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Department of Economics and Finance – Course in Economics and Business

Major in Finance

# THE ROLE OF WAGES IN THE INFLATION PROCESS
## AN HISTORICAL ANALYSIS

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## Introduction

The interplay between wages and inflation has long been a focal point in economic theory and policy. Understanding how wages influence inflation and vice versa is crucial for developing effective economic strategies. This dissertation, delves into the intricate relationship between these two critical economic variables, examining both historical and contemporary perspectives. The study begins with a comprehensive review of key economic theories of inflation from the 20th century. It explores the classical view of inflation as a purely monetary phenomenon, rooted in the Quantity Theory of Money (QTM). Moving forward, the dissertation discusses the Keynesian theory of inflation, which emphasizes the role of aggregate demand. Then in direct opposition we have the monetarist theories championed by Milton Friedman in the mid nineteen-hundreds. His work highlighted the importance of controlling money supply growth to manage inflation, contrasting sharply with Keynesian advocacy for active fiscal policy. The dissertation then reviews pivotal surveys that give an overview of the most relevant theories of inflation, such as Bronfenbrenner and Holzman's 1963 survey of inflation theory and David Laidler's 1975 survey, which integrate various theoretical approaches to inflation. These studies underscore the complexity of inflation dynamics, considering both demand-pull and cost-push factors, and the critical role of empirical evidence in validating economic theories. The last section of the first chapter is dedicated to Robert J. Gordon's influential 1988 paper, "The Role of Wages in the Inflation Process." Gordon challenges traditional Keynesian views by suggesting that wages do not significantly drive inflation and brings forth several econometric results to demonstrate his theories. In addition to historical perspectives, the document explores the developments regarding wages and inflation in the 21st century by analyzing more modern research.

The dissertation concludes with an analysis of recent inflationary episodes, particularly in the post-pandemic world and amid geopolitical tensions.

By synthesizing historical and contemporary analyses, the document aims to give a comprehensive overview of the role of wages in the inflation process.

### 1.1 Classical view - the QTM, inflation as a monetary phenomenon

The Quantity Theory of Money (QTM) is a key concept in classical economics, suggesting that the amount of money in circulation directly affects the general price level of goods and services. This relationship is expressed through the equation of exchange: MV = PQ, where ( M ) represents the money supply, ( V ) is the velocity of money, ( P ) is the price level, and ( Q ) denotes real output. Irving Fisher, one of the most important economists in the first part of the 20th century, formalized this theory, highlighting the assumption that velocity and output remain stable in the short term, leading to a direct impact of money supply changes on the price level.

Historically, the QTM has been integral to classical economic thought, which focuses on market equilibrium and self-regulation. The theory posits that an increase in the money supply, with constant velocity and output, results in a rise of the price level, thus causing inflation. This straightforward relationship underscores the classical view of inflation as primarily a monetary phenomenon. However, the assumption of constant velocity is often critiqued, as velocity can fluctuate based on changes in spending and saving behaviors.

The application and relevance of the QTM have evolved over time. For instance, periods of hyperinflation, such as in Weimar Germany, vividly demonstrate the principles of the QTM. Historical examples support the theory's assertion that an increased money supply leads to inflation. Martin Bronfenbrenner and Franklyn Holzman[1], in their 1963 survey of inflation theory, noted how post-World War II inflation challenged many pre-war economic beliefs, providing a broader context for understanding the QTM’s role and limitations.

Critics of the QTM argue that its assumption of constant velocity is unrealistic, as velocity can vary significantly. While the QTM may hold true in the long run, short-term factors like supply shocks, demand changes, and monetary policy interventions can cause deviations from its predictions. Additionally, the classical view assumes an exogenous money supply controlled by central authorities, whereas some suggest that the money supply can be endogenous, influenced by the banking system and economic activity.

[1] See section 1.4 for a more in-depth analysis of the work of the two economists.

Bronfenbrenner and Holzman also highlighted various critiques, including the importance of supply-side factors and expectations in the inflation process. These critiques emphasize the QTM's limitations in explaining all aspects of inflation. Warburton's restatement of the QTM in the 1940s, which demonstrated that changes in the money supply led to changes in velocity, adds complexity to the relationship between money supply and price levels.

**The Relevance of Wages**

Wages are a crucial component in understanding the dynamics of inflation and the broader economy. As explored by economists such as Irving Fisher[2] and A. C. Pigou[3], wages have a significant impact on the purchasing power of money and the overall price level. Examining this relationship helps to highlight the importance of wages in economic stability and growth. Irving Fisher, in his work "The Purchasing Power of Money," discusses the relationship between the money supply and price levels. Fisher's equation of exchange discussed above shows that the quantity of money (M), its velocity (V), the price level (P), and the volume of transactions (T) are interconnected. Wages, as part of production costs, directly influence prices. When wages increase, production costs rise, leading to higher prices if all other factors remain constant. This connection shows how wages can contribute to inflation, as higher wages can lead to increased consumer spending, raising the demand for goods and services and potentially driving up prices. A. C. Pigou, in his article "The Value of Money," provides additional insights into how wages affect the economy. Pigou discusses the demand for money and its value in terms of commodities, suggesting that changes in wages can impact the demand for money and its velocity. When wages rise, people have more disposable income, which can increase spending and the demand for money. This increased demand can influence how quickly money circulates and, consequently, the price level, as businesses adjust their prices in response to higher consumer demand. Pigou also emphasizes the importance of stable wages for maintaining economic balance. Wage fluctuations can lead to shifts in the demand for money, affecting

[2] Fisher, I. (1911). "The Purchasing Power of Money: Its Determination and Relation to Credit, Interest, and Crises."
[3] Pigou, A. C. (1917). "The Value of Money."

overall price stability. Stable wages contribute to predictable spending patterns, supporting a more stable demand for money and less volatile prices. Both Fisher and Pigou highlight the dual role of wages in influencing both production costs and consumer behavior. Wages impact the supply side by affecting production costs and the demand side by influencing consumer spending. This dual role makes wages a key factor in shaping economic outcomes. Policymakers need to understand this relationship to manage inflation and ensure economic stability. In summary, wages are a vital element in the economic landscape, affecting the purchasing power of money and the price level. The insights of Fisher and Pigou help us understand how wages interact with monetary factors to influence inflation and economic stability. Their work underscores the importance of balanced wage policies that support economic growth while maintaining price stability.

### 1.2 Keynesian Theory of Inflation - The general theory and beyond

John Maynard Keynes (1883-1946) is one of if not the most important economist of all time, Keynes's theory of inflation offers a distinct perspective compared to classical economic thought, and its impact is deeply rooted in his seminal work, "The General Theory of Employment, Interest, and Money," published in 1936. This groundbreaking text shifted the focus of economic analysis from the classical emphasis on supply-side factors to a demand-driven approach. Keynes argued that aggregate demand (comprising consumption, investment, and government spending) plays a crucial role in determining overall economic activity and price levels. This perspective was particularly significant during the Great Depression4, as it provided a theoretical foundation for understanding and addressing widespread unemployment and deflation.

Keynes's work on monetary theory, as detailed in "The General Theory" and other writings such as the "Tract on Monetary Reform" and "Treatise on Money," highlights his belief in the importance of money in the economy. Keynes critiqued the classical theory's reliance on

[4] The Great Depression was a severe worldwide economic downturn that lasted from 1929 to the late 1930s. It began with the stock market crash of October 1929 and was characterized by widespread unemployment, significant declines in industrial production, and profound deflation. The crisis led to widespread poverty and had profound effects on the global economy and societal structures.

Say's Law[5] and the Quantity Theory of Money, arguing instead that money's role is far more dynamic and integral to economic stability. He emphasized the need for active monetary policy to manage aggregate demand, suggesting that changes in money supply influence interest rates and, subsequently, investment and consumption.

**Liquidity Preference Theory**

A key concept introduced by Keynes is the notion of liquidity preference, which fundamentally changed the understanding of money demand and its impact on the economy. Liquidity preference refers to the desire to hold cash or easily liquidated assets rather than investing in long-term securities. Keynes identified three motives for holding money: the transactions motive (money needed to cover everyday expenses), the precautionary motive (money held for unexpected expenses), and the speculative motive (money held to take advantage of future changes in the price of bonds and other assets). According to Keynes, the interest rate is determined by the demand for money (liquidity preference) and the supply of money set by the central bank. The preference for liquidity reflects the general level of confidence or expectations about the future among economic agents. In uncertain times, the preference for money as a liquid asset increases, lowering the velocity of money and potentially stifling economic growth despite an increase in the money supply.

**Types of Inflation: Demand-Pull and Cost-Push**

In Keynesian economics, inflation is often attributed to aggregate demand exceeding aggregate supply, leading to demand-pull inflation. This situation typically arises when the economy is near or at full employment, causing businesses to raise prices to balance the heightened demand. Keynes also acknowledged cost-push inflation, where rising production costs, such as wages and raw materials, result in increased prices. This form of inflation can occur even when the economy is not operating at full capacity, indicating the importance of both demand and supply factors in the inflationary process.

[5] Say's Law, formulated by French economist Jean-Baptiste Say, posits that supply creates its own demand. In other words, the production of goods and services generates an equivalent amount of demand in the economy. This principle was integral to classical economics.

Keynes's approach to inflation centers around the interaction between nominal wages and price levels. Unlike classical and neoclassical theorists who viewed nominal wages as quickly adjusting to the labor market's supply and demand conditions, Keynes saw wages as "sticky" downwards. This stickiness prevents wages from adjusting downward during economic downturns, which can exacerbate unemployment and reduce overall economic output. In Keynes's view, inflation occurs when aggregate demand in the economy exceeds aggregate supply at current prices, which is often influenced by changes in nominal wages. When workers demand higher wages, and businesses grant these increases, production costs for businesses rise. In response, businesses raise the prices of their goods and services to maintain profit margins, leading to inflation. This process, often referred to as "cost-push" inflation, is a central theme in Keynesian analysis. Moreover, Keynes introduced the concept of the wage-price spiral6 to describe a self-reinforcing cycle where wage increases lead to higher prices, which in turn lead to demands for further wage increases as workers strive to maintain their real income amidst rising inflation. This spiral can be particularly damaging as it can lead to hyperinflation if not controlled.

