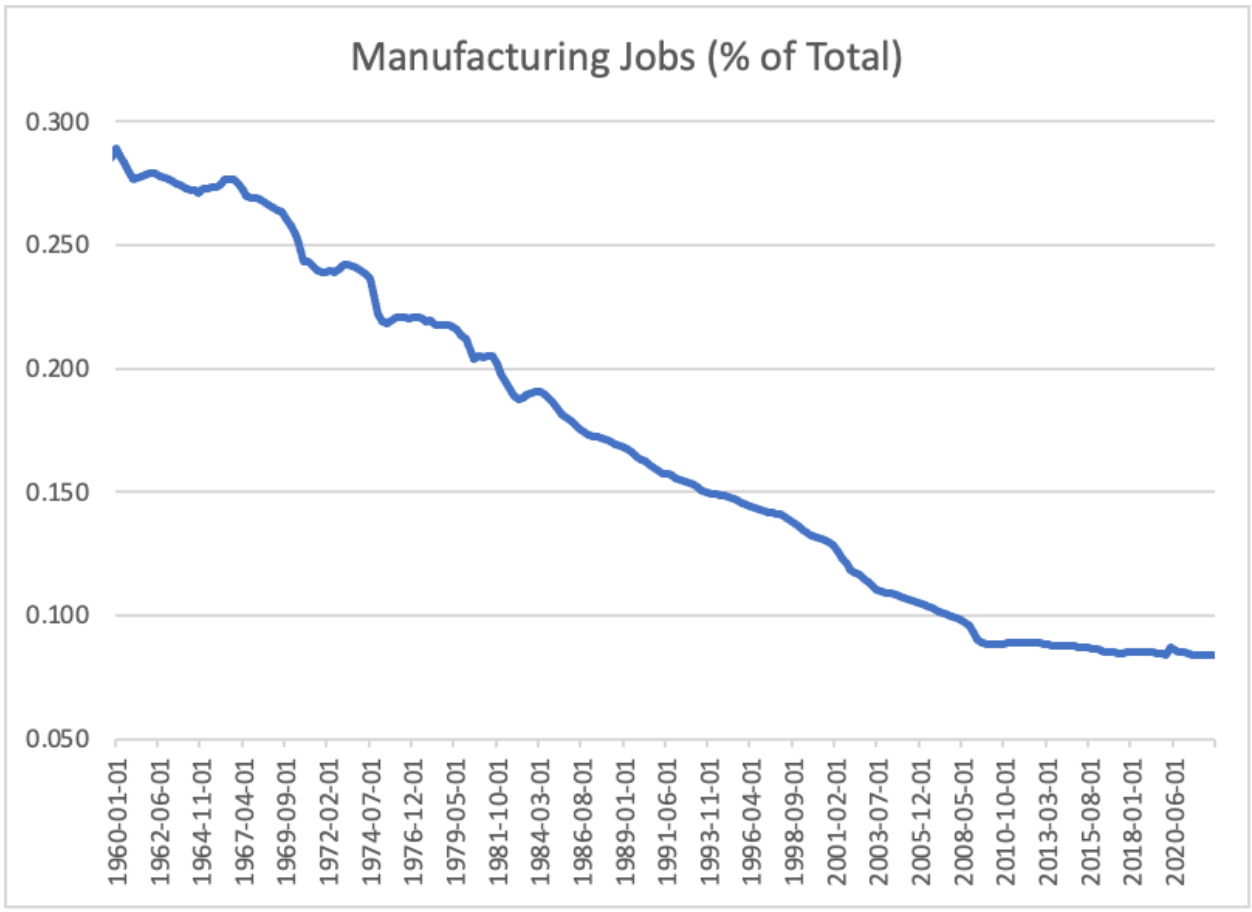

Manufacturing Jobs (% of Total)
0.300
0.250
0.200
0.150
0.100
0.050
1960-01-01
1962-06-01
1964-11-01
1967-04-01
1969-09-01
1972-02-01
1974-07-01
1976-12-01
1979-05-01
1981-10-01
1984-03-01
1986-08-01
1989-01-01
1991-06-01
1993-11-01
1996-04-01
1998-09-01
2001-02-01
2003-07-01
2005-12-01
2008-05-01
2010-10-01
2013-03-01
2015-08-01
2018-01-01
2020-06-01

Table A: FRED Data Values

Metric Name	**Definition**
Labor Force	$Labor\ Force\ =\ Employed\ +\ Unemployed$ $LF\ =\ E\ +\ U$
Labor Force Participation Rate	$Participation\ Rate\ =\ \frac{Labor\ Force}{Population}$ $PR\ =\ \frac{LF}{Pop}$
Employment-Population Ratio	$Employment\ Population\ Ratio\ =\ \frac{Employed}{Population}$ $Employment\ Population\ Ratio\ =\ \frac{E}{Pop}$
Unemployment Rate	$Unemployment\ Rate\ =\ \frac{Unemployed}{Labor\ Force}$ $\mu\ =\ \frac{U}{LF}$
Labor-Force Participation as a Function of Unemployment	$PR\ =\frac{E}{Pop}\ +\ (\frac{U}{Pop}\times\frac{LF}{LF})$ $\mu PR\ =\ PR\ -\ (\frac{E}{Pop})$ Where $\mu\ =\ 1\ -\ (\frac{\frac{E}{Pop}}{PR})$

Table B: Labor Market Statistics

Year	Labor Force Participation Rate	Employment-Population Ratio	Population	Unemployment Level	Employment Level	Civilian Labor Force Level
1/1/1989 to 12/1/2007	66.5%	62.9%	249,067	7,457	130,595	138,049
2022-12	62.3%	60.1%	333,543	5,722	159, 244	164,966

Table C: Labor Market Calculated Statistics

Year	Labor Force	Unemployment Rate
1989-01-01 to 2007-12-01	$LF = 130,595 + 7,457$ $LF = 138,052$	$\mu = \frac{7,457}{138,049}$ $\mu = .054017$
2022-12	$LF = 159,244 + 5,722$ $LF = 164,966$	$\mu = \frac{5,722}{164,966}$ $\mu = .034685$

Table D: Unemployment Calculations

If the labor force participation rate were at the stable level of 66.5%, which was the average from 1989-01-01 to 2007-12-01, at the peak, and the employment-population ratio were at the 2022-12 level of 60.1% then the unemployment level would be as calculated below.
$\mu = 1 - (\frac{\frac{E}{Pop}}{PR})$ $\mu = 1 - (\frac{.601}{.665})$ $\mu = .09624$

If the labor force participation rate were at the 2022-12 level of 62.3% and the employment-population ratio were at the stable level of 62.9%, which was the average level from 1989-01-01 to 2007-12-01, then the unemployment level would be as calculated below.
$\mu = 1 - (\frac{\frac{E}{Pop}}{PR})$ $\mu = 1 - (\frac{.629}{.623})$ $\mu = -.009630$

In other words, not only all the unemployed would be employed, but in addition an extra almost 1 percent of people outside of the labor force (discouraged workers) would have to get in and then get employed.

Table E: Capacity Utilization During Periods of Economic Growth

Date	**Average Capacity Utilization Manufacturing (SIC):**	**Average Real GDP:**
1/1/1948 to 10/1/1973	83.5191	4.1
1/1/1974 to 4/1/2007	79.3837	3.0
7/1/2007 to 10/1/2022	74.7341	1.7181