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# DOES INCREASE IN THE MONEY SUPPLY REALLY LEAD TO HIGHER PRICES?



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# INTRODUCTION

Current economic and political world is going through extraordinary times. The pandemic and the reaction to it has caused huge public deficits, extremely low interest rates, higher than usual growth in the supply of money, and faster increases in consumer and producer prices.

One of the debates which has intensified recently is to what extent is lax monetary policy causing the increase in the price inflation. Central banks all over the world, motivated by the aim to stimulate economy, have created vast amounts of new money. At first, the prominent central banks have been quite successful in convincing the public that the increased consumer price inflation – which has been significantly above the threshold of 2% – is transitory, and that it is mainly caused by the non-monetary reasons, e.g., problems in the supply chains. Now, when price inflation is accelerating, it becomes more difficult to deny that at least some of the changes in the price inflation are of monetary nature.

The empirical evidence of this matter is not clear. There are no strict empirical relationships between money supply and price inflation, especially in the short term. This raises important questions. To what extent monetary policy, in particular – the money supply, is responsible for the dynamics of prices in the economy? What is the negative side, if any, of low interest rates and higher pace of growth in the money supply? Is the possibility to finance huge public deficits through monetary policy a “free lunch”? Or are we all going to be eventually taxed by inflation? Current extraordinary circumstances in terms of monetary policy and price inflation is the time to revisit some of the basic economic relationships.

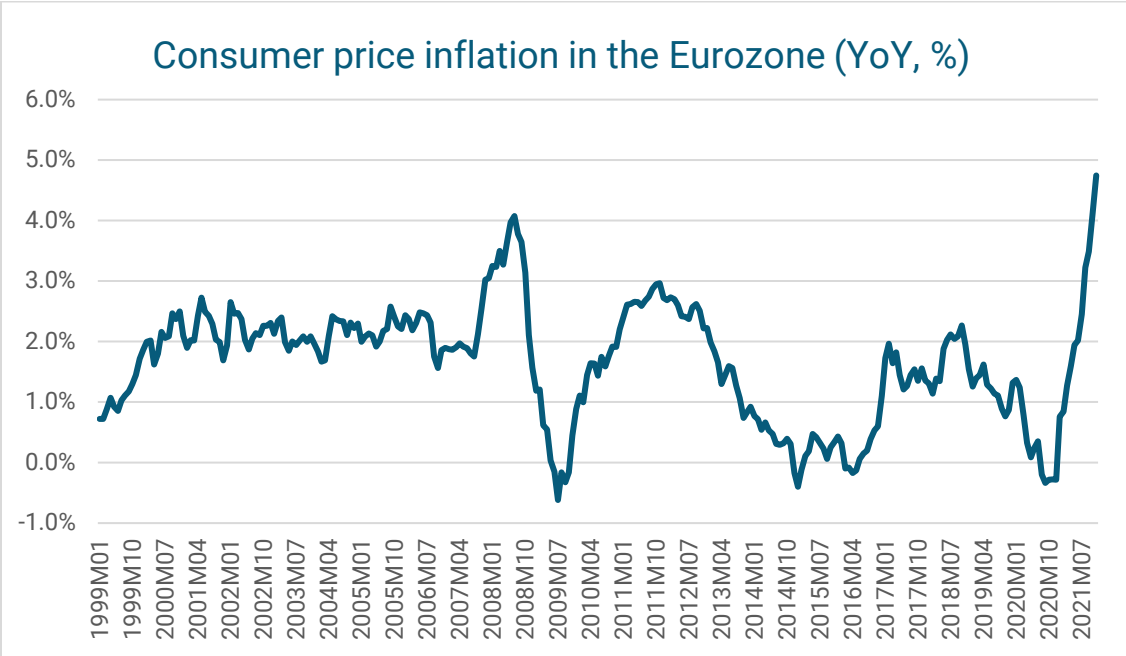
This paper will investigate the relationship between monetary policy and prices, or more specifically – the supply of money and consumer prices. At first, we will look at the empirical data on the money supply and consumer price inflation in the Eurozone. Then we will discuss two very different theoretical approaches to the analysis of the connection between money supply and prices. The first will be based on the quantity theory of money, and the second will be the subjectivist approach to the demand for money. The subjectivist approach, mostly developed by the Austrian school of economic thought, may suggest an explanation which supplements the quantity theory in reasoning about the connection between money supply and prices. Lastly, we will discuss the findings of the paper and will draw some conclusions.