**The Phillips Curve and Inflation-Unemployment Trade-Off**

A pivotal contribution of Keynesian theory is the Phillips Curve, which illustrates the inverse relationship between inflation and unemployment[7]. Initially observed by A.W. Phillips, the curve suggested that lower unemployment rates correspond with higher inflation and vice versa, although this relationship is primarily observed in the short term. The development of Neo-Keynesian models further expanded upon Keynes's ideas, incorporating wage and price rigidities to explain why prices and wages do not adjust immediately to changes in economic conditions.

**Policy Implications of Keynesian Economics**

Keynesian economics advocates for active government intervention to manage economic cycles. During periods of low demand and high unemployment, Keynesians support fiscal

[6] In the second chapter we will further discuss wage-price spirals by looking at the historical data regarding this phenomenon.

[7] In the following section of this chapter, we focus on Phillips' studies

stimulus measures, such as increased government spending and tax cuts, to boost aggregate demand. Conversely, during periods of high inflation, Keynesians recommend contractionary policies to temper the economy. This pragmatic approach aims to stabilize economic fluctuations and maintain full employment while controlling inflation. Historical applications, such as the New Deal policies in the United States during the Great Depression, exemplify the practical implementation of Keynesian principles to address economic crises. Keynes's theory suggests that managing the economy through monetary policy alone can be challenging, particularly in managing inflation and employment simultaneously. His analysis implies that active fiscal policy—government spending and taxation—is crucial to managing aggregate demand and addressing inflation without causing unemployment. For instance, in a situation where inflation is rising due to high aggregate demand, increasing taxes or reducing government spending can help temper this demand and stabilize prices without necessarily causing an increase in unemployment.

**Broader Impact of "The General Theory"**

The broader impact of "The General Theory" on economics cannot be overstated. It not only provided a new framework for understanding macroeconomic fluctuations but also legitimized the role of government in stabilizing the economy. This work laid the foundation for modern macroeconomics and influenced numerous economic policies aimed at promoting stability and growth. Its insights into the importance of aggregate demand, the interplay between inflation and unemployment, and the role of expectations continue to inform contemporary economic strategies and debates.

In summary, the Keynesian theory of inflation, emphasizing the role of aggregate demand and incorporating the dynamics of wage and price rigidities, offers a nuanced framework for understanding inflation. The integration of expectations and the natural rate of unemployment enriches this perspective, making it a valuable tool for policymakers. The concept of liquidity preference underscores the complex interplay between money supply, interest rates, and economic activity, further enhancing the explanatory power of Keynesian economics. While it has faced criticism, the empirical successes of Keynesian policies in

various historical contexts highlight its enduring relevance and importance in economic thought.

### 1.3 post-Keynesian theories of inflation - Phillips (1958)

In 1958, A. W. Phillips published an influential paper titled "The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861-1957" in Economica. This study marked a significant advancement in understanding inflation dynamics, particularly within the framework of post-Keynesian economic theories.

Phillips' research focused on the relationship between unemployment and the rate of change of money wage rates. He hypothesized that when the demand for labor is high and unemployment is low, wage rates tend to increase rapidly as employers compete for a limited pool of workers. Conversely, when demand for labor is low and unemployment is high, wage rates decrease more slowly since workers are reluctant to accept lower wages. This hypothesis was supported by empirical evidence spanning nearly a century, demonstrating a clear inverse relationship between wage changes and unemployment rates.

Phillips introduced a non-linear model to describe this relationship, emphasizing that wage rates adjust more slowly to increases in unemployment than to decreases. He identified that the rate of change in wage rates is influenced not only by the level of unemployment but also by the rate of change in unemployment. During periods of rising business activity and decreasing unemployment, employers are more likely to bid up wages. Conversely, during periods of falling business activity and increasing unemployment, wage increases are less likely as workers have reduced bargaining power.

#### Demand-Pull Inflation

Demand-pull inflation occurs when aggregate demand in an economy outpaces aggregate supply. Phillips' analysis provides insights into how wage dynamics can contribute to demand-pull inflation. In his study, Phillips noted that during periods of low unemployment, high demand for labor leads to increased competition among employers for workers. This competition drives up wages as firms offer higher pay to attract and retain employees. As

wages increase, workers' purchasing power rises, leading to higher overall demand for goods and services.

This heightened demand can push prices upward, particularly when the economy is operating near full capacity and supply cannot keep pace with the increased demand. Thus, Phillips' findings illustrate a key mechanism of demand-pull inflation: as wages rise in response to low unemployment and high labor demand, the resulting increase in consumer spending can lead to higher price levels across the economy.

Phillips' work suggests that managing demand-pull inflation requires careful balancing of aggregate demand. Policymakers can use fiscal and monetary measures to influence overall demand in the economy. For instance, tightening monetary policy by raising interest rates can help to cool off excessive demand and moderate inflationary pressures. Similarly, fiscal policies such as reducing government spending or increasing taxes can also help to control aggregate demand and prevent overheating of the economy.

**Cost-Push Inflation**

Cost-push inflation, on the other hand, arises from increases in the cost of production that drive up prices independently of demand conditions. Phillips explored the impact of changes in import prices and the cost of living on wage rates. He argued that significant increases in the prices of imports or other key inputs can lead to higher production costs for businesses. These increased costs can then be passed on to consumers in the form of higher prices, leading to inflation even in the absence of strong demand pressures.

Phillips noted that cost-push inflation is often linked to external shocks, such as sharp increases in import prices due to supply disruptions or geopolitical events. For example, he observed that the rapid rise in import prices during the early 1950s, caused by factors such as the devaluation of sterling and the Korean War, contributed to significant increases in retail prices. These higher retail prices, in turn, led to cost of living adjustments in wage rates, further fueling inflation.

The wage-price spiral described by Phillips is a key feature of cost-push inflation. As wages rise to compensate for higher living costs, businesses face increased labor costs and may raise prices to maintain profitability. This creates a feedback loop where higher wages lead to

higher prices, which then necessitate further wage increases. Managing cost-push inflation requires addressing the underlying cost pressures, such as stabilizing import prices or improving productivity to offset rising input costs.

**Policy implications**

Phillips' work has significant policy implications, particularly for the design of monetary and fiscal policies aimed at controlling inflation. Policymakers must consider the state of the labor market and wage dynamics when formulating strategies to manage inflation. The insights from Phillips' study suggest that efforts to reduce inflation through monetary tightening must be balanced against the potential impact on unemployment and wage growth. In conclusion, Phillips' 1958 study represents a pivotal contribution to post-Keynesian theories of inflation. By highlighting the interplay between unemployment, wage changes, and inflation, Phillips provided a nuanced understanding of the factors driving price levels. The distinction between demand-pull and cost-push inflation in Phillips' analysis remains a critical consideration for policymakers seeking to maintain economic stability.

### 1.4 Bronfenbrenner and Holzman - Survey of Inflation (1963)

In their comprehensive survey on inflation theory published in 1963, Bronfenbrenner M. and Holzman F.D. explore various theories that attempt to explain the causes and mechanics of inflation. The paper delves into both traditional and emerging theories of the time, offering a critical assessment of each against in the post-World War II economic conditions, in the authors' words:

*Our survey is more of a guide through chaos than a history of received doctrine or a systematic critique of a few rival positions.*

To understand were the theories presented in this survey stand in the field of economics of the times the statements brought forth by the authors are closely linked to the ideals and theories of Keynesian economics.

Bronfenbrenner and Holtzmann define inflation as a persistent rise in the general price level of goods and services over time. They identify two primary sources: demand-pull and cost-push inflation.

**Demand-Pull Inflation**

Demand-pull inflation is characterized by an excess of aggregate demand over aggregate supply. Grounded in Keynesian economics, this theory emphasizes the role of aggregate demand in driving economic output and inflation. According to this view, when the economy is at or near full employment, any additional increase in demand leads to higher prices rather than increased output. The Keynesian framework considers various factors that can shift aggregate demand, including fiscal policies, monetary policies, and consumer confidence. In Keynesian economics, aggregate demand is composed of consumption, investment, government spending, and net exports. Keynesians argue that fluctuations in these components can lead to economic instability and inflation. For instance, during economic booms, increased consumer spending and investment can lead to demand-pull inflation. Keynesians advocate for the use of fiscal and monetary policies to manage aggregate demand. Expansionary fiscal policies, such as increased government spending and tax cuts, can boost demand during recessions, while contractionary policies, such as reducing government spending or increasing taxes, can help cool down an overheated economy.

**Cost-Push Inflation**

Cost-push inflation results from increased production costs, leading to reduced aggregate supply. This can be caused by rising wages, higher raw material costs, or supply chain disruptions. The wage-price spiral is a common example of cost-push inflation, where higher wages increase production costs, leading to higher prices. Workers then demand higher wages to keep up with the cost of living, perpetuating the cycle.

Keynesian economics acknowledges the role of supply-side factors in inflation. While traditional Keynesian models focus on demand management, Keynesians recognize that supply shocks, such as increases in oil prices or other essential inputs, can lead to cost-push inflation. In such cases, traditional demand management policies may not be sufficient to

control inflation, and supply-side measures, such as improving productivity and reducing production costs, are necessary.

