

# Mladá veda

## Young Science



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# MONETARY STIMULUS STRATEGIES: ANALYZING THE EFFECTS OF QUANTITATIVE EASING AND PEPP ON KEY ECONOMIC INDICATORS DURING THE COVID-19 PANDEMIC

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Autorka pôsobí ako interná doktorandka na Vysokej škole financií a správy v Prahe na Fakulte financií. Vo svojom výskume sa zaoberá vplyvom stratégií monetárnych stimulov počas pandémie Covid-19.

The author works as an internal PhD student at University of finance and administration in Prague at the Faculty of Finance and her research deals with the impact of monetary stimulus strategies during the Covid-19 pandemic.

## Abstrakt

Tento článok skúma účinnosť QE (kvantitatívneho uvoľňovania) a PEPP (programu núdzového nákupu v prípade pandémie) ako menových intervencií počas bezprecedentného hospodárskeho poklesu vyvolaného pandemiou COVID-19. Hlavným cieľom tejto štúdie je zhodnotiť vplyv týchto politík na kritické ekonomické ukazovatele vrátane HDP, nezamestnanosti, akciových indexov a miery inflácie počas pandémie. Tento výskum, ktorý rieši výraznú medzeru v existujúcej literatúre, ponúka komparatívnu analýzu QE a PEPP a poskytuje komplexné pochopenie ich účinkov v kontexte globálnej krízy.

Z metodologického hľadiska štúdia využíva prístup zmiešaných metód, pričom kombinuje kvantitatívnu analýzu údajov s kvalitatívnym prehľadom mechanizmov menovej politiky. Kvantitatívne údaje pre túto analýzu boli získané z databázy "Trading Economics", ktorá poskytuje historické a prognostické údaje o širokom spektre ekonomických ukazovateľov z oficiálnych zdrojov. Tieto údaje zahŕňajú mesačné pozorovania od januára 2020 do novembra 2023 za všetky krajiny eurozóny a Spojené štáty, pričom sa zameriavajú na zmeny uvedených ekonomických ukazovateľov. Výsledky odhaľujú odlišné pohľady na účinnosť QE a PEPP. Hoci obe politiky boli zamerané na zmiernenie hospodárskych vplyvov pandémie, ich účinnosť sa v rôznych ukazovateľoch výrazne líšila. QE vykazovalo výrazný vplyv na zníženie miery inflácie a neúmyselné zvýšenie nezamestnanosti, čo naznačuje zložitú súhru medzi zvýšenou likviditou a dynamikou trhu práce. PEPP, hoci s menším vplyvom, vykazoval menšiu negatívnu koreláciu s rastom HDP, čo zdôrazňuje jeho obmedzenú účinnosť pri stimulácii hospodárskeho oživenia.

Hlavný prínos tohto príspevku spočíva v jeho komplexnom skúmaní toho, ako si jednotlivé menové politiky počínali pod tlakom globálnej zdravotnej krízy, pričom poukazuje na problémy a

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obmedzenia konvenčných menových nástrojov pri zvládaní takýchto bezprecedentných hospodárskych porúch. Zistenia zdôrazňujú potrebu adaptívnych menových stratégií, ktoré by dokázali účinnejšie reagovať na budúce globálne krízy.

Keywords: Kľúčové slová: Kvantitatívne uvoľňovanie (QE), program núdzového nákupu pandémie (PEPP), hospodársky vplyv, menová politika, pandémia COVID-19

### **Abstract**

This paper examines the effectiveness of QE (Quantitative Easing) and PEPP (Pandemic Emergency Purchase Programme) as monetary interventions during the unprecedented economic downturn triggered by the COVID-19 pandemic. The primary objective of this study is to evaluate the impacts of these policies across critical economic indicators including GDP, unemployment, stock market indices, and inflation rates, during the pandemic. Addressing a notable gap in existing literature, this research offers a comparative analysis of QE and PEPP, providing a comprehensive understanding of their effects in a global crisis context.

Methodologically, the study utilizes a mixed-methods approach, combining quantitative data analysis with a qualitative review of monetary policy mechanisms. The quantitative data for this analysis was sourced from the "Trading Economics" database, which provides historical and forecast data on a wide range of economic indicators from official sources. This data encompasses monthly observations from January 2020 to November 2023 for all Eurozone countries and the United States, focusing on the changes in the aforementioned economic indicators.