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# 1. Money supply and price inflation in the Eurozone

Price inflation in the Eurozone has reached the highest level since the introduction of the Euro. In November of 2021, consumer prices were higher by 4.7 compared to the November of 2020. Price inflation is significantly higher than the 2% - the target that is set by the European central bank to represent price stability.<sup>1</sup>

Figure 1. Consumer price inflation in the Eurozone.



Source: Eurostat

Economic theory demonstrates that prices in the market can only change due to either shift in the supply or demand (or both). There have been plentiful discussions recently about the failures of the supply chains and the supply shortages due to covid and related reasons, which resulted in price increase for many goods. However, factors on the demand side are playing an important role as well.

Since the beginning of the pandemic, central banks all over the world have been executing exceedingly lax monetary policy, marked by interest rates at or close to zero and vast amounts of money and credit creation. Newly created money has been flowing from financial to the real markets of goods and services creating additional demand by governments, businesses and

<sup>1</sup> The ECB has defined price stability as a year-on-year increase in the Harmonised Index of Consumer Prices (HICP) for the euro area of below 2%. In the pursuit of price stability, the ECB aims at maintaining inflation rates below, but close to, 2% over the medium term. <https://www.ecb.europa.eu/mopo/intro/html/index.en.html>

households. Higher demand for goods and services, if not offset by the higher supply, inevitably translates into higher prices.

Over the last two years, the European central bank has increased the monetary base<sup>2</sup> by 94% (November 2021/November 2020). The monetary aggregate M1<sup>3</sup> has increased by 25% (October 2021/October 2020), M3<sup>4</sup> has increased by 18% (October 2021/October 2020). These are significant increases in different measures of the money supply during a relatively short period of time.

The relationship between money supply and prices is quite intuitive. If there is more money chasing goods and services produced in the economy, prices increase and value of money drops. However, an economist would say that prices in economy tend to grow slower than the increases in the supply of money. This is because the amount of goods and services produced in the economy and exchanged for money is growing too. If more money is chasing slightly higher amount of goods and services, then prices increase slightly less. Thus, growing economies absorb some of the inflation that the central banks produce. Some of it does not show up in prices or manifest itself in the erosion of money.

Over the last 20 years money supply in the eurozone grew between 200 and 400 percent depending on the measure of the money supply (Figure 2 below), whereas the economy in terms of real or price adjusted GDP only grew by 23 percent. Significantly faster pace of growth of money supply over the amount of goods and services created in the economy has led to the increase in the price level of 41%.

