Post-Pandemic Sources of Inflation Dynamics in USA and Europe

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Abstract. In the context of so-called Great Moderation of the last decades characterized by relatively low and stable inflation rates are the post-pandemic inflation rates of late 2021 and early 2022 relatively elevated. Economic theory and intuition points to the set of inflation dynamic drivers of the real and possibly monetary character. The high inflation rates have negative economic and social consequences; however, the sources of inflation dynamic determine the adequate monetary policies. The goal of this paper is to analyze theoretically sources of inflation dynamics as the set of real and monetary variables It seems that on the real side are inflation drivers in USA and Europe of similar nature, on the contrary on the monetary side. The crucial distinction between the inflation dynamics caused by monetary factors in USA and Europe is the extent of QE program and the transmission of the program. Therefore, we conclude that it is plausible, that post-pandemic inflation dynamic in Europe is mainly driven by raising energy and food prices, whereas in USA also with fiscal over-expansion, however more rigorous analysis is needed to take stated conclusion as factual.

Keywords: Inflation, Transmission of monetary policy, Monetary policy

JEL classification: *C51, E31, E47*

1   Introduction

The greater aggregate demand of the economy than its aggregate supply causes inflationary pressure called demand-pull inflation. Economists describe this phenomenon as the state when too much money are chasing too few goods. Hower, also the side of supply is very essential in analysis of the inflation dynamics. Subdued supply of goods and services - shocks on the side of costs for companies - create inflation pressure as well. Therefore, shocks leading to reduction of supply of goods or services, fall in productivity, rising prices of commodities, destruction of capital or supply shortages can create inflation dynamic.

The main problem in analysis of inflation dynamics is to find the right set of variables which describe inflation dynamic. We will review the literature to find the set of regressors which are useful in empirical analysis of inflation dynamics.

2   Literature Review

To review different sources of inflation dynamics we are looking at the side of demand as well as side of supply. Demand driven inflation seems to relate to aggregate disposable income and wealth relative to product. On the other hand, supply driven inflation seems to relate to dynamic of the product in the economy.

To represent the money-prices link we can use the P-Star model based on the quantity theory of money. Hallman et al. (1991) state that the long-run link between money and prices is find when the velocity of M2 is represented as a mean-reversion process. The similar argumentation based on the assumption of stability of M2 velocity and operation of economy near the potential is found in Hallman and Anderson (1993). P-Star model logic is found appealing also in in the papers of Kiptui (2013), Czudaj (2011), Gerlach and Swennson (2003), Scheide and Trabandt (2000), Moosa (1998) and Kool and Tatom (1994). P-Star model based on the quantity theory of money seems to present plausible theory of demand driven inflation. The arguments of Blanchard, Domash and Summers (2022) based on the analysis of Beveridge Space show that combination of low unemployment rate and very high vacancy-to-unemployment ratio in USA suggest labor market overheating as well as substantial increase in natural unemployment rate. Blanchard (2022) describes four main forces behind inflation, labor market tightness, price shocks and their first-round effects on inflation, second-round effects reflected in other prices and nominal wages and fourth driving force is "de-anchoring". Author argues that headline numbers for inflation in the eurozone and United States are roughly similar, however behind those numbers lie important differences.

Domash and Summers (2022) describing different signals about the degree of slack of labor market in the U.S., since the outset of Covid-19 pandemic and they arguing that their analysis of labor market in USA suggest that labor market tightness is likely to contribute significantly to inflationary dynamics in the USA. Bolhuis and Summers (2022) compare past and present inflation in USA to better contextualize the current run-up in inflation, they support the view that current inflation levels are much closer to past inflation peaks than what would be otherwise suggested by the official inflation series. In the analysis conducted in the 2021, Koester et al (2021) compare inflation dynamic in the United States and euro area. They observe that substantial part of the strong increases in inflation and the upside inflation surprises over 2021 can by attributed to special factors that are likely of the temporary nature. However, they remark that for a more permanent increase in inflation, price pressures usually need to become more broad-based and need to reflect increasing labor cost pressures.