The results reveal nuanced insights into the effectiveness of QE and PEPP. While both policies were aimed at mitigating the economic impacts of the pandemic, their effectiveness varied significantly across different indicators. QE showed a notable influence on reducing inflation rates and inadvertently increasing unemployment, suggesting a complex interplay between increased liquidity and labor market dynamics. PEPP, while less impactful, demonstrated a minor negative correlation with GDP growth, underscoring its limited efficacy in stimulating economic recovery.

The main contribution of this paper lies in its holistic examination of how different monetary policies performed under the stress of a global health crisis, highlighting the challenges and limitations of conventional monetary tools in managing such unprecedented economic disruptions. The findings emphasize the need for adaptive monetary strategies that can respond more effectively to future global crises.

Keywords: Quantitative Easing (QE), Pandemic Emergency Purchase Programme (PEPP), Economic Impact, Monetary Policy, COVID-19 Pandemic

JEL Codes: E52, E58, E63, G01, F62

### **Introduction**

This paper explores the monumental quantitative easing (QE) measures and the Pandemic Emergency Purchase Programme (PEPP) implemented in response to the economic crisis precipitated by the COVID-19 pandemic. The onset of the pandemic necessitated unprecedented monetary interventions to mitigate its economic shocks, which have reshaped global financial landscapes and tested the efficacy of traditional economic stabilizers. The importance of examining these measures cannot be understated, as they represent significant deviations from conventional monetary policy and their long-term impacts are still not fully understood.

Despite extensive existing literature on QE and PEPP, there remains a significant research gap concerning the comparative effectiveness of these measures across different economic indicators during such a unique global crisis. This study aims to fill this gap by providing a detailed analysis of the impacts of QE and PEPP on GDP, unemployment rates, stock market performance, and inflation rates, thereby contributing valuable insights into the design and implementation of monetary policies during global emergencies.

The added value of this research lies in its comprehensive approach, combining empirical data analysis with a critical examination of the operational mechanisms of QE and PEPP. This dual focus not only enhances our understanding of how these policies have functioned during the pandemic but also informs potential future adjustments to policy frameworks in anticipation of similar global crises.

Methodologically, this paper employs a mix of quantitative data analysis and qualitative review. Data sourced from reputable economic databases such as "Trading Economics" provide the basis for empirical evaluation, while policy documents and existing literature offer context and depth to the analysis.

The paper is structured to guide the reader through a logical progression of content: After this introduction, the first section provides definitions and historical context for QE and PEPP, followed by an overview of the COVID-19 pandemic's economic implications. The subsequent section critically reviews existing literature to highlight the effects of these monetary measures on macroeconomic indicators. The penultimate section presents the results of our empirical analysis, and the final section discusses these findings in light of the research objectives, concluding with policy recommendations based on the observed impacts of QE and PEPP.

## **Literature review**

### **Definition and amount of Quantitative Easing**

Gabler, a German economic lexicon, defines "quantitative easing" as a monetary policy strategy where the central bank acquires financial assets, usually government securities or bonds, from the open market, resulting in an expanded money supply in the economy.

Curry and Jackson (2023) explain that through QE, central banks like the Fed send a strong message to the financial markets, indicating their commitment to sustain asset purchases to keep interest rates low. In response to the coronavirus pandemic, the Fed expanded its asset purchases to include longer-term Treasuries and commercial bonds. By creating bank reserves, the Fed buys these securities from major financial institutions, leading to increased liquidity within these institutions. This additional cash can then be used for lending, investing, or maintaining as reserves. The primary goal of QE is to prevent financial crises such as credit crunches by ensuring liquidity in the financial system, maintaining the smooth functioning of financial markets, and making borrowing cheaper to stimulate economic activity.

During the COVID-19 pandemic, the U.S. Federal Reserve launched an aggressive quantitative easing (QE) program, initially committing to purchase at least \$700 billion in Treasury and mortgage-backed securities. As the economic impact of the pandemic deepened, the Fed transitioned to an open-ended QE policy, prepared to buy unlimited amounts of these securities to stabilize financial markets and support the economy. By June 2020, the Fed's balance sheet had expanded from approximately \$4.2 trillion in early March to nearly \$7 trillion. The total asset purchases by the end of 2020 surpassed \$3 trillion, marking a significant effort to lower interest rates and stimulate economic activity during the crisis (Fed 2023).

