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MONETARY POLICY EFFICIENCY IN CURBING POST-COVID-19 INFLATION

Abstract:

The COVID-19 pandemic led to unconventional monetary policies, such as large-scale asset purchases and near-zero interest rates, which contributed to rising inflation. As inflation increased, central banks responded by tightening policies, including raising interest rates to reduce money supply. This study evaluates the effectiveness of these measures in controlling inflation during the post-pandemic recovery, focusing on the European Union and the United States. It examines the relationship between M2 monetary aggregates and inflation, using the Harmonized Index of Consumer Prices (HICP). Granger causality tests on data from January 2018 to July 2024 show a significant causal link between M2 and inflation, highlighting the importance of interest rate adjustments in managing inflation.

Keywords:

Inflation Control, Money Supply, Granger Causality Analysis, Central Bank Actions

JEL Classification: E52, E58

1 Introduction

The global economic landscape has undergone profound transformations due to the COVID-19 pandemic, which introduced unprecedented challenges for policymakers and central banks worldwide. The pandemic's economic fallout necessitated swift and robust responses from central banks, which had to deploy various monetary policies to stabilize economies, support financial markets, and mitigate the severe economic contraction. The primary goal of these interventions was to curb the sharp rise in inflation and support economic recovery, particularly in the European Union (EU) and the United States, two of the world's largest economic regions.

This paper is motivated by the need to understand the effectiveness of these monetary policies in the post-pandemic period, specifically their role in controlling inflation. As economies began to recover from the immediate impacts of the pandemic, central banks faced the dual challenge of sustaining the recovery while preventing runaway inflation. Inflation, measured by the Harmonized Index of Consumer Prices (HICP), surged in the wake of the pandemic, driven by both demand-side factors, such as pent-up consumer spending, and supply-side constraints, including disrupted global supply chains. The central question addressed in this research is whether changes in M2 monetary aggregates—a broad measure of money supply—can effectively predict and control inflation during the post-COVID-19 recovery.

The paper is structured as follows: the next section provides a comprehensive review of the theoretical background and literature on monetary policy effectiveness during economic crises. This is followed by an analysis of the monetary policy landscape during and after the COVID-19 pandemic, highlighting the specific actions taken by central banks in response to the crisis. The empirical section presents the data, methodology, and results of the Granger causality tests, while the final sections discuss the findings and their implications for future monetary policy.

By exploring these dynamics, this paper aims to contribute to the ongoing debate on the role of monetary policy in managing inflation in a rapidly changing global economy.

2 Theoretical background

Monetary policy plays a crucial role in modern macroeconomic management. The primary goal of most central banks, such as the Federal Reserve (Fed) and the European Central Bank (ECB), is to influence economic activity through tools like interest rates and open market operations. These actions are intended to regulate inflation, stabilize currency, and promote sustainable economic growth (Bernanke, 2020). However, the effectiveness of monetary policy is not guaranteed and depends on various factors, including the state of the economy, market expectations, and global economic conditions (Blinder, 2018).

Monetary policy’s effectiveness is heavily dependent on its impact on aggregate demand, primarily through the manipulation of interest rates. Lowering interest rates tends to reduce the cost of borrowing, encouraging both consumer spending and business investment. Conversely, increasing interest rates raises borrowing costs, dampening economic activity to control inflation (Mishkin, 2019). The central bank's ability to influence these macroeconomic variables is fundamental to the policy's success (Clarida, 2019).

However, the relationship between interest rate changes and economic activity can be complex. Research shows that during periods of economic distress, such as recessions, the conventional tools of monetary policy may become less effective, particularly when interest rates approach the zero lower bound (Krugman, 2018). For example, during the 2008 financial crisis and the COVID-19 pandemic, many central banks had to resort to unconventional monetary policies like quantitative easing (QE) when interest rate reductions alone were insufficient to stimulate economic recovery (Rogoff, 2017).