**Empirical Testing and Quantitative Analysis**

Bronfenbrenner and Holtzmann delve into the empirical testing of inflation theories. They discuss various studies and statistical methods used to test the validity of demand-pull and cost-push inflation models. For example, they reference Harberger's analysis, which uses regression techniques to examine the relationship between money supply and price levels. This quantitative approach helps isolate the effects of different variables on inflation, providing a more nuanced understanding of its causes.

The authors emphasize the importance of empirical evidence in validating economic theories. They highlight how historical data can shed light on the relative importance of demand-pull and cost-push factors in different economic contexts. By examining periods of high inflation, such as the post-World War II era and the 1970s oil shocks, Bronfenbrenner and Holtzmann demonstrate how empirical analysis can inform our understanding of inflation dynamics and guide policy responses.

The authors acknowledge the complexity of inflation, often resulting from a combination of demand-pull and cost-push factors. This mixed inflation scenario suggests that policy responses need to be multifaceted. For demand-pull inflation, contractionary fiscal and monetary policies can be effective, such as reducing government spending or increasing interest rates. However, for cost-push inflation, these measures might lead to higher unemployment and slower economic growth. Therefore, supply-side policies, such as improving productivity and reducing production costs, are also necessary.

In line with Keynesian thought, Bronfenbrenner and Holtzmann advocate for a balanced policy approach that addresses both demand and supply factors. Keynesians argue that while demand management is crucial for stabilizing the economy, supply-side measures are essential for addressing structural issues that can lead to inflation. This comprehensive approach ensures that policymakers can effectively manage inflation without sacrificing economic growth and employment.

**The Role of Wages**

A crucial aspect of Bronfenbrenner and Holtzmann's analysis is the role of wages in the inflation process. Wages can influence both demand-pull and cost-push inflation. On the demand side, higher wages increase disposable income, thereby boosting aggregate demand. When workers have more money to spend, consumption rises, leading to increased demand for goods and services, which can push prices up if the economy is near full capacity.

On the supply side, rising wages contribute to cost-push inflation. Higher labor costs increase production costs for businesses. To maintain profit margins, companies may raise prices of their goods and services, leading to a general rise in the price level and contributing to inflation. Additionally, the wage-price spiral is a critical concept. As workers demand higher wages to keep up with rising living costs, employers face increased production costs and, in turn, raise prices. This cycle can perpetuate ongoing inflation and is difficult to break once it starts.

Bronfenbrenner and Holtzmann also highlight the interaction between wage policies and inflation control measures. While wage increases are necessary to ensure fair compensation and maintain living standards, they must be managed carefully to avoid triggering inflationary spirals. Policymakers must balance the need for wage growth with potential inflationary pressures. This balance is crucial for achieving stable economic growth without sacrificing price stability.

The authors discuss the role of collective bargaining and labor unions in the wage-setting process. Strong unions can secure higher wages for workers, benefiting income distribution and social equity. However, if wage increases outpace productivity growth, they can lead to higher inflation. This interplay between wages, productivity, and inflation underscores the complexity of wage dynamics in the broader inflationary process.

Keynesians emphasize the importance of productivity growth in maintaining price stability while allowing for wage increases. By improving productivity, economies can support higher wages without triggering inflation. This perspective highlights the need for policies that promote innovation, education, and infrastructure development to enhance productivity and support sustainable economic growth.

**Post-War Inflation**

Bronfenbrenner and Holtzmann provide an insightful analysis of the post-World War II inflationary period as an example of how different inflation theories play out in real-world contexts. After World War II, many economies experienced significant inflationary pressures due to a combination of pent-up consumer demand, supply shortages, and the transition from wartime to peacetime production.

In this period, demand-pull inflation was evident as consumers, who had saved money during the war due to rationing and limited availability of goods, began spending their savings, leading to a sharp increase in aggregate demand. Governments also continued high levels of spending to support post-war reconstruction and economic recovery, further boosting demand. This surge in demand, coupled with supply-side constraints, created an environment ripe for inflation.

Cost-push factors were also at play during the post-war period. The transition from wartime production led to supply bottlenecks as industries retooled for civilian production. Additionally, labor shortages and the bargaining power of labor unions led to significant wage increases, which raised production costs for businesses. These higher costs were passed on to consumers in the form of higher prices, contributing to inflation.

Bronfenbrenner and Holtzmann's analysis of the post-war situation highlights the importance of understanding the interplay between demand-pull and cost-push factors in inflation. They argue that policymakers must consider both sides of the inflation equation to develop effective strategies for controlling inflation. This comprehensive approach aligns with Keynesian economics, which advocates for a balanced policy mix that addresses both demand and supply-side factors.

The authors end their survey with the following remark:

*"Gazing into our respective crystal balls, we guess that progress in inflation theory over the next decade or so will take two forms: (1) better quantitative estimates (for different times and places, also different lengths of run) of many effects we have noted only qualitatively; and (2) simpler and more usable syntheses of the three or four main streams of thought we have noted in this survey-demand*

*inflation, supply or cost inflation, interactions with sociological economics, and interactions with the burgeoning theory of economic growth and development."*

We will see in the following sections that their predictions came true indeed.

### 1.5 Monetarism, Milton Friedman and the revival of classic theory

*"Milton Friedman, Nobel Prize winner in Economics in 1976 and a leading figure in monetarism, contributed perhaps more than anyone else to building an alternative to Keynesian theory and to the strong resurgence of the liberal paradigm starting from the 1980s."*[8]

Monetarism emerged as a significant economic theory in the mid-20th century, reviving the classical view that emphasizes the importance of the money supply in determining inflation and economic activity. This section explores the key principles of monetarism, Milton Friedman's contributions, policy implications, critiques, and the similarities and differences between Friedman's theories and Keynesian ideas. Milton Friedman, played a crucial role in developing monetarism. He argued that "inflation is always and everywhere a monetary phenomenon," emphasizing that changes in the money supply have significant effects on the real economy. This view countered the Keynesian perspective, which often downplayed the role of money. Friedman believed that the money supply could be effectively controlled by monetary authorities and that money demand is stable and predictable, governed by a few key variables. This stability contrasts with the Keynesian view, which often saw money demand as more volatile and influenced by a broader array of factors. According to Friedman, the balance between money supply and money demand determines nominal GDP in the short term and the price level in the long term, as real output is driven by supply-side factors like productivity and technological progress. His theoretical framework focused on the dynamic version of the Quantity Theory of Money (QTM), expressed as $(m + v = \pi + g)$, where $( m )$ represents the growth rate of the money supply, $( v )$ is the rate of change in the velocity of

[8] This quote (liberally translated) opens the second chapter (titled: enslaved to a deceased economist) of the book "Oltre le banche centrali" by Francesco Saraceno, LUISS University press.

money, ( π ) is the rate of inflation, and ( g ) is the growth rate of the economy. Friedman argued that long-term changes in the money supply primarily affect the price level, while short-term changes influence both output and prices due to price and wage stickiness.

**Reformulation of the Phillips Curve**

One of Friedman's notable contributions was his reformulation of the Phillips Curve, which originally depicted an inverse relationship between unemployment and inflation. Friedman challenged this view by introducing the concept of the natural rate of unemployment. He argued that any attempt to reduce unemployment below this natural rate using monetary expansion would only lead to accelerating inflation, not a permanent decrease in unemployment. In his restatement of the Quantity Theory of Money, Friedman emphasized the role of expectations in the inflation-unemployment relationship. He posited that in the short run, there might be a trade-off between inflation and unemployment due to unanticipated inflation. However, in the long run, as expectations adjust, this trade-off disappears, and the economy returns to the natural rate of unemployment regardless of the inflation rate. This insight led to the development of the expectations-augmented Phillips Curve, which incorporates adaptive expectations and highlights the long-term neutrality of money.

Friedman's expectations-augmented Phillips Curve can be expressed with the following equation (1):

$$(1) \quad \pi_t = \pi_t^e + \beta(u_t - u_n) + \epsilon_t$$

where $(\pi_t)$ is the actual inflation rate, $(\pi_t^e)$ is the expected inflation rate, $(u_t)$ is the actual unemployment rate, $(u_n)$ is the natural rate of unemployment, $(\beta)$ is a coefficient, and $(\epsilon_t)$ represents supply shocks. This formulation underscores that only unexpected inflation can influence real economic variables like unemployment in the short term.

## Empirical Evidence and Policy Implications

Empirical studies supporting monetarism have shown a consistent relationship between money supply growth and inflation. Historical data often demonstrate that periods of rapid money supply growth correlate with high inflation, while tight money supply corresponds with lower inflation. These findings support the monetarist policy recommendation that central banks should maintain a stable, predictable growth rate in the money supply to achieve low inflation and economic stability. Friedman's policy recommendations include a simple rule where monetary authorities maintain a steady growth rate in the money supply matching the economy's growth rate. This approach is designed to avoid the instability caused by erratic changes in monetary policy and to ensure long-term price stability. This recommendation contrasts sharply with Keynesian advocacy for active fiscal policy to manage economic fluctuations. Friedman also discussed the concept of the inflation tax, where governments finance their spending by printing more money, leading to inflation. He argued that this practice diminishes the purchasing power of money and effectively acts as a tax on holders of money. Controlling the money supply is thus essential to prevent excessive government reliance on inflationary financing.

## Comparisons with Keynesian and Monetarist Theories

Milton Friedman and John Maynard Keynes had differing views on many economic issues, but there are also some similarities in their theories: Importance of Monetary Policy: Both economists acknowledged the significant role of monetary policy in influencing economic activity. While Keynes emphasized interest rates and liquidity preference, Friedman focused on the money supply. Aggregate Demand Focus: Both recognized the importance of aggregate demand in driving economic activity. Keynes highlighted the need for active demand management, while Friedman acknowledged that changes in the money supply impact aggregate demand. Long-Term Economic Stability: Both aimed for long-term economic stability and growth, although they proposed different methods. Keynes advocated for fiscal policy intervention, while Friedman emphasized stable monetary policy.