### **Definition and amount of PEPP**

PEPP is a form of quantitative easing. According to the German National Bank (2023) the PEPP, initiated by the European Central Bank in March 2020, was designed to counteract the economic and monetary disruptions caused by the Covid-19 pandemic within the Euro Area. It focused on buying securities from the private and public sectors to maintain favorable financing conditions and prevent market fragmentation. The program started with an allocation of 750 billion Euros, later increased by an additional 1,100 billion Euros across two increments, culminating in a total of 1,850 billion Euros. Notably, 97% of the purchases were in public sector securities, with a significant portion of the funds directed towards government bonds, maintaining a fair distribution based on each country's share in the Eurosystem's total capital.

### **Covid-19 pandemic overview and economic implications**

The COVID-19 pandemic began with unidentified pneumonia cases in Wuhan, China in December 2019, according to Ciotti et al. (2020). This led to the global spread of SARS-CoV-2, resulting in significant fatalities and prompting the WHO to declare a pandemic on March 12, 2020. Over the course of the pandemic, there were notable peaks in death rates, with the highest in January 2021 at 103,719 deaths per week. The situation began to stabilize with the introduction of vaccines; by December 2020, the European Commission had approved the first vaccine, leading to decreased infection and mortality rates. By August 2023, there were over 770 million confirmed cases, nearly 7 million deaths, and over 13 billion vaccine doses administered. In May 2023, the WHO officially ended the global health emergency for COVID-19 (United Nations, 2023).

According to the World Bank (2023) the COVID-19 pandemic had profound impacts on the global economy, triggering one of the worst economic downturns since the Great Depression. The major effects included:

- **Recession and Job Losses:** Many countries experienced severe recessions as businesses closed and unemployment rates soared. Sectors such as travel, hospitality, and retail were especially hard hit.
- **Supply Chain Disruptions:** The pandemic disrupted global supply chains, leading to shortages of goods and delays in production across various industries, from electronics to automotive.
- **Government Spending:** To mitigate the economic fallout, governments worldwide implemented large fiscal stimulus measures, which significantly increased public debt levels.

It can be said that the COVID-19 pandemic, emerging from Wuhan in December 2019, rapidly escalated into a global health crisis that had profound and far-reaching economic consequences.

### **Effects of quantitative easing on macroeconomic indicators**

This comprehensive review of the literature explores the significant and varied impacts of QE on key macroeconomic indicators, demonstrating its widespread influence on everything from interest rates to government debt. The effects will be explained briefly in the following section.

**Interest Rates:** QE typically leads to lower interest rates across the economy, including those on bonds, mortgages, and loans. This decrease in interest rates is intended to make borrowing cheaper, encouraging businesses and consumers to spend and invest more (Jackson and Curry 2024).

**Inflation:** By increasing the money supply, QE can raise inflation to a target level. This is particularly useful in deflationary periods. However, if not carefully managed, QE can lead to excessively high inflation (ibid)

**Stock Markets:** Lower interest rates and increased liquidity often lead to rises in stock markets. Investors seeking higher returns move towards stocks, driving up prices. This wealth effect can boost consumer confidence and spending (Ross and Boyle 2023).

**Economic Growth:** By facilitating increased lending and spending, QE can help in supporting or recovering economic growth which is crucial during periods of economic downturn or recession (IFM 2024).

**Unemployment:** QE helps to lower unemployment primarily by reducing interest rates, which encourages businesses to expand and hire due to cheaper borrowing costs. Additionally, QE increases consumer spending through higher asset prices, boosting demand for goods and services and leading to job creation (Luck and Zimmermann 2020).

**Government Debt:** QE often involves the purchase of government bonds, which can help finance government spending, especially during periods of fiscal strain such as during recessions or crises (IFM 2024).

Overall, the extensive literature review reveals that Quantitative Easing (QE) has a profound and multifaceted impact on macroeconomic indicators for example by leading to lower interest rates, potential changes in inflation rates, increased stock market activity.

### **Research gap**

The research gap addressed in this paper pertains to the comparative effectiveness of QE and the PEPP across multiple macroeconomic indicators during the unique circumstances of the COVID-19 pandemic. While existing studies have individually assessed the impact of these monetary interventions on specific economic outcomes like inflation or stock markets, comprehensive analyses evaluating their simultaneous effects on GDP, unemployment, inflation, and stock market indices during a global health crisis are limited. This paper fills this gap by providing a holistic assessment of how these policies influenced a range of critical economic indicators during the pandemic, offering insights into their overall effectiveness and interrelated impacts in a crisis context. This research not only adds depth to our understanding of monetary policy tools under extreme conditions but also aids in shaping future policy responses to similar global emergencies.