The effectiveness of monetary policy also depends on the transmission mechanisms within the financial system. These mechanisms include the banking sector's willingness to lend, the responsiveness of financial markets, and the confidence levels of businesses and consumers. When banks are hesitant to lend due to weakened balance sheets or concerns about economic stability, even significant reductions in policy rates may not lead to increased credit creation (Brunnermeier & Koby, 2018). Empirical studies indicate that during the global financial crisis, the breakdown of these transmission mechanisms led to a diminished impact of monetary policy in many advanced economies (Gertler & Karadi, 2015). Moreover, if businesses and consumers lack confidence in future economic prospects, they may not respond to lower interest rates by increasing spending or investment, further limiting the effectiveness of monetary policy (Eggertsson, 2003).

In today’s globalized economy, external factors such as international trade dynamics, exchange rate fluctuations, and cross-border capital flows can also influence the effectiveness of monetary policy. A study by Rey (2016) suggests that global financial cycles can constrain national monetary policy, particularly in small open economies. For instance, a rate cut in one country might lead to capital outflows as investors seek higher returns elsewhere, undermining the intended stimulative effect (Rey, 2016). Additionally, policy coordination among central banks can play a critical role in enhancing the effectiveness of monetary interventions. For example, the coordinated actions taken by major central banks during the 2008 financial crisis helped to stabilize global markets, demonstrating that international cooperation can be pivotal in managing economic crises (Obstfeld, 2015).

Structural factors within an economy can also impact the effectiveness of monetary policy. Issues such as financial market depth, institutional quality, and regulatory frameworks play a significant role in determining how monetary policy actions translate into real economic outcomes (Romer & Romer, 2019). In economies with robust financial markets and strong institutions, the transmission of policy signals tends to be more efficient, enhancing policy effectiveness. Conversely, in economies with weak financial systems or significant structural rigidities, the impact of monetary policy can be significantly diluted (Cecchetti & Schoenholtz, 2017).

3 Monetary policy landscape: during-and Post-COVID-19

The outbreak of COVID-19 in early 2020 precipitated a global economic crisis that was unparalleled in both scale and speed. As governments imposed lockdowns and social distancing measures to contain the spread of the virus, economic activity plummeted, leading to a sharp contraction in global GDP, widespread unemployment, and significant financial market turmoil (International Monetary Fund [IMF], 2020). The sudden and severe nature of the crisis demanded

an immediate and robust response from central banks, which took center stage in efforts to stabilize economies and restore confidence in financial markets.

Monetary policy, traditionally focused on controlling inflation and managing economic cycles, had to be rapidly adapted to address the unique challenges posed by the pandemic. Central banks employed a combination of conventional tools, such as interest rate cuts, and unconventional measures, including large-scale asset purchases and forward guidance, to mitigate the economic fallout. As economies gradually recover from the pandemic's impact, central banks are now reassessing their strategies to address the ongoing risks and uncertainties that characterize the post-pandemic landscape.

At the onset of the pandemic, central banks around the world acted swiftly to counter the economic shock. The U.S. Federal Reserve (Fed) moved quickly to lower its benchmark interest rate to near zero in March 2020, a level not seen since the aftermath of the 2008 financial crisis (Board of Governors of the Federal Reserve System, 2020). This aggressive rate cut was intended to reduce borrowing costs across the economy, thereby supporting consumer spending and business investment during a period of extreme uncertainty.

Similarly, the European Central Bank (ECB) responded by maintaining historically low interest rates and introducing the Pandemic Emergency Purchase Programme (PEPP), a large-scale asset purchase program designed to ensure liquidity in financial markets and support the transmission of monetary policy (European Central Bank, 2020). The PEPP was notable not only for its size but also for its flexibility, allowing the ECB to adjust the pace and composition of purchases in response to market conditions.

Beyond interest rate cuts and asset purchases, central banks also employed forward guidance to influence expectations about the future path of monetary policy. The Bank of England, for example, provided clear communication that it would maintain accommodative monetary conditions until there was "clear evidence" of a sustainable recovery (Bank of England, 2021). This use of forward guidance aimed to reassure markets and the public that central banks would continue to support the economy as long as necessary.