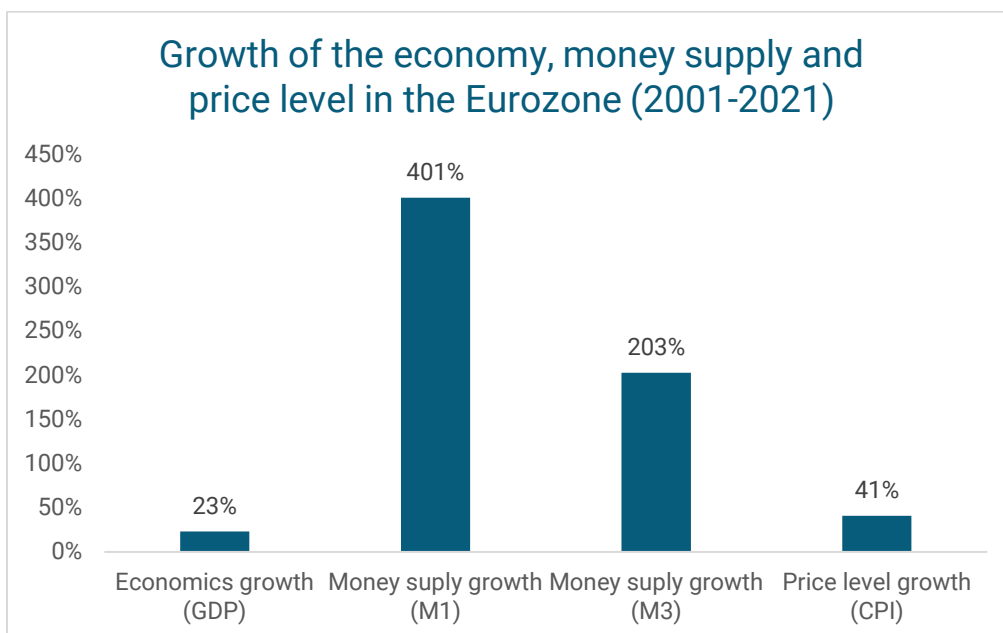
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<sup>2</sup> Currency (banknotes and coins) in circulation plus the minimum reserves credit institutions are required to hold with the Eurosystem and any excess reserves they may voluntarily hold in the Eurosystem's deposit facility, all of which are liabilities on the Eurosystem's balance sheet.

<sup>3</sup> A "narrow" monetary aggregate that comprises currency in circulation and overnight deposits.

<sup>4</sup> A "broad" monetary aggregate that comprises M1 plus deposits with an agreed maturity of up to two years and deposits redeemable at notice of up to three months, plus repurchase agreements, money market fund shares and units as well as debt securities with a maturity of up to two years.

**Figure 2. Growth in GDP, money supply and price level in the Eurozone.**



Source: Eurostat, ECB, own calculations

Thus, by looking at the long-term relationship between the money supply and price inflation in the Eurozone several observations can be drawn.

First, price inflation, measured by the consumer prices, is significantly lower than the growth in the money supply, measured in different definitions – monetary base, monetary aggregate M1 and monetary aggregate M3. Table 1 below shows that the average yearly growth rate of monetary base, M1 and M3 is respectively 14%, 9% and 6%. Average growth in consumer prices in this period is significantly lower – only 1.6%. This suggests that changes in the money supply do not translate into the proportional changes in the consumer prices.

**Table 1. Yearly average changes in the money supply and consumer prices in the Eurozone (1998-2021). Source: ECB, own calculations**

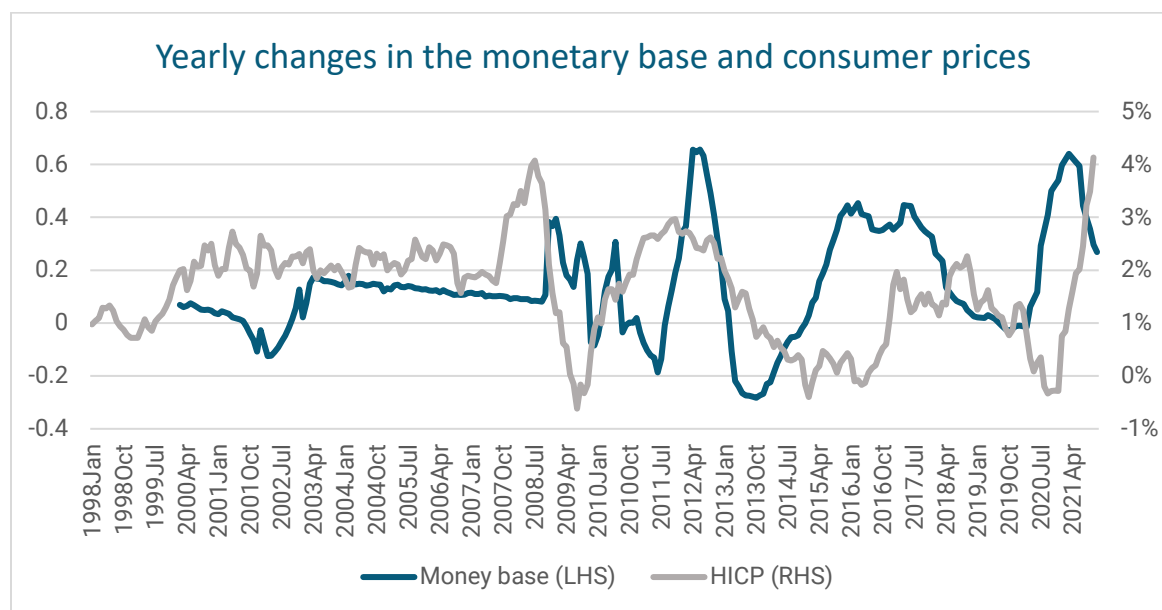
	Monetary base	M1	M3	HICP
Average growth	14%	9%	6%	1,6%
Average growth of HICP when money expansion is below average	1,8%	1,9%	2,6%	
Average growth of HICP when money expansion is above average	1,4%	1,3%	1,4%	