### **Significance of the study & research objectives**

The research critically examines the PEPP as a response to the economic crisis triggered by COVID-19. It aims to analyze the PEPP's structural flexibility, its effectiveness in managing market distortions, and its interplay with fiscal policies. The significance of the study lies in providing a comprehensive investigation into the effectiveness of the PEPP as a crisis management tool, its impact on the euro area's economy, and its implications for future ECB policies. The research objectives include contextualizing the economic shock of the pandemic, analyzing the operational mechanisms and challenges of the PEPP, comparing the PEPP with the Federal Reserve's Quantitative Easing in the United States, and assessing the broader economic impacts of these monetary policy tools.

The research aims to examine the specific impact of monetary policy measures, particularly QE and the PEPP, during the COVID-19 pandemic, on the following macroeconomic factors: GDP, unemployment, stock markets and inflation rate.

The research question is formulated as follows: *What specific impacts did monetary policy measures, particularly QE and the PEPP, have on macroeconomic factors such as GDP, unemployment, stock market and inflation rate during the COVID-19 pandemic?*

## **Research hypothesis**

In assessing the effects of monetary policy interventions during the COVID-19 pandemic, this section presents a series of null (H0) and alternative (H1) hypotheses concerning the impact of QE and the PEPP on key economic indicators such as GDP, unemployment rates, stock market indices and inflation rates. These hypotheses aim to explore whether these policies significantly influenced economic outcomes during the investigated period.

Hypothesis 0 (H0) for GDP: There is no significant impact of QE and PEPP on GDP during the COVID-19 pandemic.

Hypothesis 1 (H1) for GDP: QE and PEPP have a significant impact on GDP during the COVID-19 pandemic.

Hypothesis 0 (H0) for Unemployment: QE and PEPP do not significantly affect the unemployment rate during the COVID-19 pandemic.

Hypothesis 1 (H1) for Unemployment: QE and PEPP significantly affect the unemployment rate during the COVID-19 pandemic.

Hypothesis 0 (H0) for Stock Markets: There is no significant impact of QE and PEPP on stock market indices during the COVID-19 pandemic.

Hypothesis 1 (H1) for Stock Markets: QE and PEPP have a significant impact on stock market indices during the COVID-19 pandemic.

Hypothesis 0 (H0) for Inflation Rate: QE and the PEPP do not significantly affect the inflation rate during the COVID-19 pandemic.

Hypothesis 1 (H1) for Inflation Rate: QE and PEPP significantly affect the inflation rate during the COVID-19 pandemic.

## **Research methods**

### **Data sourcing**

The data analyzed in this study was obtained from "Trading Economics," a detailed platform that provides data for 196 countries. It includes historical records and forecasts for more than 20 million economic indicators. To guarantee the reliability of the data, "Trading Economics" sources its information directly from official entities, minimizing reliance on third-party data providers. Regular and thorough consistency checks are conducted to maintain the accuracy of the data (Trading Economics, n.d.).

The analysis focused on the effects of QE in the US and PEPP in the Eurozone on critical economic indicators such as the inflation rate, interest rate, GDP, stock market trends, and unemployment. Monthly data from January 2020 to November 2023 were collected for all Eurozone countries and the United States to facilitate this study. Given that GDP values are not available on a monthly basis, they were collected annually. The selected timeframe was chosen to compile a dataset that reflects the economic conditions before, during, and after the Covid-19 crisis, which was officially declared a pandemic in March 2020.

### **Data analysis**

To analyze the data properly a detailed exploratory data analysis was conducted to identify and visualize relationships between variables, including correlation heatmaps and scatter plots with trend lines. Additionally, descriptive statistics were performed to provide an overview of the data.



## Results

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. Inflation_Rate	4.86	4.81						
2. GDP	0.00	0.01	-.12**					
			[-.18, -.06]					
3. Interest_Rate	1.07	1.62	.32**	-.11**				
			[.26, .38]	[-.17, -.05]				
4. PEPP	-0.07	0.32	-.06	-.07*	-.06			
			[-.12, .00]	[-.14, -.01]	[-.12, .01]			
5. QE	0.01	0.05	-.27**	-.02	-.26**	.06		
			[-.33, -.21]	[-.08, .05]	[-.32, -.20]	[-.00, .13]		
6. Stockmarket	0.01	0.04	-.11**	.10**	-.02	.05	.03	
			[-.17, -.04]	[.03, .16]	[-.08, .05]	[-.01, .12]	[-.04, .09]	
7. Unemployment Rate	7.27	2.94	-.22**	.07*	-.22**	.03	.11**	.10**
			[-.28, -.16]	[.01, .13]	[-.28, -.16]	[-.03, .10]	[.04, .17]	[.03, .16]

Table 1 - Means, Standard Deviations, and Correlations with Confidence Intervals

Source: Author

*Note: "M" and "SD" stand for mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have produced the sample correlation (Cumming, 2014). \* indicates  $p < .05$ . \*\* indicates  $p < .01$ .*

In the following section, the results will be interpreted. Below, a visual representation of the results can be found.