In addition to these measures, central banks expanded their role in supporting the financial system directly. The Federal Reserve launched a series of emergency lending facilities, including the Primary Market Corporate Credit Facility (PMCCF) and the Secondary Market Corporate Credit Facility (SMCCF), to ensure that businesses could continue to access credit even as financial markets experienced significant stress (Federal Reserve Bank of New York, 2020). These facilities were crucial in preventing a collapse in credit markets, which could have exacerbated the economic downturn.

The effectiveness of these monetary policy interventions during the pandemic has been the subject of extensive analysis. Research suggests that the rapid deployment of both conventional and unconventional tools was critical in preventing a more severe economic collapse. For instance, asset purchase programs like the Fed’s quantitative easing (QE) and the ECB’s PEPP were effective in lowering long-term interest rates, reducing risk premiums, and supporting credit flows to businesses and households (Long, et al., 2021). These measures helped to stabilize financial markets and provided essential liquidity during a period of unprecedented uncertainty.

However, the effectiveness of these policies varied across different phases of the pandemic and among different economies. In advanced economies with well-developed financial markets, the transmission of monetary policy actions to the real economy was relatively effective. By contrast, in emerging markets and developing economies, where financial systems are less mature and more vulnerable to external shocks, the impact of monetary policy interventions was more limited (Hofmann et al., 2020).

Moreover, while the initial response to the crisis was largely successful in stabilizing financial markets, the prolonged use of unconventional monetary policies raised concerns about potential side effects. For example, there is growing evidence that extensive asset purchases may have contributed to asset price inflation, particularly in equity and real estate markets, leading to concerns about financial stability and the potential for future market corrections (Ling et al., 2020; Hoesli & Malle, 2022). Additionally, low interest rates and ample liquidity may have encouraged excessive risk-taking and the buildup of leverage in some sectors, increasing the vulnerability of the financial system to future shocks (Mühlich et al., 2022).

As economies began to recover and vaccinations accelerated, new challenges emerged. A surge in demand, coupled with supply chain disruptions and labor shortages, led to inflationary pressures that were more persistent than initially anticipated. By mid-2021, inflation rates in advanced economies, particularly in the U.S., had reached levels not seen in decades. The Fed, which initially deemed inflation to be "transitory," was compelled to rethink its policy stance. In November 2021, it announced a tapering of its bond-buying program, reducing asset purchases by $15 billion per month, with the intention of concluding the program by mid-2022 (Federal Reserve, 2021). This decision was seen as a preparatory step towards potential interest rate hikes, a strategy aimed at containing inflation without derailing the economic recovery.

The ECB, on the other hand, faced a more nuanced challenge due to the diverse economic conditions across the Eurozone. While inflation in some member states surged, in others, it remained below the ECB's target (see Figure 2A in appendix). Thus, the ECB opted for a more cautious approach, maintaining its accommodative stance while emphasizing the need to avoid premature tightening. However, it also signaled a potential recalibration of its policy tools, suggesting a gradual winding down of the PEPP, while continuing other QE programs to support weaker economies (European Central Bank [ECB], 2022).

Emerging market economies (EMEs) encountered a distinct set of challenges in the post-pandemic environment. Many EMEs had already been facing economic vulnerabilities before COVID-19, such as high debt levels, capital outflows, and currency depreciations. The pandemic exacerbated these issues, leading to sharper economic contractions and greater financial instability. With the tightening of global financial conditions in 2021, many EMEs, particularly those with large external debt burdens or weak fiscal positions, were forced to raise interest rates earlier than advanced economies. For example, the central banks of Brazil, Russia, and Turkey implemented significant rate hikes to counter inflation and stabilize their currencies amid capital outflows (World Bank, 2022). These measures, however, risk slowing down the recovery, highlighting the delicate balance EMEs must strike between maintaining economic growth and ensuring financial stability.