Since 1960´s was the Phillip curve the prominent model describing the connection between domestic rate of unemployment and wage inflation. Peneva and Rudd (2015)

think that the effect of wage growth on inflation makes at least intuitive sense. However, according to Feldstein (2015) the link between wages and prices can be offset by lower prices of oil as well as appreciating domestic currency. Forbes (2019) argues that globalization has meaningful impact on the dynamics of CPI inflation over the last decade, however had a a more moderate effect on core inflation and wages. To argue that globalization affects dynamic of inflation is not new, after all, since the 1970´s Gordon (1977 and 1985) highlighted the necessity to supplement the Philips curve framework to account for global prices of oil. The war in Ukraine which started in 2022 seems to create shock for energy prices, especially for Europe. Oil embargos of 1970´s are in some sense similar events to import embargo of Russian oil in 2022. Still, the labor market activity and the overall Covid-19 fiscal stimulus play critical role in assessing the drives of inflation dynamics. For example, Summers (2022) describing the USA economy where the income was running short by $50 billion a month because of the COVID-19 pandemic, whereas the government injected $150 to $200 billion a month into the economy. According to Summers (2020) is therefore not surprising that the overstimulation of the U.S. economy led to an overflow of demand, which has generated inflation. Kinlaw et al (2022) apply a Hidden Markov Model to identify inflation regimes and employ an attribution technique based on the Mahalanobis distance to identify determinants of inflation, their analysis reveals that as of February 2022, the most important determinant of the recent spike in inflation in USA was spending by the federal government.

3   Data and Methodology

The complexity of the inflation dynamics in the short and long run does not allow to describe inflation as purely a monetary phenomenon, i.e. a situation where "too much money chases too little goods". Inflation is a more complex phenomenon, so it is necessary to combine the demand side (demand-driven inflation) with factors acting on the supply side. For the USA, such factors are clearly wages, the price of imports and energy prices. However, the demand side is important as well, especially in the case of imbalances in the rate of growth of money supply and product.

From the review of the literature, relative rate of change (represented by the slope of the curve) of wages, import and energy prices, money and product is important determinant of inflation generating process. Therefore, we will analyze the data graphically and try to infer imbalances in their rate of change.

From the perspective of the demand side and in line with the quantitative theory of money, we define the parameters M (money supply), V (velocity of money), P (average price level) and Y (real output) as in (1):

$$P = \frac{V}{Y}M \tag{1}$$

We analyze the individual parameters of the model graphically. We measure the money supply by monetary aggregates. The speed of money circulation cannot be observed explicitly (but it may be computed) and the concept of real product corresponds to real GDP. The change in the average price level is inflation. In the following section, we will graphically display and analyze the evolution of the elements of the equation (1).
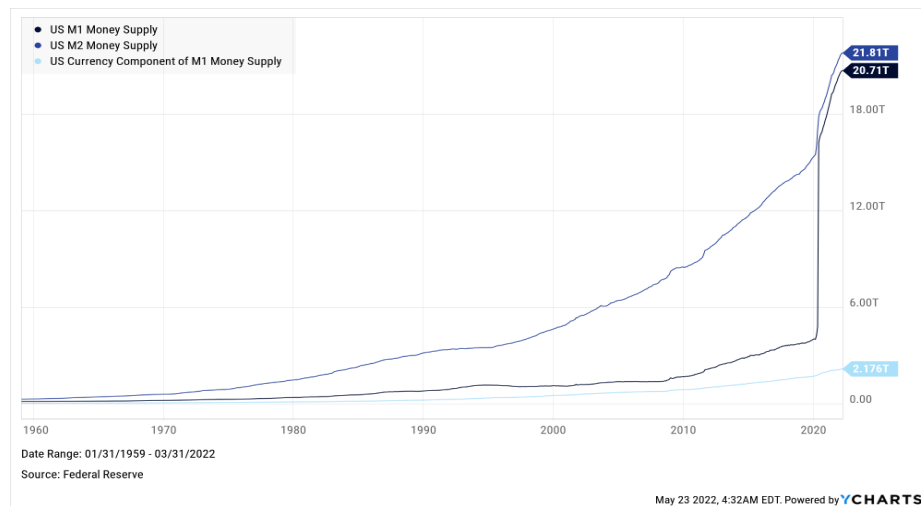

Fig. 1. Monetary aggregates (M1, M2) and currency component of M1.