**Legacy and Impact**

Despite critiques, monetarism has had a profound influence on monetary policy, especially in the late 20th century. Central banks globally, including the Federal Reserve, have adopted policies reflecting monetarist principles, focusing on controlling money supply growth to achieve economic stability. Friedman's impact is evident in the widespread adoption of monetary targets by central banks, the emphasis on controlling inflation, and the move away from discretionary fiscal policies toward rule-based monetary policies. His ideas have significantly shaped modern understandings of central banking and the importance of maintaining a stable and predictable monetary environment. In conclusion, Keynesian and monetarist theories offer valuable insights into economic stability and growth. While Keynes emphasized the importance of aggregate demand and active fiscal policy, Friedman focused on the role of the money supply and stable monetary policy. Understanding both perspectives provides a comprehensive view of the debates and policies shaping economic thought and practice in the 20th century and going forward. Despite their differences, the contributions of both economists have left lasting legacies on economic policy and theory and are often still relevant in today's economic debates.

## 1.6 Laidler: Inflation a survey (1975)

David Laidler's 1975 survey, "Inflation: A Survey," offers a thorough examination of inflationary theories, with a significant focus on the monetarist perspective. Laidler[9] integrates various theoretical approaches and empirical findings to present a comprehensive analysis of the inflationary process. The survey is notable for its detailed exploration of the relationship between inflation, monetary policy, and economic variables.

At the heart of Laidler's analysis is the monetarist view that inflation is fundamentally a monetary phenomenon. This perspective aligns with Milton Friedman's assertion that "inflation is always and everywhere a monetary phenomenon." According to this view,

[9] David Earnest William Laidler (born 12 August 1938, North Shields, England) is an English/Canadian economist who has been one of the foremost scholars of monetarism.

inflation results from an excessive growth in the money supply relative to the growth in output. Laidler emphasizes that controlling the money supply is essential for managing inflation, echoing Friedman's advocacy for a steady, predictable monetary policy.

Laidler's survey underscores the importance of the Quantity Theory of Money (QTM), which posits that the price level is directly proportional to the money supply, assuming constant velocity and output. This theory is central to the monetarist approach to inflation, where controlling money supply growth is seen as the primary tool for stabilizing prices.

**Empirical Analysis**

Laidler's empirical work includes examining the stability of the demand for money function and the responsiveness of inflation to excess demand. He discusses various econometric models that capture the dynamics of inflation and unemployment, evaluating their implications for policy. One significant finding is that, while there is often a trade-off between inflation and unemployment in the short run, this relationship does not hold in the long run—a view consistent with the natural rate hypothesis advocated by Friedman and Phelps[10]. Laidler's analysis includes regression models that demonstrate the relationship between money supply growth and inflation. These models typically show a strong correlation, supporting the monetarist view that controlling the money supply is crucial for managing inflation. He also examines the role of expectations in the inflation process, noting that anticipated inflation can influence wage and price setting behaviors.

**Wage and Price Setting Behavior**

A substantial portion of Laidler's survey is dedicated to the micro-foundations of wage and price setting behavior, which are crucial for understanding the inflationary process. He explores how wages and prices respond to excess demand and inflation expectations. The survey highlights the role of wage and price controls in managing inflation, noting their mixed success and potential to create distortions in the economy.

[10] Edmund Strother Phelps is an american economist, he was awarded the Nobel Prize for Economics in 2006 for: "Clarifying the understanding of the relationships between the short-term and long-term effects of economic policies."

Laidler also examines the impact of inflation on income distribution and employment, noting that unanticipated inflation can lead to arbitrary redistributions of wealth. This insight is particularly relevant in understanding the social consequences of inflation, beyond its purely economic effects. For example, unexpected inflation can erode the real value of savings, disproportionately affecting retirees and those relying on fixed incomes.

**Comparisons with Keynesian and Monetarist Theories**

Laidler's survey contrasts monetarist views with Keynesian theories, particularly regarding the role of fiscal policy. While Keynesians emphasize the importance of fiscal policy in managing aggregate demand, monetarists argue for the primacy of monetary policy. Laidler acknowledges the potential for fiscal measures to influence demand but maintains that monetary policy is more effective in controlling inflation in the long term. This distinction is critical for understanding the policy debates between these two schools of thought.

Laidler critiques the Keynesian reliance on fiscal policy, pointing out that it can lead to time lags and political constraints that reduce its effectiveness. In contrast, he argues that monetary policy, when applied consistently and predictably, can provide a more reliable tool for managing inflation.

The survey also delves into post-war inflation, highlighting the difficulties faced by economies in managing inflationary pressures. Laidler discusses the interplay between monetary expansion and inflation during this period, emphasizing the need for sound monetary policies to achieve economic stability. The experiences of different countries with inflation provide valuable lessons for contemporary policymaking.

Laidler provides detailed case studies of post-war inflation in various countries, examining the policies implemented and their outcomes. These case studies illustrate the complexities of managing inflation in different economic contexts and underscore the importance of adapting monetary policies to specific conditions.

**The Role of Expectations and Rational Expectations Theory**

Laidler emphasizes the importance of expectations in the inflation process, drawing on the rational expectations theory developed by John Muth and further popularized by Robert Lucas. According to this theory, individuals form expectations about future inflation based

on all available information, including anticipated monetary and fiscal policies. These expectations influence their economic decisions, such as wage demands and price setting, which in turn affect actual inflation.

Laidler argues that policymakers must consider the role of expectations when designing and implementing monetary policy. If individuals expect that the central bank will allow the money supply to grow rapidly, they may anticipate higher future inflation and adjust their behavior accordingly, leading to a self-fulfilling prophecy. Conversely, if the central bank commits to a stable monetary policy, it can anchor inflation expectations and help maintain price stability.

Laidler's survey concludes with several policy recommendations based on his analysis of inflation theories and empirical evidence. He advocates for a monetary policy that focuses on controlling the growth rate of the money supply to achieve long-term price stability. This approach involves setting clear targets for money supply growth and adhering to them consistently, thereby reducing uncertainty and anchoring inflation expectations.

Laidler also emphasizes the need for transparency and communication from central banks. By clearly articulating their monetary policy goals and the rationale behind them, central banks can build credibility and manage public expectations more effectively. This transparency helps to reinforce the commitment to stable monetary policy and enhances its effectiveness.

### 1.7 Robert J. Gordon - The role of wages in the inflation process (1988)

Robert J. Gordon's influential paper, "The Role of Wages in the Inflation Process," published in the American Economic Review in May 1988, examines how wage changes relate to inflation. Gordon challenges traditional Keynesian views by arguing that wages do not significantly drive inflation, suggesting instead that inflation is more dependent on its own past behavior than on wage dynamics.

Gordon’s work centers around the Phillips curve, which traditionally links wage changes to unemployment, implying wages are a main driver of inflation. He suggests that for stabilization policy, the focus should be on inflation itself rather than wage changes. This

view differs from traditional Keynesian models where wage equations are central to explaining inflation.

Gordon argues that wage equations may be redundant if price changes follow wage changes closely. Instead, he advocates focusing on the Phillips curve as a relationship between inflation and unemployment without emphasizing wages. He introduces the "dichotomy hypothesis," which posits that wage changes do not statistically explain inflation. This means that inflation depends on past inflation, not on past wage changes, which deviates from the structural interpretation common in Keynesian models where wage equations represent labor market behavior and price equations reflect businesses' markup pricing decisions.

**Econometric Evidence**

Gordon supports his argument with econometric evidence from price and wage equations estimated over the period from 1954 to 1987. His analysis shows that wage changes do not significantly influence price behavior, reinforcing the dichotomy hypothesis. The results highlight the importance of output ratios and supply shifts, such as productivity deviations and import prices, in influencing inflation and labor costs.

Gordon's general specification of the price equation (2) is:

$$(2) \quad a(L)P_t = b(L)w_t + c(L)X_t + d(L)z_t + e_t$$

Where lowercase letters designate first differences of logarithms, uppercase letters designate the logarithms of levels, and where ( $P_t$ ) is the rate of price change, ( $w_t$ ) is the growth rate of a wage index, ( $X_t$ ) is an index of excess demand, ( $z_t$ ) is a vector of other relevant variables (e.g., supply shocks), and ( $e_t$ ) is the error term. This equation allows for an analysis of how various factors, including wages and supply shocks, impact price changes.

In his normalized price equation (3):

$$(3) \quad P_t = -a'(L)P_{t-1} + b_0 w_t + b'(L)w_{t-1} + c(L)X_t + d(L)z_t + e_t$$

Gordon shows that price changes include not only past price and wage changes but also the current value of wage changes. This suggests that price and wage equations are alternative forms of the same equation, challenging the traditional view of separate wage and price equations.

The wage equation (4) is thus:

$$(4)\quad w_t = -\left(\frac{1}{b_0}\right) \times [b'(L)w_{t-1} - P_t - a(L)P_{t-1} + c(L)X_t + d(L)z_t + e_t]$$

This suggests that wage changes are fundamentally linked to price changes and other economic variables, questioning the independent role of wage equations in inflation models. Gordon also examines labor's share of income, showing that changes in labor's share affect inflation. If ( w – θ ) is change labor's average product the equation (5) for labor's share change is:

$$(5)\quad \Delta S = w_t - \theta_t - P_t$$

This relationship indicates that if the sum of coefficients on lagged changes in labor's share is zero, wage changes are irrelevant for inflation, meaning any increase in labor's income share results in a profit squeeze rather than upward pressure on inflation.