One of the critical challenges for central banks in this new landscape is managing inflation expectations. In the post-pandemic period, inflation has been driven by both demand and supply-

side factors. While robust fiscal stimuli and pent-up consumer demand have fueled spending, supply chain disruptions, including shortages of semiconductors, shipping delays, and labor market mismatches, have restricted supply, creating upward price pressures (Organisation for Economic Co-operation and Development [OECD], 2021). The interplay between these forces has made it difficult for central banks to gauge the true underlying inflation trend and determine the appropriate policy response. In response, the Fed and other central banks have begun signaling their readiness to tighten monetary policy more aggressively if inflation proves to be more than a temporary phenomenon. However, there is also a concern that tightening too quickly could stifle the nascent recovery, especially given the uncertainties around COVID-19 variants and uneven vaccine distribution (International Monetary Fund [IMF], 2021).

Furthermore, the pandemic has underscored the importance of coordinating monetary and fiscal policies. Unlike previous crises where monetary policy was the primary tool for stabilization, the COVID-19 response has seen an unprecedented level of fiscal intervention, with governments worldwide rolling out massive stimulus packages to support households, businesses, and healthcare systems. This fiscal-monetary coordination has helped to mitigate the immediate economic impact of the pandemic, but it has also raised concerns about longer-term fiscal sustainability and the risk of central banks becoming overly entangled in fiscal matters (Bank for International Settlements [BIS], 2021). Central banks now face the challenge of unwinding extraordinary support measures without triggering financial market turbulence or undermining fiscal positions.

In addition, the pandemic has accelerated the discussion around central bank digital currencies (CBDCs) and the future of money. The shift towards digital payments and the potential decline in cash use have prompted central banks to explore the issuance of their digital currencies as a way to enhance payment systems, maintain monetary sovereignty, and provide a safe, reliable digital payment method in an increasingly digital economy (Bank for International Settlements, [BIS], 2021). The People's Bank of China (PBOC) has been at the forefront of this effort, with its digital yuan already in the pilot stage, while other central banks, such as the ECB and the Fed, are conducting research and consultations on the feasibility and design of CBDCs.

4 Data and methodology

This study investigates the efficiency of monetary policy in curbing post-COVID-19 inflation by analyzing the relationship between M2 monetary aggregates and inflation, measured by the Harmonized Index of Consumer Prices (HICP), across the European Union (EU) and the United States. The data used in this analysis includes:

- **M2 Monetary Aggregates**: Monthly seasonally adjusted data for M2 money supply, representing broad money, is retrieved from the Federal Reserve Economic Data (FRED) for the United States and from the European Central Bank (ECB) for the Euro area (see Figure 1A in Appendix). M2 includes cash, checking deposits, and easily convertible near money such as savings deposits and money market securities. This data is critical for understanding the impact of monetary policy, as changes in the money supply are often used by central banks to influence inflation and economic activity.
- **Inflation (HICP)**: The Harmonised Index of Consumer Prices (HICP) is a measure of inflation that allows for comparisons of inflation rates across different countries, particularly in the

European Union. The HICP is designed to provide a consistent and comparable measure of consumer price inflation across the EU member states. Although it primarily focuses on EU countries, the Eurostat database also includes HICP data for non-EU countries like the United States, which can be used for international comparisons. Monthly HICP data for EMU countries and United States for the period from January 2018 to July 2024 is obtained from the Eurostat database and presented in Figure 2A in Appendix. This time frame allows for the examination of pre-pandemic, pandemic, and post-pandemic periods, providing insights into how monetary policy responses have influenced inflation dynamics during and after the COVID-19 pandemic.

To explore the relationship between M2 money supply and inflation, this study employs the Granger causality test, a statistical hypothesis test used to determine whether one time series can predict another. Specifically, we investigate whether changes in M2 monetary aggregates Granger-cause changes in inflation (HICP) and vice versa. The Granger causality test is based on the concept that if variable X_t (e.g., M2) Granger-causes variable Y_t (e.g., HICP), then past values of X_t should contain information that helps predict Y_t (Granger, 1969). The standard econometric equations for the Granger causality test are specified as follows:

Model 1: $Y_t = \alpha + \sum_{i=1}^{p} \beta_i Y_{t-i} + \varepsilon_t$ (1)

Model 2: $Y_t = \alpha + \sum_{i=1}^{p} \beta_i Y_{t-i} + \sum_{j=1}^{q} \gamma_j X_{t-j} + \varepsilon_t$ (2)

Where Y_t is a dependent variable, X_t is a variable that we test if it Granger cause Y_t, and p and q are the lag. α, β_i and γ_j are coefficients to be estimated, and ε_t is the error term. The comparison of the fit of Model 1 with Model 2 (using standard F-test) Granger causality from X to Y. If the additional lagged values of X in Model 2 significantly improve the fit, it suggests Granger causality from X to Y.