Since 2020, we have observed a significant increase in the monetary aggregate M1 and M2 (approximations of the M component of the relation (1)). The M1 monetary aggregate has been redefined by the Federal Reserve System (Regulation D, Reserve Requirements). The new regulation incorporated into M1 the new components of money previously contained in M2 (but not M1). Savings deposits and checkable deposits, which limited the choice of depositors (to less than 6 transactions per month). Under Regulation D, restrictions no longer apply to savings account transactions, and therefore savings accounts may be included in more liquid forms of money (M1).

The slope of M2 and M1 is after 2020 significantly higher than in the previous decades, which indicates significantly higher rate of money growth since the early 2020.
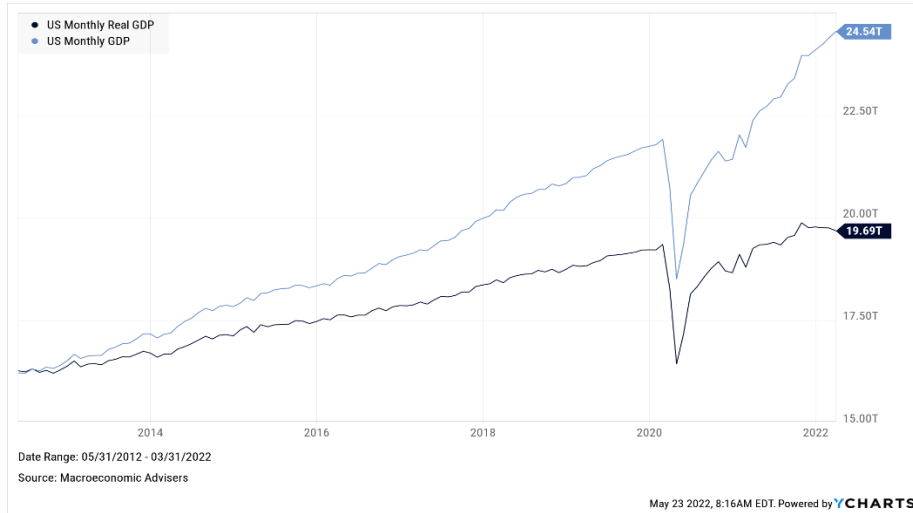
Fig. 2. US Monthly Real GDP and Nominal GDP.

The description of the product dynamic from relation (1) is an important component determining the dynamics of inflation. The declining pace of real GDP growth in the inflationary period suggests weakening consumption. According to Fig. 2., nominal GDP is growing but real GDP is declining during 2022. We can also see significant rebound of GDP during 2020. Real GDP is roughly on its long-term trend.

We still need to analyze the development (variable V), i.e., the velocity of money from relation (1). In Chart 4, we observe the instability of the money circulation rate of the monetary aggregate M1.
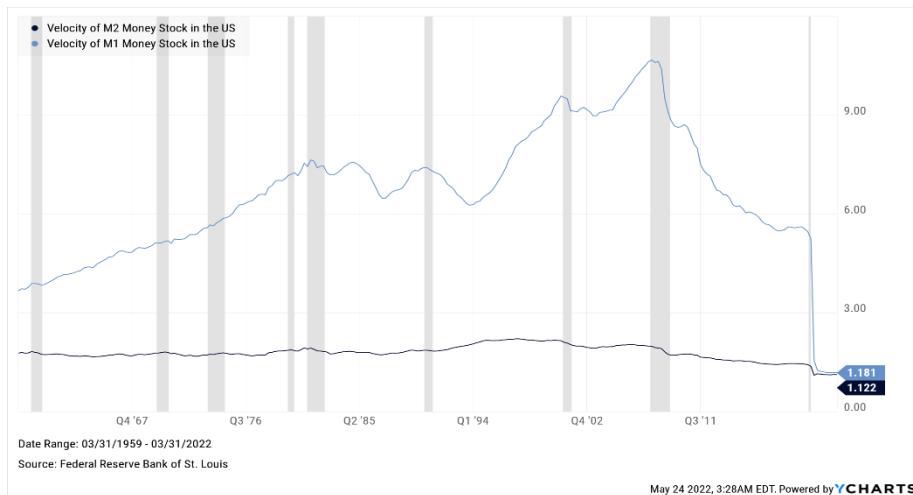