**Impact QE on GDP:** There is no significant correlation between QE and GDP ( $r = -0.02$ ,  $p > .05$ ). This suggests that QE may not have a direct or measurable influence on GDP growth, which could raise questions about the effectiveness of this policy in terms of stimulating economic growth.

Correlation: PEPP shows a slight, yet significant negative correlation with GDP ( $r = -0.07$ ,  $p < .05$ ).

**Impact PEPP on GDP:** PEPP shows a slight, yet significant negative correlation with GDP ( $r = -0.07$ ,  $p < .05$ ). This very small effect may indicate that PEPP has only a minor negative impact on economic growth. This fact calls into question the effectiveness of this measure in terms of promoting economic growth.

**Impact QE on Inflation:** QE shows a significant negative correlation with the inflation rate ( $r = -0.27$ ,  $p < .05$ ). This significant negative correlation indicates that an increase in QE is associated with a reduction in inflation rates, which might be unexpected since QE is often associated with an increased risk of inflation. The effect size can be considered small.

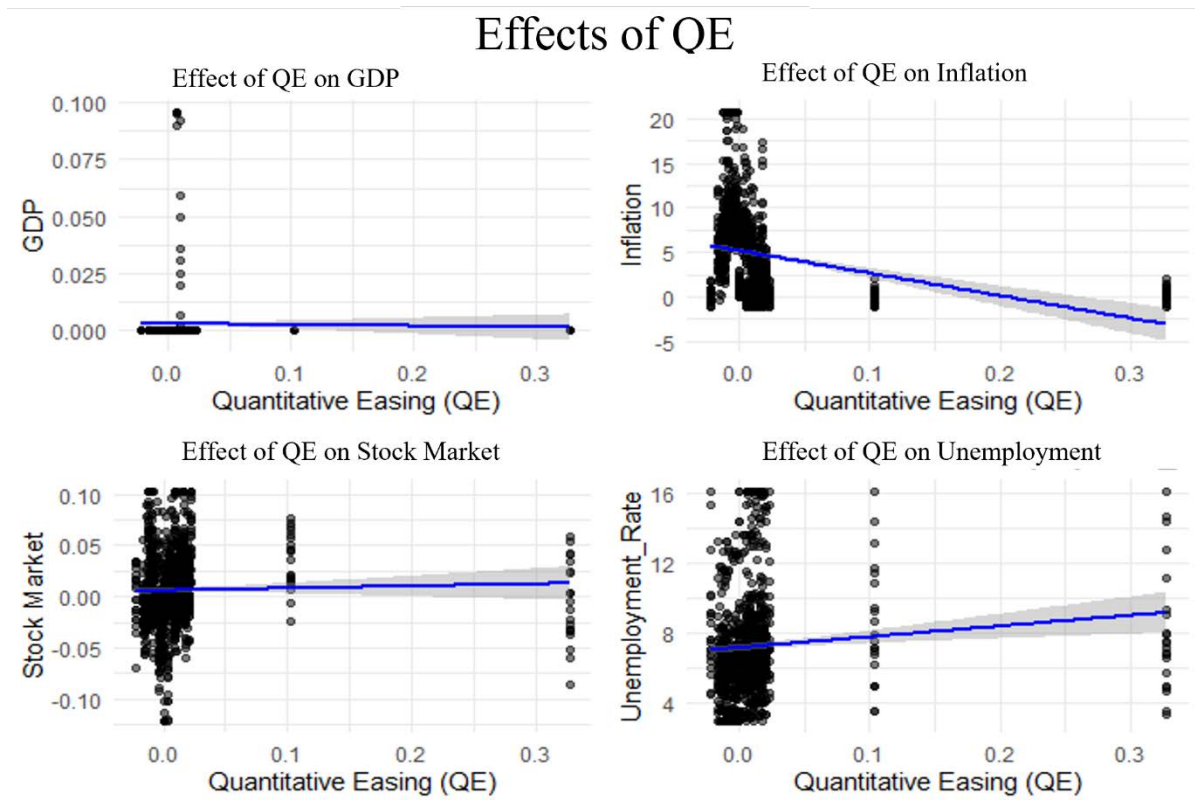
**Impact PEPP on Inflation:** PEPP shows a slight, but non-significant negative correlation with the inflation rate ( $r = -0.06$ ,  $p > .05$ ). This means that PEPP, similar to QE, may contribute to a slight reduction in inflation rates.