Before conducting the Granger causality test, it is essential to ensure that the time series data is stationary. Stationarity is a property of a time series whereby its statistical properties, such as mean and variance, are constant over time. Non-stationary data can lead to unreliable and spurious regression results, making it crucial to transform the data appropriately (Hamilton, 1994).

To test for stationarity, this study applies both the Augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test. The ADF test is a widely used method to check for the presence of a unit root, which indicates non-stationarity (Dickey & Fuller, 1979). The Phillips-Perron test is employed as a complementary method to confirm the results of the ADF test. Unlike the ADF test, the PP test accounts for possible serial correlation in the error terms without adding lagged difference terms, making it a robust alternative for verifying stationarity (Phillips & Perron, 1988).

If the ADF and PP test results indicate non-stationarity in the time series at levels, the data is differenced to achieve stationarity. Differencing involves transforming the series by subtracting the previous observation from the current observation, thereby removing trends and seasonality. Ensuring stationarity through these tests allows for more reliable application of the Granger causality test and the subsequent interpretation of results.

For this analysis, the M2 and HICP series are differenced because they exhibit non-stationarity in levels, ensuring that the data utilized in the Granger causality tests are appropriate for econometric modeling. The results are given in next section

5 Empirical analysis, results and discussion

The results of unit roots of variables in levels and in first difference are given in table 1.

Table 1: Unit root test

	Method	ADF	PP		Method	ADF	PP
M2_ECB – in levels	Statistic	-1.9232	-1.7321	**HICP_EA – in levels**	Statistic	-1.2232	-1.307
	Prob.**	0.3202	0.4113		Prob.**	0.6607	0.6227
M2_FED – in levels	Statistic	-1.4508	-1.3588	**HICP_US – in levels**	Statistic	-1.5463	-1.3888
	Prob.**	0.553	0.5982		Prob.**	0.505	0.5837
M2_ECB – 1st diff.	Statistic	-43,352	-4.2366	**HICP_EA – 1st diff.**	Statistic	-5.9579	-6.0388
	Prob. **	0.0008	0.0011		Prob. **	0.0000	0.0000
M2_FED – 1st diff.	Statistic	-4.2341	-3.0331	**HICP_US – 1st diff.**	Statistic	-4.9204	-4.9204
	Prob. **	0.0011	0.0362		Prob. **	0.0001	0.0001

Source: author's calculation

*Notes: Exogenous variables: Individual effects, Newey-West automatic bandwidth selection and Bartlett kernel. ** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.*

The variables analyzed included M2 for the Euro area (M2_ECB), M2 for the United States (M2_FED), HICP in the Euro area (HICP_EA), and HICP in the United States (HICP_US). The results from both tests indicated that all variables are non-stationary in levels, as we failed to reject the null hypothesis of a unit root. However, after applying the first difference, all series became stationary, allowing us to proceed with the Granger causality tests on the differenced data. The results of Granger Causality statistical tests that include one, two and three lags are given in Table 2. D_M2_ECB, D_M2_FED, D_HICP_EA and D_HICP_US represent the change in M2_ECB, M2_FED, HICP_EA and HICP_US series, respectively.