Second, there is no clear relationship between the changes in the money supply and consumer prices over time. This means that the faster growth in the money supply does not automatically translate into faster growth of prices. There is no clear connection between the monetary base

and consumer prices (see Figure 3 below). Figure 4 suggests that there might be a weak and negative relationship between the monetary aggregate M1 and consumer prices, which is counterintuitive. Figure 5 indicates that there might be a weak positive relationship between the monetary aggregate M3 and consumer prices.

Another important empirical point we can draw is that during periods when growth in the money supply is above average, consumer prices do not increase faster than during the periods of below the average growth in the money supply (see Table 1).

**Figure 3. Yearly changes in the monetary base and consumer prices. Source: ECB**



**Figure 4. Yearly changes in the monetary aggregate M1 and consumer prices. Source: ECB**

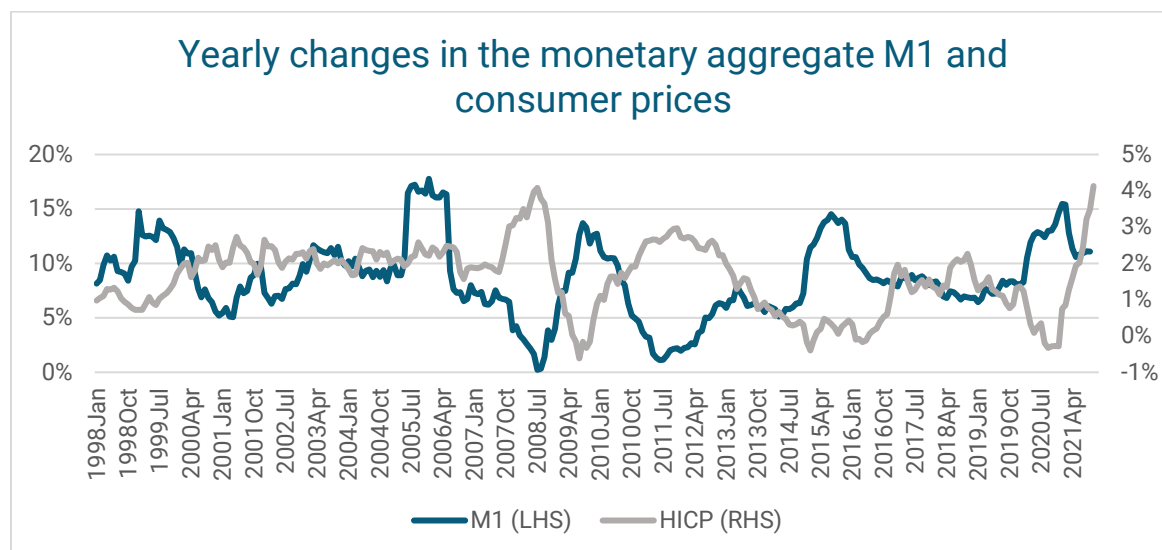
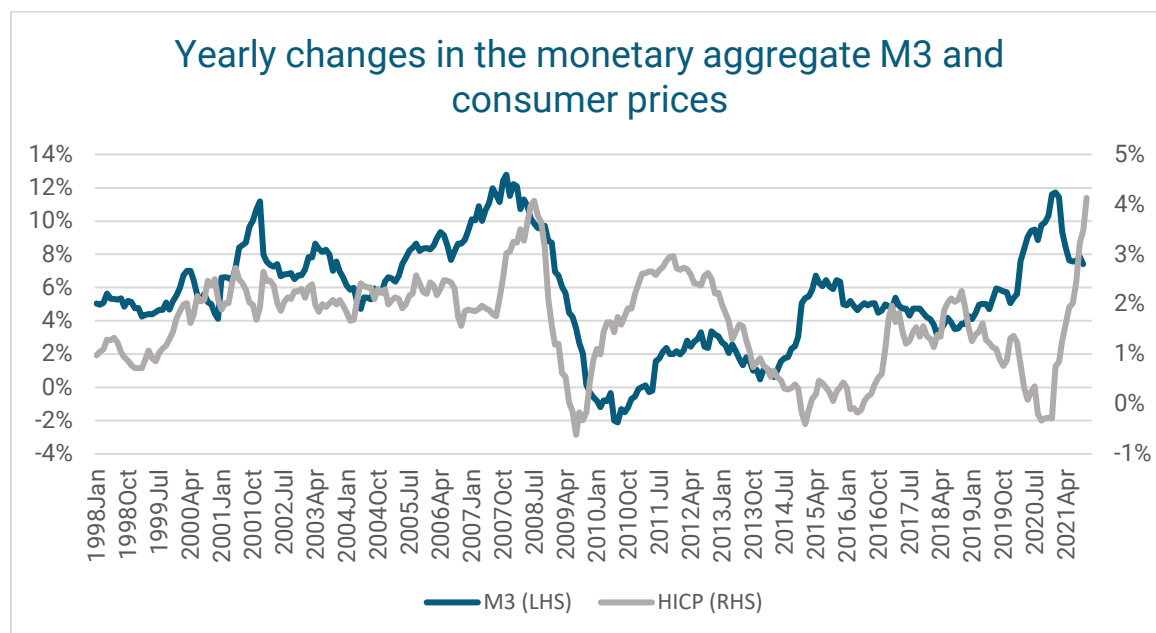




Figure 5. Yearly changes in the monetary aggregate M3 and consumer prices. Source: ECB



This short empirical investigation presents us with a conundrum. What is the nature of the relationship between prices and money supply (and monetary policy)? If it is true that in the long term the growth in the money supply causes prices to go up, how does this relationship work in the medium and short term? How do we explain the lack of empirical relationship between prices and money supply in the short term? Should central banks be wary of increasing the money supply too quickly, or are prices completely detached from the monetary policy?

In what follows we will aim to answer these questions by going through different theoretical approaches that analyze the relationship between prices and money supply. In the end, we will draw some conclusions.

## 2. Relation between money and prices according to the quantity theory of money

Modern monetary economics relies on the quantity theory of exchange in explaining purchasing power of money. Quantity theory is known from the classic elaborations by David Hume and David Ricardo. They attempted to explain the relationship between prices and the quantity of money based on the laws of supply and demand. Later the quantitative theory of money was more explicitly formulated by Fisher (1911) and restated by Friedman (1956).

Quantity theory of money is usually expressed with the famous Fisherian equation of exchange,  $MV = PY$ , where  $M$  is the quantity of money,  $V$  is money velocity (rate of circulation),  $Y$  is real output and  $P$  is the price level of this output.