**Impact QE on stock market:** There is no significant correlation between QE and the Stock Market Index ( $r = 0.03$ ,  $p > .05$ ). It appears that QE does not have a direct or significant influence on stock market indices. This could mean that other factors may play a larger role in determining stock market performance.

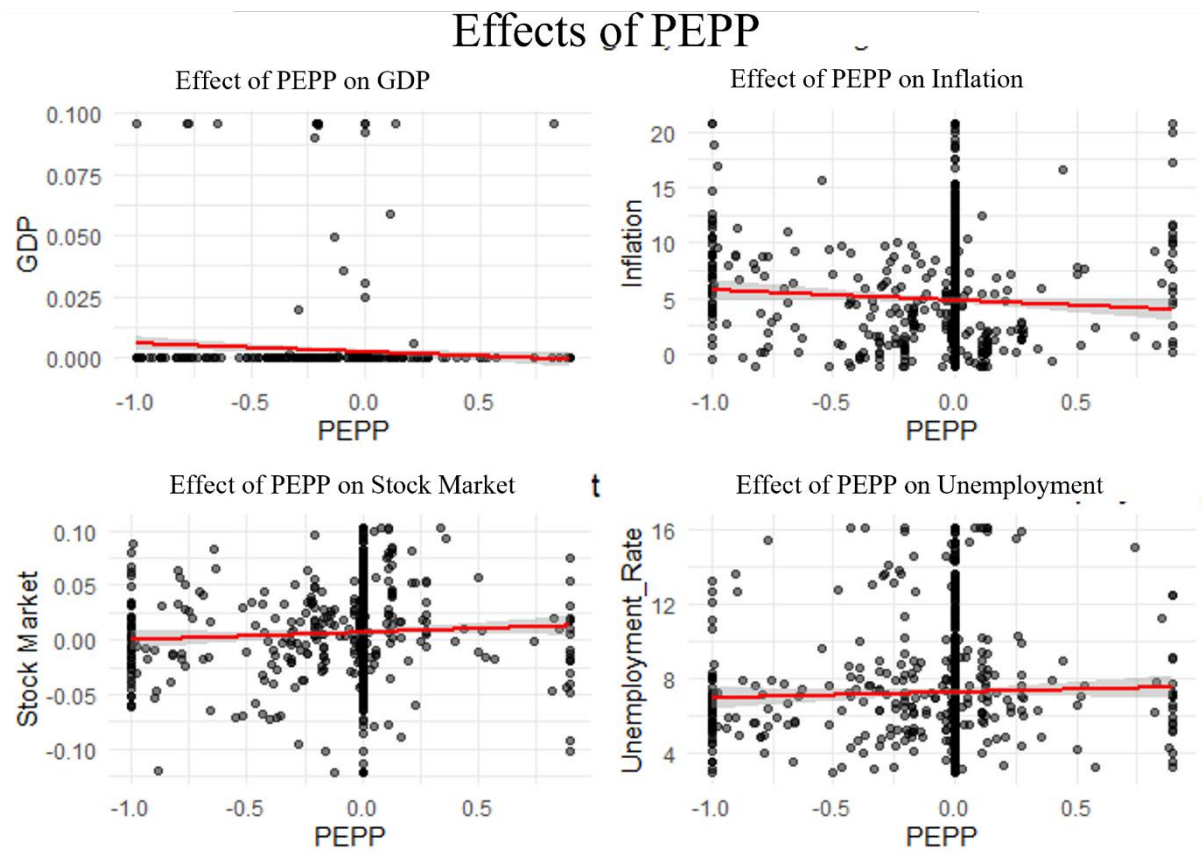
**Impact PEPP on stock market:** There is no significant correlation between PEPP and the Stock Market Index ( $r = 0.05$ ,  $p > .05$ ). This means that PEPP does not have a significant impact on the stock market, which highlights the role of other economic and financial factors in determining market performance.

**Impact QE on unemployment:** QE shows a significant positive correlation with the unemployment rate ( $r = 0.11$ ,  $p < .05$ ). Contrary to the usual expectation that QE boosts employment, this correlation suggests that QE may be associated with an increase in unemployment. This could indicate that the liquidity provided by QE is not effectively flowing into job-creating sectors. The effect size can be described as small.