Table 2: Pairwise Granger Causality Tests

Number of lags:	**1**		**2**		**3**	
Null Hypothesis:	**F-Stat.**	**Prob.**	**F-Stat.**	**Prob.**	**F-Stat.**	**Prob.**
D_M2_ECB does not Granger Cause D_HICP_EA	7.96293	0.0061	4.35611	0.0164	3.11080	0.0319
D_HICP_EA does not Granger Cause D_M2_ECB	0.04382	0.8348	0.19372	0.8243	0.42257	0.7374
D_M2_FED does not Granger Cause D_HICP_US	4.80594	0.0315	7.54443	0.0011	5.78939	0.0014
D_HICP_US does not Granger Cause D_M2_FED	0.46899	0.4956	0.53129	0.5902	1.15823	0.3322

Source: author's calculation

Following the stationarity adjustments, the Granger causality tests were conducted to investigate the directional influence between the monetary aggregates (M2) and inflation (HICP) in both the Euro area and the United States. The key results from the Granger causality tests are as follows:

- **M2_ECB and HICP_EA**: The null hypothesis that changes in M2_ECB do not cause changes in HICP_EA was rejected. This indicates that fluctuations in the Euro area's money supply, as captured by M2, have a statistically significant causal effect on inflation within the Euro area.
- **M2_FED and HICP_US**: Similarly, the null hypothesis that changes in M2_FED do not cause changes in HICP_US was also rejected. This suggests that changes in the money supply in the United States, as measured by M2, have a significant impact on inflation.

These findings suggest that central banks' policies, reflected in the M2 monetary aggregates, have had a direct influence on inflation rates both in Euro area and in United States. This is consistent with traditional monetary theory, which posits that an increase in the money supply can lead to higher inflation if it outpaces economic growth (Friedman, 1968). The positive causality between M2 and HICP observed in both the Euro area and the United States during the post-COVID period highlights the effectiveness and influence of monetary policy.

The results obtained in this study align with similar findings in the literature. For instance, in their analysis of post-financial crisis monetary policy, Sims and Zha (2006) demonstrated that expansive monetary policies in response to economic crises often lead to inflationary pressures, particularly when such policies are sustained over time. Moreover, a recent study by Bordo and Levin (2020) examined the impacts of aggressive monetary interventions during the COVID-19 pandemic and found that while these measures were necessary to stabilize the economy, they also posed significant inflationary risks, as reflected in the subsequent inflation trends observed in 2021 and 2022.

In the context of the Euro area, studies such as those by Ciccarelli and Mojon (2010) have documented the significant role of monetary aggregates in influencing inflation, particularly during periods of economic recovery. The findings of this study reinforce the argument that the European Central Bank's (ECB) monetary policies, through mechanisms such as the Pandemic Emergency Purchase Programme (PEPP), have contributed to inflation dynamics in the region.

In comparison, the United States has also seen similar outcomes, with research by Gagnon (2016) highlighting that the Federal Reserve's quantitative easing (QE) measures and low-interest rates during the pandemic have led to increased money supply, which, in turn, has fed into rising inflation. The results of this study further corroborate these findings by showing a clear causal link between the Fed's monetary aggregates and inflation. The empirical results suggest that monetary policy, as operationalized through changes in the M2 money supply, plays a crucial role in influencing inflation in both the Euro area and the United States. The strong Granger causality observed between M2 and HICP in both regions underscores the importance of carefully monitoring and adjusting monetary policies, especially in the context of economic recoveries following large-scale disruptions such as the COVID-19 pandemic. However, these findings also raise important policy considerations. While monetary expansion was necessary to prevent deeper economic contractions during the pandemic, central banks must now consider the timing and magnitude of tightening measures to avoid embedding inflationary expectations. This

balancing act between supporting economic growth and controlling inflation will continue to be a critical challenge for central banks in the post-pandemic world.

6 Conclusion

The findings of this study underscore the significant influence of monetary policy, particularly through M2 monetary aggregates, on inflation dynamics in both the Euro area and the United States during the post-COVID-19 recovery. The Granger causality tests conducted in this research reveal a statistically significant relationship between changes in M2 and subsequent inflation rates, suggesting that central banks' monetary interventions have played a crucial role in shaping inflation outcomes in these regions. This aligns with contemporary monetary theory, which posits that an increase in the money supply, if not matched by corresponding economic growth, can lead to higher inflation (Blinder, 2018).