**Implications for Policy**

Gordon's findings challenge the traditional Keynesian view that wage equations are central to understanding inflation. By demonstrating that inflation depends on past inflation rather than wage changes, Gordon shifts the focus of economic stabilization policies towards managing inflation expectations and addressing supply-side factors. Policymakers should emphasize historical inflation patterns and supply shocks over wage dynamics.

Gordon's analysis also impacts the natural rate of unemployment. His findings suggest that the natural rate of unemployment in the U.S. remained around 6 percent without significant

change during the 1980s, implying that wage behavior is irrelevant for determining both the inflation rate and the natural rate of unemployment.

Gordon's analysis provides a significant shift in understanding the role of wages in the inflation process. His evidence that wage changes do not significantly contribute to inflation challenges traditional Keynesian models and highlights the need for focusing on inflation itself and other supply-side factors in economic policy. This perspective is crucial for policymakers aiming to stabilize inflation without overemphasizing wage dynamics. By focusing on inflation expectations and supply-side factors, policymakers can better manage inflation and promote economic stability.

### 1.8 The IS-MP-IA model (Romer 2000)

David Romer's IS-MP-IA model, introduced in 2000, updates the traditional IS-LM framework by incorporating more realistic assumptions about monetary policy and inflation dynamics. This model addresses several shortcomings of the IS-LM model, such as the outdated assumption that central banks target the money supply and its lack of consideration for inflation expectations. Instead, the IS-MP-IA model assumes that central banks follow a real interest rate rule, making it a better reflection of contemporary monetary policy practices where interest rates are the primary policy tool. The IS-MP-IA model consists of three main components: the IS curve, the MP curve, and the IA curve. The IS curve represents the relationship between the real interest rate and the output gap, showing how aggregate demand is influenced by changes in the interest rate. The MP curve, or Monetary Policy curve, illustrates the central bank's interest rate rule, which adjusts the real interest rate in response to changes in inflation. The IA curve, or Inflation Adjustment curve, captures the dynamic relationship between inflation and the output gap, reflecting how inflation responds to deviations in output from its natural level.

Romer’s model integrates several key ideas. First, it acknowledges that central banks control interest rates rather than the money supply, aligning with the practice of targeting short-term interest rates to manage economic stability. Second, it incorporates the concept of inflation expectations, recognizing that these expectations influence actual inflation and thus the

central bank's policy decisions. Third, it emphasizes nominal rigidities, such as sticky prices and wages, which prevent the economy from instantaneously adjusting to full employment. The model also accounts for the dynamic interaction between inflation and the output gap, addressing aggregate demand and aggregate supply shocks in a stochastic manner. This provides a more realistic depiction of how economies operate under various shocks and central bank policies. By focusing on these aspects, Romer's IS-MP-IA model offers a more comprehensive and accurate framework for understanding the short-run fluctuations in modern economies.

One of the primary advantages of the IS-MP-IA model is its relevance to actual policymaking. Central banks today, including the Federal Reserve in the United States, predominantly use interest rate adjustments as their main tool for influencing economic activity, rather than targeting monetary aggregates. This shift is better captured by the IS-MP-IA framework, making it a more applicable tool for contemporary economic analysis and policy design.

Furthermore, the IS-MP-IA model simplifies the analysis of economic fluctuations by focusing on the central bank's interest rate rule and its effects on inflation and output. This approach allows for clearer insights into the transmission mechanisms of monetary policy and the role of inflation expectations in shaping economic outcomes.

In summary, Romer's IS-MP-IA model represents a significant evolution from the IS-LM framework, addressing its limitations and incorporating modern economic realities. By doing so, it provides a more accurate and practical tool for analyzing short-run economic fluctuations and the effects of monetary policy. This model underscores the importance of understanding the dynamic interactions between monetary policy, inflation expectations, and the output gap, making it an asset for both academic analysis and practical policymaking in today's economic environment.

# Chapter 2 - Inflation and wages in the 21st century

The chapter opens with a review of some data spanning the last decade that helps us to better grasp the inflation and wages situation in a few relevant countries in current times, it also gives us the perspective we need to dive into the changes regarding inflation in a globalized world.

By increasing trade, improving global supply chains, advancing technology, and integrating financial systems, globalization has generally helped keep prices down, a trend known as "imported disinflation." However, it has also led to wage stagnation in developed countries and widened the gap between rich and poor.

We then dive in a more thorough and modern analysis of a previously mentioned phenomenon that of Wage-price spirals, where rising wages push up prices and lead to even higher wages, have historically been rare and short-lived. Factors like inflation expectations, job market conditions, and productivity growth influence these spirals. Despite recent worries about wage-price spirals after the pandemic, history shows they don't usually lead to long-term inflation.

Focus is then shifted on the two most relevant instances of inflationary pressures in the 21st century. The 2007-2008 Global Financial Crisis had a huge impact, causing unemployment to soar and wages to stagnate, which increased income inequality. Initially, inflation spiked but was followed by deflation. Central banks lowered interest rates and took other measures to ease the crisis, but many people still lost jobs and saw their wages cut. The crisis showed the limits of traditional monetary policies and the need for broader fiscal measures.

The COVID-19 pandemic caused severe disruptions, including supply chain issues and large-scale fiscal and monetary responses. These actions increased demand at a time when supply was limited, leading to higher inflation. The pandemic also changed the job market, causing labor shortages and wage pressures in some sectors. This situation highlights the challenge of balancing economic recovery with controlling inflation.

## 2.1 Recent Empirical Data

To provide context to the following sections of the chapter the figures below show the level of inflation, the unemployment level and the percentage growth of wages in the United States, Euro Area and China for the last decade[11].


*Figure 1: Inflation rate in the U.S., U.S. Bureau of Labor Statistics*

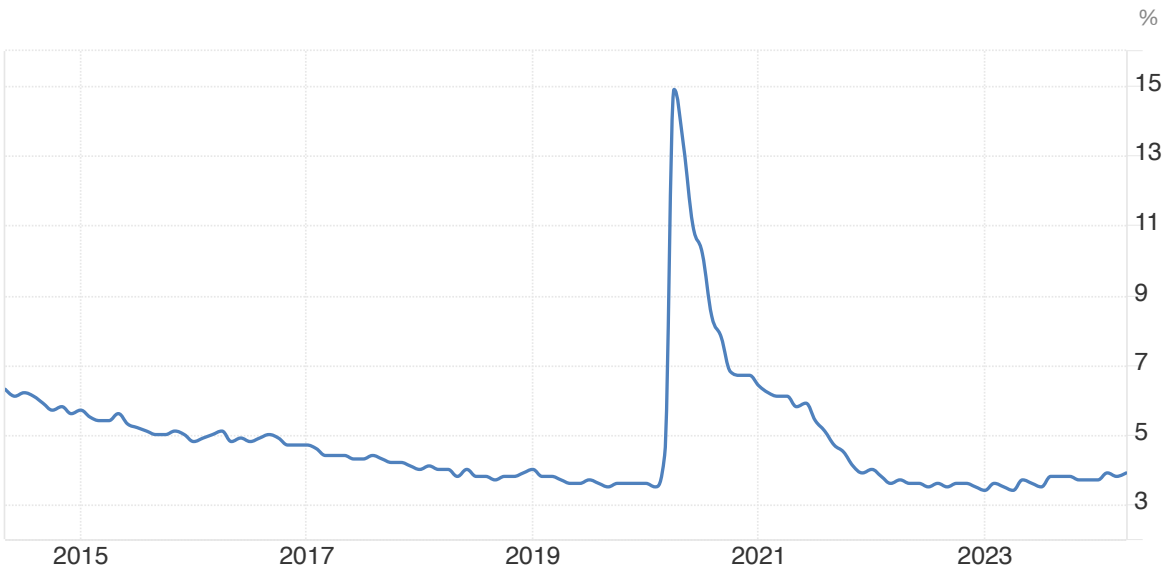


*Figure 2: Unemployment in the U.S., U.S. Bureau of labor statistics*

[11] All data is provided by tradingeconomics.com.

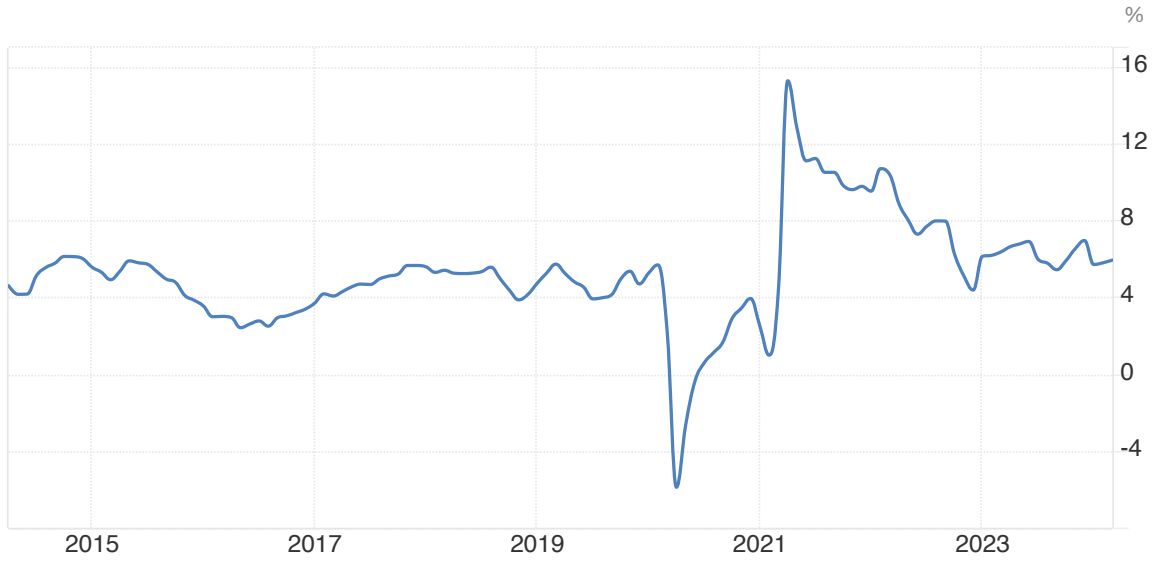


*Figure 3 Wages and salaries growth in the U.S., U.S. Bureau of labor statistics*