**Impact PEPP on unemployment:** PEPP shows a slight, non-significant positive correlation with the unemployment rate ( $r = 0.03$ ,  $p > .05$ ). This slight positive correlation could suggest that PEPP is not as effective at reducing unemployment as intended, or that other factors are influencing employment conditions.



Graphic 1 - Effects of QE  
 Source: Selfmade based on the dataset



Graphic 2 - Effects of PEPP  
Source: Selfmade based on the data set

Based on the conducted analysis, the research hypothesis and the research question will be answered in the following section and the results will be interpreted:

**Impact of QE and PEPP on GDP:**

Hypothesis 0 (H0) for GDP: This hypothesis is supported because the correlation between QE and GDP is not significant ( $r = -0.02, p > .05$ ). Similarly, even though PEPP shows a slight negative correlation with GDP ( $r = -0.07, p < .05$ ), the effect size is very small, indicating that neither QE nor PEPP significantly impacts GDP in a meaningful way.

Hypothesis 1 (H1) for GDP: This hypothesis is not supported due to the negligible or minor impacts observed.

**Impact of QE and PEPP on Unemployment:**

Hypothesis 0 (H0) for Unemployment: This hypothesis is not supported because QE shows a significant positive correlation with unemployment ( $r = 0.11, p < .05$ ), indicating that QE might be associated with an increase in unemployment. However, PEPP does not show a significant effect on unemployment ( $r = 0.03, p > .05$ ).

Hypothesis 1 (H1) for Unemployment: This hypothesis is partially supported by the findings on QE but not for PEPP.

### **Impact of QE and PEPP on Stock Markets:**

Hypothesis 0 (H0) for Stock Markets: This hypothesis is supported as there is no significant correlation between QE and the stock market indices ( $r = 0.03$ ,  $p > .05$ ) or between PEPP and the stock market indices ( $r = 0.05$ ,  $p > .05$ ).

Hypothesis 1 (H1) for Stock Markets: This hypothesis is not supported due to the lack of significant impacts observed.

### **Impact of QE and PEPP on Inflation Rate:**

Hypothesis 0 (H0) for Inflation Rate: This hypothesis is not supported because QE shows a significant negative correlation with the inflation rate ( $r = -0.27$ ,  $p < .05$ ), indicating that QE can influence inflation rates.

Hypothesis 1 (H1) for Inflation Rate: This hypothesis is supported for QE due to its significant impact on reducing inflation rates. However, the impact of PEPP is not significant ( $r = -0.06$ ,  $p > .05$ ), so it only partially supports the hypothesis.

### **Answering the research question**

Both QE and PEPP had negligible or minor negative impacts on GDP. For QE, there was no significant correlation, suggesting that it did not have a measurable influence on GDP growth. PEPP showed a slight but significant negative correlation, though the effect size was very small, indicating a minor impact at best.

Unemployment: QE was associated with an increase in unemployment rates, as indicated by a significant positive correlation. This suggests that QE may not have effectively translated its liquidity into job creation, contrary to its intended goal of stimulating employment.

PEPP, on the other hand, showed a slight, non-significant positive correlation with unemployment rates, indicating it had little to no effect on reducing unemployment, which questions its effectiveness in this area.

Stock Markets: Neither QE nor PEPP had significant impacts on stock market indices. This indicates that other economic and financial factors likely played a more substantial role in determining stock market performance during the pandemic, overshadowing the effects of these monetary policies.

Inflation Rate: QE significantly reduced inflation rates, evidenced by a notable negative correlation. This effect, while significant, was counterintuitive to the common belief that QE typically raises inflation risks due to increased money supply.

PEPP had a slight, but not significant, negative correlation with inflation rates, suggesting only a minor influence on decreasing inflation, if any.

In conclusion, the specific impacts of QE and PEPP during the COVID-19 pandemic show that while QE had a notable effect on reducing inflation and inadvertently increasing unemployment, its influence on GDP growth and stock markets was minimal. PEPP's impact was generally weaker across all areas except for a minor negative influence on GDP, highlighting its limited effectiveness in addressing economic challenges during the pandemic.

## Discussion

The results of the analysis on the impact of QE and the PEPP during the COVID-19 pandemic provide nuanced insights into the efficacy of these monetary policies under extraordinary economic conditions.