In principle, the equation explains the relationship between the supply of money and the prices of goods and services in the following way: if we assume that  $V$  and  $Y$  (velocity of money and output) are constant, then an increase in  $M$  (money supply) necessarily leads to an increase in  $P$  (price level). In this quite simple and intuitive way, the equation offers an explanation of the relationship between the monetary side and the real side of the economy. The theory suggests that an increase in the quantity of money necessarily leads to an increase in prices, *ceteris paribus*, i.e., if other parts of the equation (e.g. the velocity of money) are held constant.

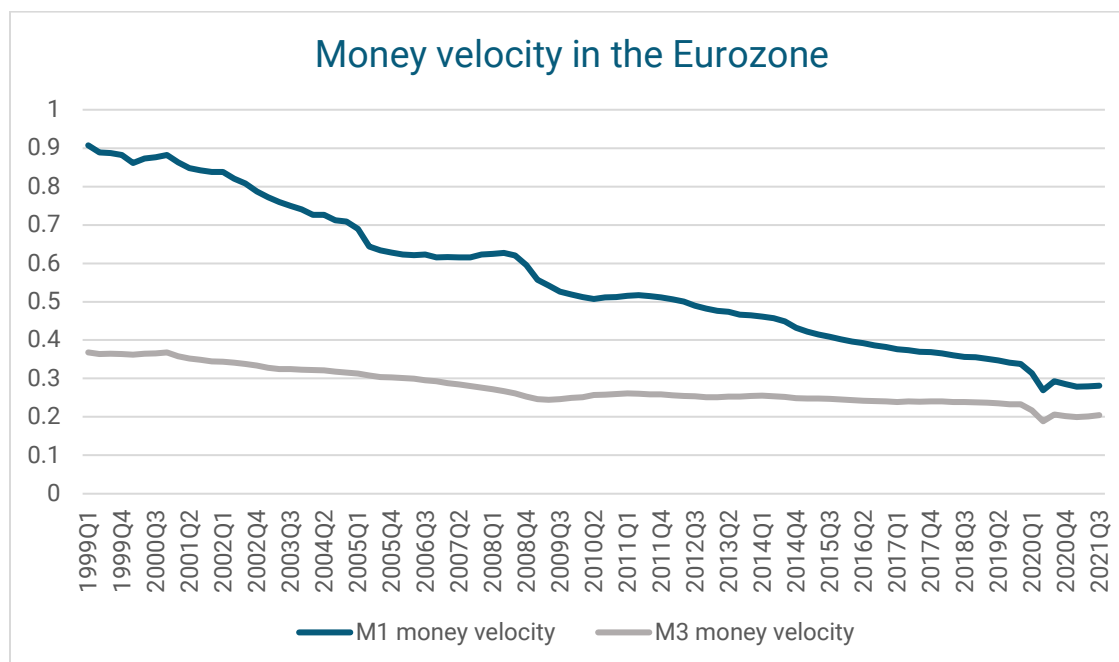
Friedman has famously expressed the quantity theory of money in its famous saying that "inflation is always and everywhere a monetary phenomenon." In the long run the price level will tend to be proportional to the supply of money, increases in the supply of money eventually turn to price inflation.

Granted the apparent simplicity and intuitiveness of the quantity theory of money it has an important problem connected to it.

The velocity of money is not a very clear and well-defined concept. In contrast to other variables of the equation, there is no way to independently arrive at  $V$ . In practice, velocity of money is calculated using other terms of the formula:  $PY/M$ . But then velocity of money simply becomes a factor which necessarily makes the equation  $M=PY/V$  empirically correct. Which suggests that the equation of exchange is simply an identity, an economic truism. It just says that the sum of money expenditures in a given period has to equal the sum of money incomes for that same period. And while this is necessarily true by definition (in any transaction the buyer's expenditure is necessarily equal to the seller's income), it has no real explanatory power on the relationship between supply of money and prices.