*Figure 4: Euro Area inflation rate, EUROSTAT*

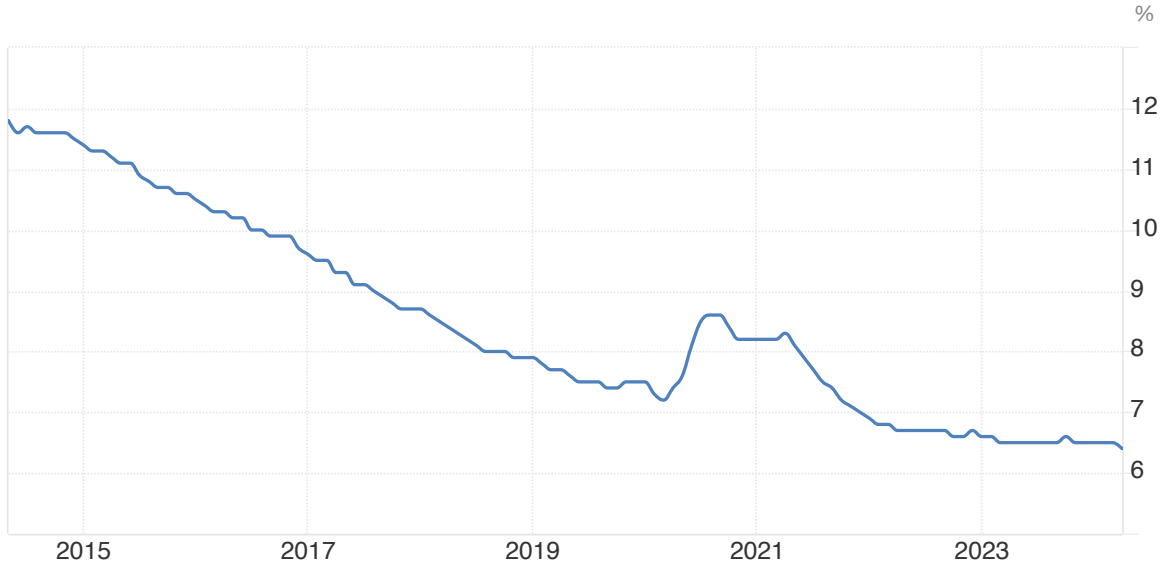


*Figure 5: Euro Area Unemployment rate, EUROSTAT*

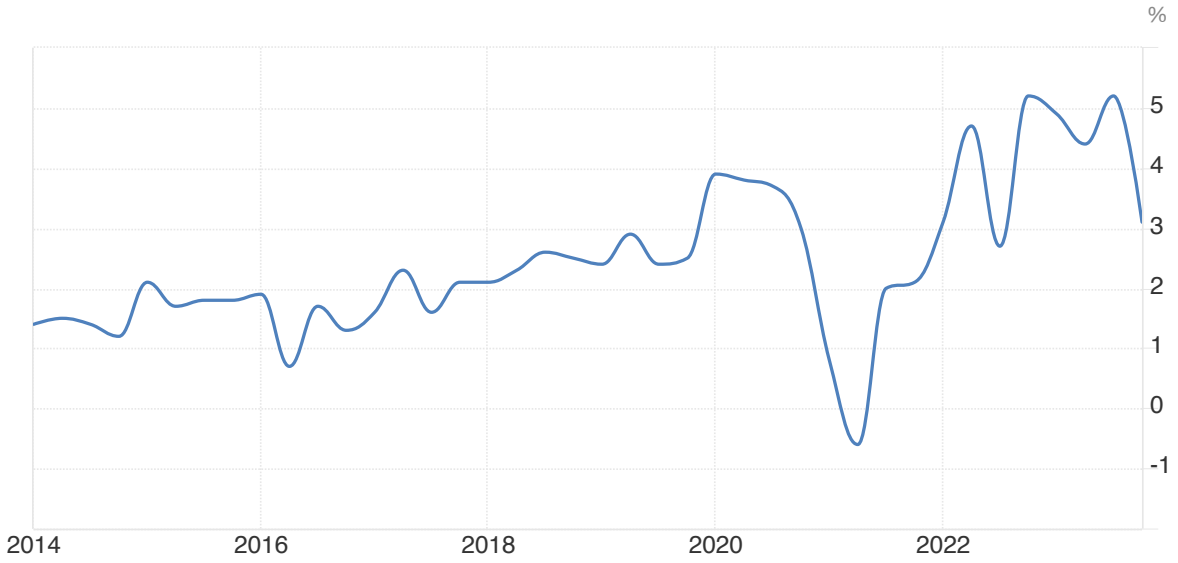


*Figure 6: Euro Area Wage growth, EUROSTAT*

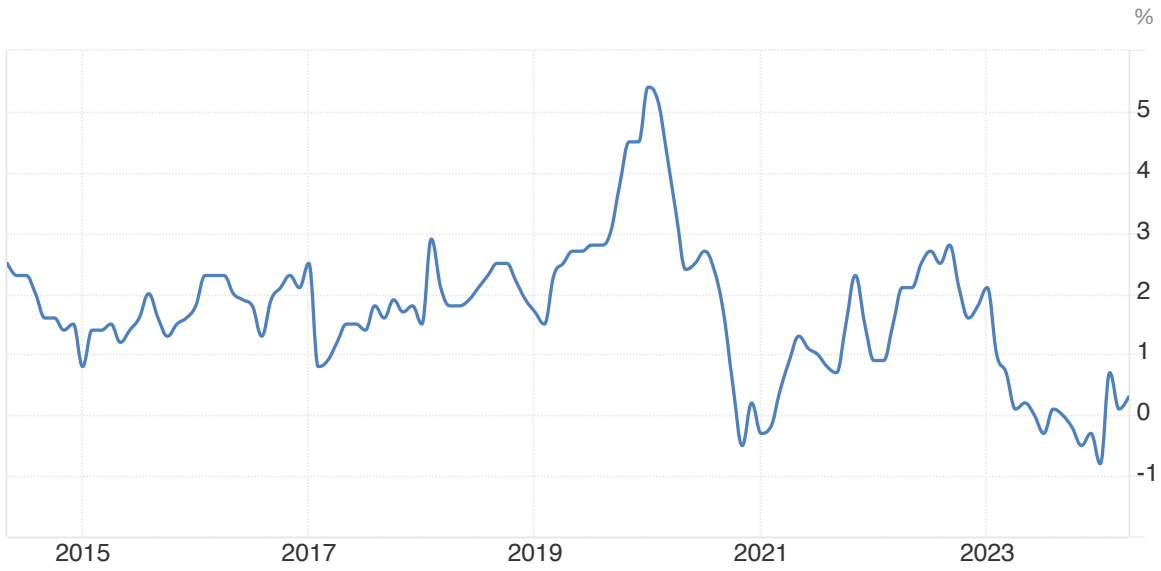


*Figure 7: Inflation rate in China, National Bureau of Statistics of China*

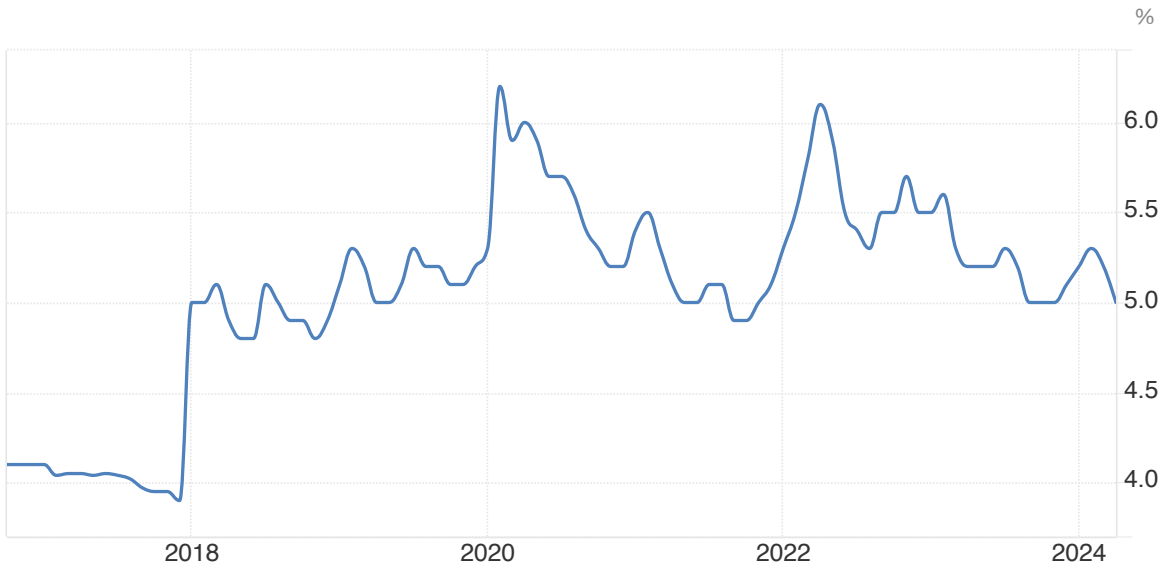


*Figure 8: Unemployment rate in China, National bureau of statistics China*

By confronting the levels of inflation (Figures 1 - 4 - 7) in the three areas we can see that China is the outlier since the biggest spike in prices happened in the beginning of the COVID outbreak, then they went down drastically and stabilized while the prices in the United States and Euro Area deflated at the beginning of the pandemic and then started inflating in 2021 and kept rising reaching their peak in 2023 when the consequences of the Ukraine War have

been felt the most. In China, although the overall level of inflation is a more volatile, prices did not spike as much in the same period.