Fig. 3. Velocity of M1 and M2.

Until 2008, the M1 had a growing character, and during the recession period, velocity tended to decline. In other words, the periods associated with a decline in product are associated with a decline in the velocity of money circulation. The 1970´s are associated with oil shocks, the oil embargo began in 1973 and caused a series of recessions. The size of the M1 fell sharply during the Great Recession (2008), when the QE program was launched in the USA. Subsequently, the M1 velocity fell sharply in 2020, since parts of the M2 monetary aggregate were divided into M1. The money in circulation of the broader monetary aggregate M2 also slowed down, reaching the level of only 1,122 at the end of 1Q 2022.

The declining velocity of M1 and M2 suggests that there are elements of money that do not enter the real economy. It is money that is not subject to exchange and the economic context suggests that these money represents the reserves of commercial banks from the sale of bonds to the central bank within QE.
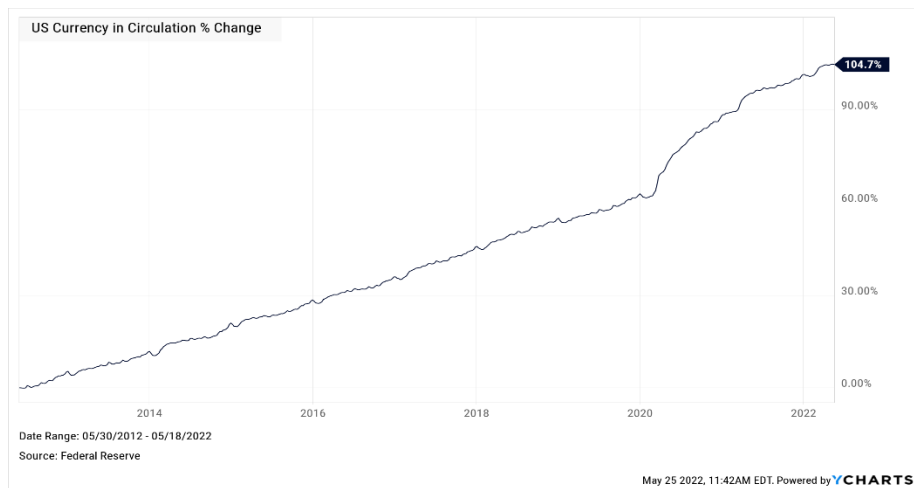

Fig. 4. USA Currency in circulation (% change)

The accelerating pace of money growth in the circulation since 2020 is causing inflationary pressure. Balances in the central bank's government account grew significantly during 2020 as money was used to help citizens during the Covid-19 pandemic.

In addition to the monetary side of inflation in the US, we also observe supply-side inflationary pressures caused by rising costs (wages, commodities) and insufficient supply of goods.

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4   Conclusion

The paradigm of low inflation observed from the beginning of QE in the US (2008) to the outbreak of the US pandemic (2020) seems to be disrupted by the greater interconnectedness of budgetary and monetary policy, reflected in the fiscal over-expansion in terms of direct transfer payments to US citizens. Relatively high post-pandemic inflation rate in the USA of the late 2021 and early 2022 may be, therefore partly monetary phenomenon.

Unlike previous QE programs before 2020, the liquidity from the purchases of government bonds by the Federal Reserve System in 2020 was directed directly to the real economy due to fiscal spending. To support the conclusions here, there is the need for more rigorous, mathematical description of inflation dynamics. Therefore, the results of this paper should rather be taken as informative than factual.

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