This problem makes the approach of quantity theory of money only partially useful in explaining the relationship between the supply of money and prices. It gives a rather simple and intuitive explanation that given the fixed velocity of money and fixed real output, higher supply of money must translate into higher prices. This explanation is useful for the analysis in principle or over the long periods of time. However, it does not extend itself to the analysis of the money and prices in the short run, or when the velocity of money and other factors in the economy change significantly. Since the equation of exchange assumes any velocity which would equilibrate the equation, it does not give a satisfactory explanation of what are reasons in the changes of money velocity. This means that in the short run increases in the supply of money lead to different changes depending on the velocity of money, which cannot be defined or observed independently and is simply derived from the other variables in the equation of exchange.

Figure 6. Money velocity in the Eurozone. Source: ECB, own calculations



The velocity of money in the Eurozone has been decreasing since the introduction of Euro (see Figure 6 above). Increases in the supply of money over time have had lesser impact on prices (if  $V$  in the equality  $MV = PY$  is decreasing, then increases in  $M$  will lead to lesser increase in  $P$ ). However, this analysis does not give a satisfactory explanation of why this is the case? What are the underlying causes of the changes in the velocity of money?

Moreover, if we look at the empirical relationship between money supply ( $M3$ ) and consumer prices (see Figure 5 above), it is not so clear that the nature of this relationship has really changed. For example, in 2021, the growth in the money supply has reached similar levels to those observed in 2007-2008 and it suggests that the current growth in prices will outpace the one experienced in 2007-2008. This suggests that there are more variables involved in the link between money and prices than it is suggested by the equation of exchange.

### 3. Subjectivist approach

#### 3.1. The subjective nature of the demand for money

In the traditional framework based on the quantity theory of money, the supply of money is essentially the key element through which central banks conduct monetary policy. Monetary policy-induced changes in the supply of money are part of the transmission mechanism of

monetary policy. Money supply is the factor which, in the long term, determines the price level in the economy.

This theory focuses on the supply of money, and it does not explicitly suggest a role for the subjective factors, which determine the demand for money. *“While such an analysis is not obviously incorrect, the attention the equation affords to past quantities, both of money and nominal transactions, obscures the real problem at hand regarding the value of and demand for the monetary unit.”* (Bagus & Howden, 2016, p. 110). This theory tends to overlook the subjectivist nature of the demand for money.

How is demand for money related to the relationship between the money supply and prices in the economy?

We can think of the demand for money as the total amount of money that people in the economy are willing to hold in their money balances at any point in time. The excess money that market participants are not willing to hold is then spent on goods or services. Thus, demand for money, or the amount of cash and other types of money that people choose to hold, determine the amount of money that people spend on non-monetary goods and services, and thus it influences the prices of these goods and services. If the amount of money that people want to hold decreases (lower demand for money), people will choose to spend their excess cash reserves on goods and services, this will increase the demand of these goods and services and their prices. So, what does the demand for money depend on?

Some economists, predominantly those in the Austrian school of economic thought, clearly identify that the demand and value of money is subjective and it stems from its ability to fulfil its functions in the market (medium of exchange, store of value, unit of account). Money as a good must have certain characteristics to be properly used as money. Classically, these are divisibility, fungibility (or universal want), durability, stability of value etc. In today's conditions of increased price inflation Euro is clearly still a medium of exchange and a unit of account. However, its function as a store of value is increasingly inhibited.

Mises in the *Theory of Money and Credit* and *Human Action* explained how prices and value of money can be explained using the same principles used to explain the prices and value of other goods in the economy. The price of money is its purchasing power and it emerges in the market as a *result* of the demand for and the supply of money (the so-called money relation). It is clear that according to Mises the demand for money is subjective. Catallactics can tell us about the advantages of holding money and factors which may influence the demand for money. But it can never be reduced to a specific function.