Regarding the unemployment levels and the growth rate of wages the most interesting country to consider is the United States, by confronting the data (Figures 1 - 2 - 3) we can see that in the first half of 2020 with the outbreak of the Covid pandemic the inflation rate went down and almost reached 0%, at the same time wage growth drastically decreased and unemployment spiked up, this sum of events seems to follow the relationship described by the Phillips' curve as we see the tradeoff between inflation and unemployment also in 2022 and 2023 when inflation increased and simultaneously unemployment when rapidly back to the levels before the initial spike in prices.

The situation in the Euro Area is less clear but we can see (Figures 4 – 5) that the small spike in unemployment that begins in the second half of 2020 quickly shuts down as the inflation rate starts and keeps rising in 2021.

### 2.2 Changes brought by globalization to the inflation process.

Globalization has significantly reshaped the inflation process over the past few decades. This section explores how increased global economic integration, trade liberalization, and technological advancements have influenced inflation dynamics.

#### Trade Liberalization and Increased Competition

Globalization has led to the liberalization of trade, reducing tariffs and trade barriers. This influx of cheaper imported goods has increased competition, exerting downward pressure on domestic prices. Known as "imported disinflation," this phenomenon allows firms to reduce costs by sourcing cheaper inputs and products from abroad, thereby helping to keep domestic inflation in check[12].

The development of global supply chains has played a critical role in stabilizing prices. Companies can optimize production by locating different stages of manufacturing in countries where they can be performed most efficiently and cost-effectively. This global distribution of production lowers production costs and, consequently, consumer prices.

[12] Romer, D. (1993). "Openness and Inflation: Theory and Evidence." The Quarterly Journal of Economics

Increased efficiency and reduced costs associated with global supply chains have been crucial in mitigating inflationary pressures.

The complexity and interconnectedness of global supply chains mean that disruptions in one part of the world can have significant ripple effects. For example, natural disasters or geopolitical tensions can lead to supply shortages, temporarily increasing prices. However, the overall trend has been towards greater efficiency and cost reduction.

**Labor Market Effects**

The integration of emerging markets into the global economy has increased the global labor supply, particularly in manufacturing. This has led to wage stagnation or slower wage growth in advanced economies as firms have the option to outsource labor to lower-cost regions. The pressure on wages helps moderate inflation, as labor costs are a significant component of overall production costs.

However, this increased labor market flexibility has also led to greater income inequality. While consumers in advanced economies benefit from lower prices, workers in some sectors face job insecurity and stagnant wages. This dynamic has sparked debates on the need for policies to support workers affected by globalization.

**Technological Advancements and Productivity Gains**

Technological advancements driven by globalization have led to substantial productivity gains. Innovations in information technology, logistics, and manufacturing processes have increased efficiency and output, reducing the cost of goods and services. Higher productivity often translates into lower prices or slower price increases, contributing to lower inflation.

Advances in technology have also enabled new business models and increased competition in many sectors, further contributing to price stability. For instance, the rise of e-commerce has increased price transparency and competition, exerting downward pressure on prices.

**Capital Flows and Financial Integration**

Globalization has facilitated the movement of capital across borders, leading to greater financial integration. This has several implications for inflation[13]:

1. Access to Global Capital Markets: Countries can finance deficits and investment more easily by accessing global capital markets, which can help stabilize domestic economies and inflation rates.

2. Interest Rates and Monetary Policy: Central banks must consider global financial conditions when setting monetary policy. The interconnectedness of global financial markets means that changes in interest rates in one country can influence capital flows and exchange rates, impacting inflation dynamics.

Financial globalization has also led to greater synchronization of economic cycles across countries. This interconnectedness can amplify the impact of economic shocks, making coordinated policy responses more important.

**Exchange Rates and Inflation**

Exchange rates play a crucial role in the inflation process in a globalized economy. An appreciating currency can make imports cheaper, reducing inflationary pressures, while a depreciating currency can increase the cost of imports, contributing to higher inflation. Globalization has made exchange rate movements more influential in determining domestic inflation.

The volatility of exchange rates can introduce additional uncertainty into the inflation process. Central banks often monitor exchange rate developments closely as part of their inflation-targeting frameworks.

[13] Obstfeld, M., & Taylor, A. M. (2004). Global Capital Markets: Integration, Crisis, and Growth. Cambridge University Press.

**Policy Implications**

The impact of globalization on inflation has important policy implications. Central banks need to consider global factors when designing monetary policy. For instance, global supply chain disruptions, international trade policies, and global commodity prices can all influence domestic inflation rates. Policymakers must also address the potential for wage stagnation and income inequality resulting from globalization.

Effective policy responses may include measures to support workers displaced by globalization, investments in education and training, and policies to enhance social safety nets. Ensuring that the benefits of globalization are widely shared is crucial for maintaining social and economic stability.

Globalization has profoundly changed the inflation process through increased trade, efficient global supply chains, technological advancements, and financial integration. While these factors have generally contributed to lower and more stable inflation, they also present challenges for policymakers in managing inflation dynamics in an interconnected global economy. Understanding the multifaceted impact of globalization is crucial for effective economic policy and inflation control.

By examining the various channels through which globalization affects inflation, policymakers can better anticipate and respond to the challenges and opportunities presented by an increasingly interconnected world.

## 2.3 An historical analysis of wage-price spirals

Wage-price spirals have often been a focal point in discussions about economic policy, especially during times of rising inflation. This section explores the historical instances of wage-price spirals, how they have developed, and their implications.

A wage-price spiral happens when wage increases lead to higher production costs for firms, prompting them to raise prices. As prices rise, workers demand higher wages to keep up with the cost of living, creating a cycle that can potentially lead to ongoing inflation.

Research by Alvarez et al. (2022)[14] investigates the history of wage-price spirals in advanced economies since the 1960s. They define a wage-price spiral as an occurrence where accelerating consumer prices and nominal wages happen in at least three out of four consecutive quarters. Their study found 79 such instances, noting that these spirals are typically short-lived. Most did not result in sustained wage and price acceleration beyond the initial periods. One notable example is the U.S. experience after the first OPEC oil embargo in 1973, which led to a spike in oil prices and inflation. Consumer price inflation rose significantly for five quarters before starting to decline in 1975. However, nominal wage growth did not match this increase, leading to a drop in real wage growth.

**Factors Affecting Wage-Price Spirals**

The study points out several factors that influence wage-price spirals:

1. Inflation Expectations: If people expect higher inflation, workers will likely demand higher wages, and firms might raise prices preemptively, thus sustaining the spiral.
2. Labour Market Conditions: Tight labour markets, characterized by low unemployment and high job vacancies, can increase wage pressures, potentially leading to wage-price spirals.
3. Productivity Growth: High productivity growth can counterbalance wage increases, reducing the need for firms to raise prices.

The relationship between wage dynamics, inflation, and labour market conditions is often analyzed using a wage Phillips curve. This framework connects wage growth to inflation, unemployment gaps, and productivity growth. Historical data indicates that wage growth is driven by both inflation and labour market tightness but tends to stabilize after the initial rise, suggesting that persistent wage-price spirals are uncommon.

Recently, concerns about wage-price spirals have arisen again, particularly after the COVID-19 pandemic. Labour market tightness and rising inflation in 2021 have sparked fears of a cycle where wages and prices drive each other up. However, historical evidence indicates that similar past situations have not usually led to prolonged wage-price spirals. Typically, nominal wages catch up with inflation, allowing real wages to recover while inflation

[14] Alvarez, J., Bluedorn, J., Hansen, N.-J., Huang, Y., Pugacheva, E., & Sollaci, A. (2022). "Wage-price spirals: What is the historical evidence?" IMF Working Paper 22/221.

decreases. Historical evidence shows that wage-price spirals are not commonly persistent. While certain conditions, such as tight labour markets and unanchored inflation expectations, can trigger these spirals, they are generally short-lived. Understanding the factors that contribute to wage-price spirals can help policymakers create effective measures to prevent prolonged inflation. This historical perspective offers valuable insights for managing current economic conditions.

## 2.4 The global financial crisis - Inflation and Wage impact

The Global Financial Crisis (GFC) of 2007-2008 had profound and lasting effects on economies worldwide, influencing inflation dynamics and impacting wages. This section explores these effects through the analysis of the book "Oltre le banche centrali" by Francesco Saraceno[15].

### Causes and Initial Impact

The GFC was triggered by the collapse of the housing bubble in the United States. Excessive risk-taking by banks, combined with the proliferation of complex financial instruments like mortgage-backed securities (MBS) and collateralized debt obligations (CDOs), led to widespread financial instability. When the housing bubble burst, it resulted in a sharp decline in housing prices, leading to a wave of mortgage defaults and foreclosures. Banks faced significant losses due to subprime mortgage defaults, resulting in a credit crunch. The crisis quickly spread globally, affecting financial markets and economies. According to Saraceno, the collapse of Lehman Brothers marked a pivotal moment, exposing structural vulnerabilities within the global economy.

During the GFC, inflation initially spiked due to rising commodity prices, especially oil. However, as the crisis deepened, deflationary pressures emerged. The collapse in demand led to falling prices for goods and services. Central banks responded with aggressive monetary easing, including lowering interest rates and implementing unconventional policies like quantitative easing (QE).

[15] Francesco Saraceno is professor of international and European macroeconomics at Sciences Po and at Luiss

Saraceno highlights how central banks' measures during the GFC aimed to stabilize financial systems and prevent deflation[16]. Despite these efforts, the situation revealed the impotence of traditional monetary policies against the severity of the crisis. The GFC underscored the need for a broader policy framework that included significant fiscal interventions to stimulate the economy.