However, the study also highlights several limitations and challenges that warrant further investigation. One significant shortcoming is the reliance on M2 as a sole indicator of monetary policy effectiveness. While M2 is a broad measure of money supply, it may not fully capture the complexities of modern financial systems, particularly in the context of unconventional monetary policies such as quantitative easing. Additionally, the study's focus on the EU and the U.S. may limit the generalizability of its findings to other regions, particularly emerging markets, where financial systems and policy environments differ significantly.

Another limitation is the potential for confounding factors that could influence the relationship between M2 and inflation. For example, global supply chain disruptions, fiscal policies, and external economic shocks may also play a significant role in shaping inflation dynamics, complicating the attribution of outcomes solely to monetary policy. Furthermore, the Granger causality test, while useful for identifying predictive relationships, does not establish causality in a strict sense, meaning that the observed correlations between M2 and inflation may not imply direct causation.

Given these limitations, future research could benefit from a more nuanced analysis that incorporates additional indicators of monetary policy, such as interest rates, credit conditions, and the velocity of money. Comparative studies involving a broader range of countries, including both advanced and emerging economies, could provide a more comprehensive understanding of the global impact of monetary policy on inflation. Moreover, longitudinal studies that track the long-term effects of post-pandemic monetary interventions would offer valuable insights into the sustainability of these policies and their potential side effects, such as asset price inflation and financial stability risks.