Both QE and PEPP showed limited influence on GDP. This suggests that in the context of a global pandemic, traditional monetary tools might not be sufficient to counteract the severe economic downturns caused by external shocks such as health crises. The minor negative correlation between PEPP and GDP might indicate that the program's scale or the timing of its implementation was not optimal to generate significant economic growth during such an unprecedented situation. This finding could prompt policymakers to reconsider the design and execution of such programs in future crises. The increase in unemployment associated with QE is particularly significant because it contradicts the primary goal of such policies—to stimulate the economy and increase job creation. This result might reflect the sectoral mismatches where the liquidity provided by QE did not reach the sectors most capable of job creation, or it might indicate that businesses hoarded cash instead of using it to expand and hire. For PEPP, the lack of significant impact on unemployment could suggest that similar issues of liquidity misallocation occurred, or that the program was insufficient to overcome the labor market challenges posed by the pandemic.

The absence of significant effects on stock markets from both QE and PEPP during the study period could be interpreted in several ways. It may indicate that these measures were overshadowed by broader economic uncertainties or that the markets had already anticipated these moves and priced in their effects. This aligns with the efficient market hypothesis, which posits that stock prices reflect all available information.

The significant reduction in inflation rates due to QE challenges the conventional wisdom that QE would lead to higher inflation due to increased money supply. This could indicate that the downward pressures on prices during the pandemic—such as reduced consumer spending and lower oil prices—were strong enough to offset the inflationary impacts of increased liquidity. For PEPP, the insignificant effect on inflation further demonstrates the complexity of influencing price levels through monetary policy alone during periods of economic turmoil.

These findings suggest that the effectiveness of monetary policy during global crises such as a pandemic may be limited and influenced by factors beyond the control of central banks. This could include the initial economic conditions, the responsiveness of financial markets, and the behavior of other economic agents (consumers and businesses). Further research should explore how these factors interact with monetary interventions and whether alternative or supplementary fiscal measures could enhance policy outcomes.

Moreover, as the global economy continues to evolve and new challenges emerge, there is a pressing need for continuous evaluation of monetary policy tools to ensure they are capable of achieving desired economic outcomes in various scenarios. This could involve more targeted approaches that consider the specific needs of different sectors and more robust coordination with fiscal policy to address broader economic challenges.

Further research is necessary to dissect the channels through which QE and PEPP influence the economy and to identify factors that might enhance their effectiveness. Studies could focus on the sectoral impacts of these policies, the role of financial markets in mediating their effects, and the interplay between monetary and fiscal policies in crisis management. Moreover, examining the long-

term effects of these policies as the global economy recovers from the pandemic will provide deeper insights into their lasting impact and any unintended consequences.

Overall, this discussion underscores the complexity of managing economic policy in a global crisis and highlights the need for agile, informed policymaking that can adapt to unprecedented conditions and uncertain outcomes.

## **Conclusion**

The exploration into the impacts of QE and the PEPP) during the COVID-19 pandemic has yielded important insights into the functionality and limitations of these key monetary policy tools under crisis conditions. The study analyzed the effects of these policies on various macroeconomic indicators including GDP, unemployment rates, stock market performance, and inflation rates, within the unique context of a global health emergency and its accompanying economic disruptions.

### **Key Findings:**

**GDP:** Both QE and PEPP had minimal to slight negative impacts on GDP growth, suggesting that these tools alone may not be sufficient to counteract the economic fallout from severe external shocks.

**Unemployment:** QE was associated with an increase in unemployment rates, indicating potential mismatches in the flow of liquidity and actual job creation. PEPP did not significantly affect unemployment rates, pointing to its limited efficacy in stimulating the labor market during the pandemic.

**Stock Markets:** The lack of significant impact on stock market indices from both QE and PEPP implies that market movements were likely driven by broader, more complex factors than monetary policy adjustments alone during the pandemic.

**Inflation:** QE significantly reduced inflation rates, contrary to the expectations that it would lead to higher inflation, suggesting that deflationary pressures during the pandemic were strong. PEPP's effect on inflation was not significant, reinforcing the complexity of using monetary policy to control inflation under crisis conditions.

**Implications for Policy:** These findings underscore the challenges central banks face when deploying traditional monetary tools during unprecedented global crises. The limited impacts of QE and PEPP on key economic indicators highlight the need for more innovative, flexible, and possibly more targeted monetary and fiscal interventions. Policymakers should consider the broader economic context and potential structural changes in the economy when designing and implementing such measures.

In conclusion, while QE and PEPP were crucial elements of the policy response to the COVID-19 pandemic, their effectiveness in terms of stimulating economic growth, reducing unemployment, and managing inflation was mixed and highlighted the limitations of conventional monetary policy tools in dealing with global systemic shocks. This calls for a reevaluation of economic policy strategies in the face of future global challenges.

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