**Mechanisms of the GFC**

The mechanisms driving the GFC included a combination of financial innovation, regulatory failures, and excessive risk-taking. The widespread use of financial derivatives, like MBS and CDOs, created an interconnected web of financial obligations that amplified the impact of the housing market collapse. Additionally, credit rating agencies failed to accurately assess the risk of these complex instruments, contributing to their proliferation. Saraceno notes that the deregulation of financial markets allowed banks to engage in riskier activities without adequate oversight, leading to systemic vulnerabilities.

Another critical factor was the reliance on short-term funding in the shadow banking system, which included non-bank financial institutions that operated outside traditional regulatory frameworks. When confidence in these institutions waned, it led to a liquidity crisis, exacerbating the overall financial instability. Saraceno emphasizes that these intertwined factors created a perfect storm that overwhelmed traditional financial safeguards.

**Impact on Wages**

The labor market was significantly impacted by the GFC. Unemployment rates soared as businesses cut costs, leading to wage stagnation or declines in many sectors. The bargaining power of workers weakened, and real wages (adjusted for inflation) fell in numerous advanced economies. Saraceno discusses how the crisis exacerbated income inequality, with lower-income workers bearing the brunt of job losses and wage cuts.

The GFC caused a dramatic increase in unemployment rates worldwide. In the United States, the unemployment rate peaked at 10% in October 2009, doubling from pre-crisis levels.

[16] Between October 2008 and May 2009, the ECB lowered its main policy interest rate, the rate on the main refinancing operations, by 325 basis points.

Similar trends were observed in Europe, where countries like Spain and Greece experienced even higher unemployment rates. The massive job losses meant that many workers faced prolonged periods of unemployment, eroding their skills and future employability as well.

**Wage Stagnation and Declines**

As companies struggled to survive during the crisis, wage growth stalled or even reversed. Employers froze wages, reduced hours, or implemented pay cuts to manage costs. The sectors most affected included construction, manufacturing, and finance, where the initial shocks were most severe. Saraceno notes that the stagnation in nominal wages, coupled with rising inflation in the early stages of the crisis, led to significant declines in real wages, reducing workers' purchasing power.

The crisis also led to an increase in part-time and insecure employment. Many workers who lost full-time jobs had to accept part-time or temporary positions, often with lower pay and fewer benefits. This shift towards more precarious forms of employment further contributed to wage inequality and financial instability for many households.

**Impact on Different Demographics**

The impact of the GFC on wages was not uniform across all demographics. Young workers, recent graduates, and less-educated individuals faced the highest unemployment rates and the most severe wage declines. Gender disparities also emerged, with women often experiencing greater job losses in certain sectors, although some studies found that men, particularly in construction and manufacturing, were initially harder hit. Saraceno highlights the disproportionate impact on lower-income and vulnerable populations, exacerbating existing economic inequalities.

The long-term effects on wages continued well beyond the immediate aftermath of the crisis. Even as economies began to recover, wage growth remained subdued for several years. Employers remained cautious, and high unemployment rates kept wage pressures low. Saraceno discusses the concept of a "jobless recovery," where economic growth resumed, but the labor market lagged behind, with slow improvements in employment and wage conditions.

**Policy Responses and Their Effects**

Governments and central banks implemented various measures to combat the economic downturn and support the labor market. These included stimulus packages, extended unemployment benefits, and job creation programs. While these interventions helped mitigate the worst effects, they were not sufficient to fully restore pre-crisis wage levels. Saraceno argues that more aggressive and sustained policy measures were necessary to address the deep-rooted issues exposed by the GFC.

The Global Financial Crisis had a significant and lasting impact on wages, highlighting vulnerabilities in the labor market and the limitations of existing policy tools. The crisis led to widespread unemployment, wage stagnation, and increased income inequality, with lower-income and vulnerable populations suffering the most. Insights from Saraceno's work emphasize the need for comprehensive labor market reforms and coordinated policy responses to ensure a more equitable and resilient economic recovery.

## 2.5 The recent inflationary episode - The post pandemic world

The recent surge in inflation, influenced by the aftermath of the COVID-19 pandemic and new geopolitical tensions, has had a profound effect on global economies. The COVID-19 pandemic brought about a severe economic crisis, leading to extensive lockdowns, disruptions in supply chains, and considerable fiscal and monetary responses.

Lockdowns and restrictions severely disrupted global supply chains, causing factory shutdowns, reduced production capacities, and logistical challenges. These disruptions led to supply shortages and increased prices for goods and services. The bottlenecks in supply chains have persisted, further intensifying inflationary pressures.

Governments and central banks responded to the pandemic with substantial fiscal stimulus packages and accommodative monetary policies. These measures were aimed at supporting households, businesses, and financial markets. However, the scale of these interventions also injected significant liquidity into the economy, increasing demand while supply was constrained, thus fueling inflation. It is highlighted in recent economic discussions that these

interventions, while necessary to prevent economic collapse, have long-term implications for inflation, raising concerns about overheating economies and sustaining higher inflation rates. The pandemic reshaped labor markets significantly. Many workers lost their jobs or experienced changes in work conditions, such as remote work. The labor market recovery has been uneven, with some sectors facing labor shortages and others dealing with surplus labor. These dynamics have led to wage pressures in certain industries, contributing to overall inflation.

**Wages and Inflationary Pressures**

Wages play a crucial role in the inflationary process, particularly in the context of the recent economic disruptions. The relationship between wages and inflation is complex, influenced by various factors including labor market conditions, productivity, and expectations.

As economies began to recover from the pandemic, certain sectors experienced acute labor shortages. This was particularly evident in industries like healthcare, technology, logistics, and hospitality. Employers in these sectors faced increased competition for a limited pool of workers, leading to higher wages as firms sought to attract and retain employees. This rise in wages contributed to increased production costs, which were often passed on to consumers in the form of higher prices.

Higher wages can lead to cost-push inflation, where increased labor costs drive up the prices of goods and services. This type of inflation occurs when companies raise prices to maintain profit margins in response to rising wage expenses. During the post-pandemic recovery, sectors with labor shortages saw significant wage increases, which in turn led to higher consumer prices, contributing to overall inflationary pressures.

While nominal wages have increased in many sectors, real wages (adjusted for inflation) have not kept pace in several cases. Inflation erodes the purchasing power of workers, meaning that even with higher nominal wages, individuals may find their real income stagnant or declining. This can lead to increased demand for wage hikes, particularly in unionized sectors or where labor is scarce.

Governments and central banks must carefully navigate the balance between supporting wage growth and controlling inflation. Policies aimed at improving productivity can help

offset the inflationary impact of higher wages. For example, investments in technology, training, and infrastructure can enhance productivity, allowing for wage increases without corresponding price hikes.

The pandemic has also accelerated structural changes in the labor market that impact wages and inflation. Remote work has become more prevalent, leading to shifts in geographic labor market dynamics and cost structures. Additionally, the gig economy has expanded, with more workers in flexible, often lower-paid positions that lack traditional benefits. These changes affect overall wage dynamics and their impact on inflation.

In "Oltre le banche centrali," it is discussed how these labor market transformations and wage dynamics play a significant role in shaping inflation. The book emphasizes the need for policies that address both immediate inflationary pressures and longer-term structural changes in the economy.

The recent inflationary episode, driven by post-pandemic dynamics and geopolitical tensions, presents significant challenges for global economies. The interplay between wages and inflation is a critical factor in this context. While rising wages in response to labor shortages and increased demand have contributed to inflation, they also highlight underlying structural changes in the labor market. Policymakers must balance controlling inflation with supporting economic recovery, ensuring that wage growth is sustainable and contributes to broader economic stability. Adaptive and resilient economic policies are essential to navigate these complexities, promoting resilience and inclusivity in the face of ongoing economic challenges.

## Conclusions

The role of wages in the inflation process is a complex and multifaceted issue, as demonstrated through the previously discussed historical and contemporary analysis. The exploration has revealed that no single theory can fully capture the intricate dynamics between wages and inflation.

Classical theories, such as the Quantity Theory of Money, offer a foundational perspective, viewing inflation as a monetary phenomenon influenced by money supply. However, these theories often overlook the fluid and variable nature of real-world economies. Keynesian theories, which emphasize the importance of aggregate demand and liquidity preference, provide valuable insights into how wage dynamics and demand-side factors impact inflation. Nonetheless, these theories face limitations, particularly in addressing the complexities of modern globalized economies.

Monetarism, championed by Milton Friedman, underscores the significance of controlling the money supply to manage inflation. While this approach has shaped central banking policies globally, its practical implementation requires balancing monetary control with the realities of wage dynamics and economic growth.

Empirical studies by economists such as Bronfenbrenner, Holzman, Laidler, and Gordon highlight the necessity of considering both demand-pull and cost-push factors to understand inflation fully. Gordon's research suggests that inflation is largely self-sustaining and less influenced by wage changes than traditionally believed. This finding shifts the policy focus towards managing inflation expectations and addressing supply-side factors rather than solely controlling wages.

Globalization adds another layer of complexity to the inflation process. Increased competition, trade liberalization, and technological advancements have generally helped to lower prices, leading to imported disinflation. However, these benefits are tempered by challenges such as wage stagnation in advanced economies and the need to address growing income inequality.

In conclusion, the relationship between wages and inflation is dynamic and influenced by various factors, including monetary policy, global economic integration, and unexpected

global events. Policymakers must adopt a holistic approach that incorporates historical insights, empirical evidence, and contemporary economic realities. By doing so, they can better navigate the complexities of inflation, ensuring economic stability and equitable growth. This dissertation underscores the importance of continually refining economic theories and policies to address the ever-changing landscape of global economies.

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