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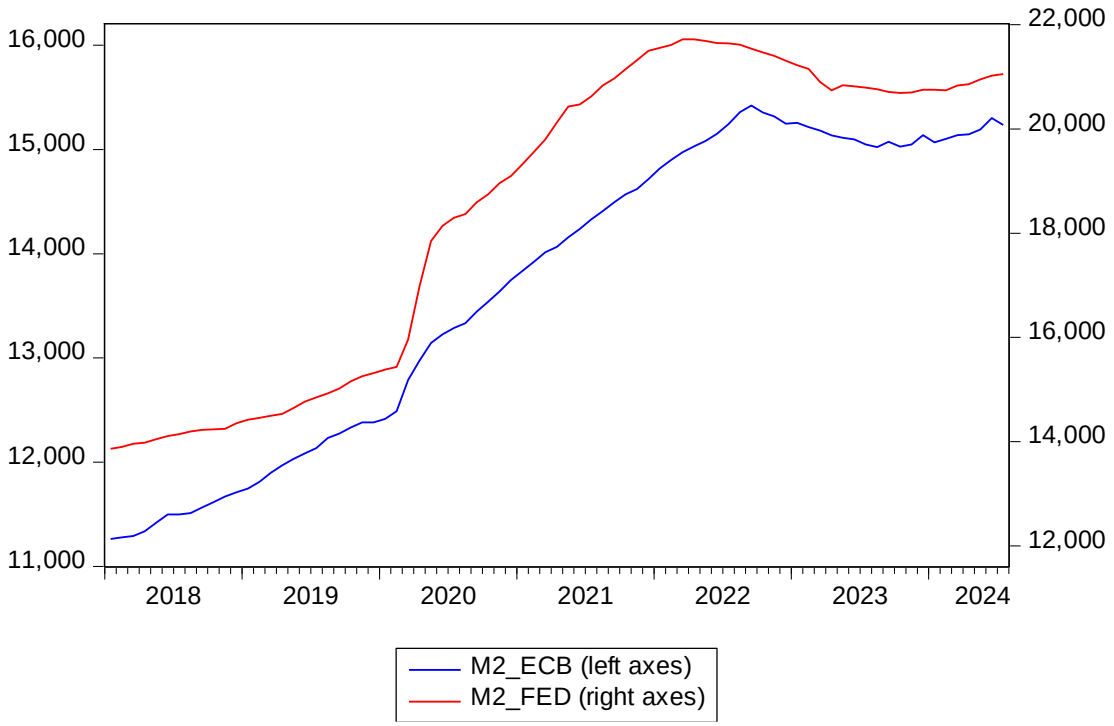
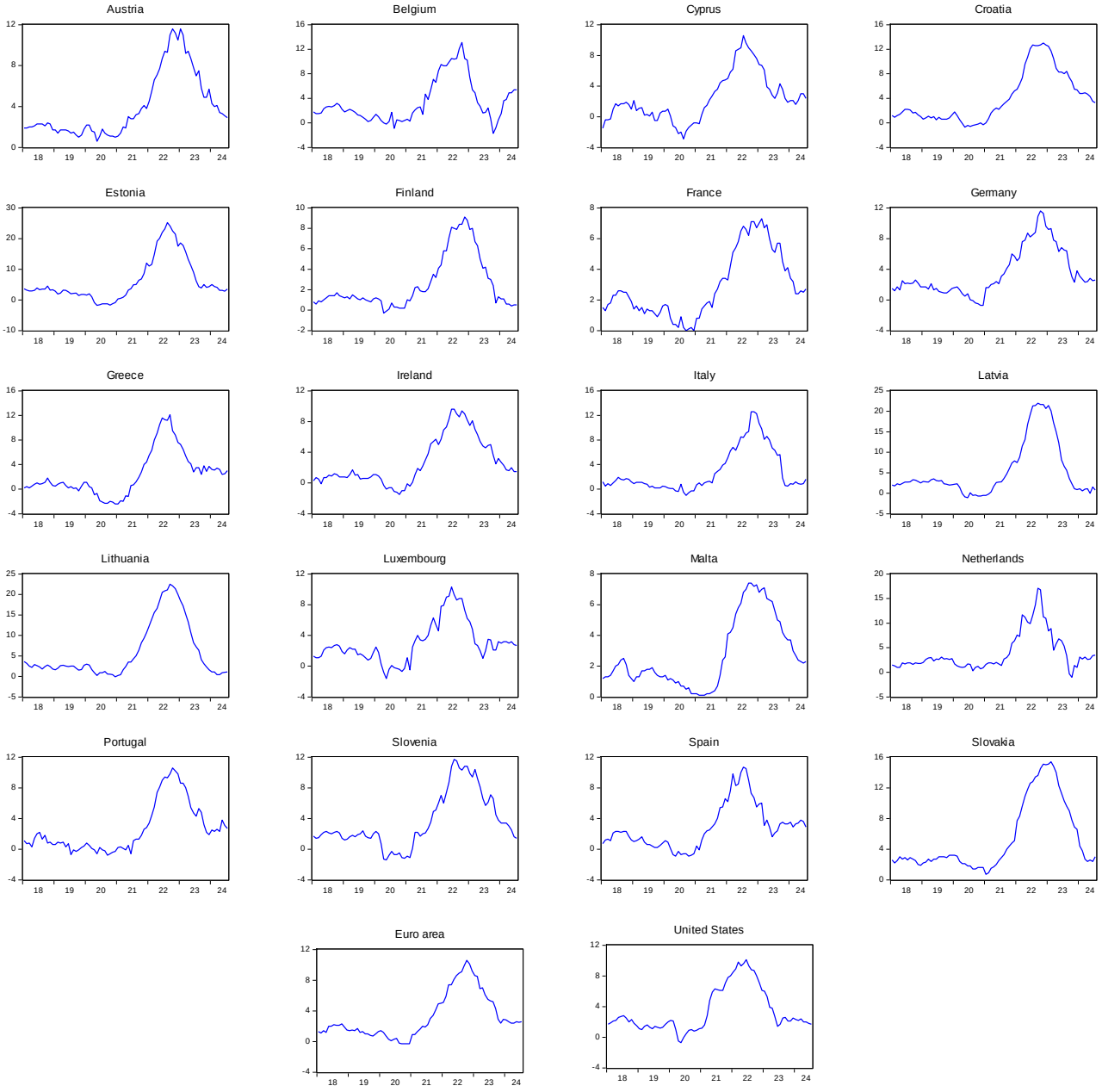
APPENDIX

Figure 1A: M2 monetary aggregates in billions of Euros (left axes) and in billions of US dollars (right axes)



Source: European central bank and FRED economic data, st. Louis FED

Figure 2A: Inflation measured by HICP in European Union countries that are in the Eurozone



Source: EUROSTAT