*The various actors make up their minds about what they believe the adequate height of their cash holding should be. They carry out their resolution by renouncing the purchase of commodities, securities, and interest-bearing claims, and by selling such assets or conversely by increasing their purchases. With money, things are not different from what they are with regard to all other goods and services. The demand for money is*

*determined by the conduct of people intent upon acquiring it for their cash holding.*  
(Mises, 1949/1998, p. 401)

The subjective demand for money is closely linked to the recognition that money is a good. Like any other good, money is demanded by the market participants for its valuable services. Hutt (1956) explains that money should not be considered unproductive or barren, as was claimed by many influential authors (e.g. Aristotle, Locke), who influenced modern thinkers. Keynes claimed, that by choosing to hold money for convenience and security market participants are foregoing the interest that could be earned by holding other assets which bring nothing “*in the shape of output*” (Keynes, 1936, p. 226). However, according to Hutt, money is productive in exactly the same sense as other goods in the economy. Money assets held provide valuable services, and thus they derive their value from their power to render these services. The amount of money, which market participants decide to hold, is determined by the marginal utility of its services.

The services that the owner receives from holding money are related to the uncertainty in the market economy. Rothbard (1962/2009) recognizes that the demand for money emerges from the uncertainty that economic agents face, “*Its [monies] uses are based precisely on the fact that the individual is not certain on what he will spend his money or of the precise time that he will spend it in the future.*” (p. 767) Although these uses are objective in the sense that every economic agent faces uncertainty, the demand of money is still subjective:

*Economists have attempted mechanically to reduce the demand for money to various sources. There is no such mechanical determination, however. Each individual decides for himself by his own standards his whole demand for cash balances, and we can only trace various influences which different catallactic events may have had on demand.*  
(Rothbard, 1962/2009, p. 768)

Horwitz (1990) applies subjectivist principles to the demand for money as well and criticizes “*neoclassical and Keynesian models that portray the only opportunity cost of money held as interest-bearing securities*” as over-simplified. His approach claims that the choice to hold money depends on the utility of the most valuable alternative forgone:

*When an actor is facing a decision to hold wealth in the form of money, she is deciding between a number of prospective utility streams. We can broadly categorize those streams as the utility from non-financial assets and the utility from both the availability and interest returns from non-money financial assets.* (Horwitz, 1990, p. 465)

For example, people today have many choices about the form in which to keep their surplus earnings, or savings. When price inflation in the Eurozone is increasing and the speed at which money loses its purchasing power increases, the relative utility stemming from holding savings in other non-monetary forms (e.g. real estate, precious metals, financial assets) – increases. This is especially true if there are additional sources of value in holding these assets (e.g. security, privacy, increases in value over time).

Most importantly, the demand for money is subjective, since only the chooser can determine the utility that this choice provides. Moreover, the cost of holding money is subjective because it is never objectively realized.

*What is given up in a choice is by definition what was not chosen, so the "measure" of that cost must necessarily be the expected utility of the sacrificed alternative. Such expectations can be definitively described only by the chooser." (Horwitz, 1990, p. 465)*

The subjectivity of the demand for money brings us back to the monetary policy. If the demand for money balances has an important subjective element to it, the demand for money can be influenced, but it is not mechanically determined by such factors as income, price level, supply of money, interest rate or others. Then central banks and monetary policy may influence the amount of money that people are willing to hold not just through the manipulation of the money supply and the interest rate. The subjectivist approach to the demand for money allows to recognize that the impact of central banks on money (and prices) may be much broader.

If we incorporate the subjective element in the demand for money, we can see that the impact of the increased money supply on the prices has many more dimensions to it than is suggested by the quantity theory of money. The impact of increased money supply on the prices will depend, simply put, on what households, companies and institutions, holding newly created money, will choose to do with the money. If the demand for money is increasing simultaneously with the growth in the money supply, this will negate at least some of the impact of increased money supply on the prices. In other words, since market participants will choose to hold and not spend new money on goods and services, the prices of goods and services will not be impacted or will be impacted less than if all new money was spent.

Another important suggestion of the subjectivist analysis of the demand of money is that since the impact of the increase in the money supply on the prices travels through subjective choices of market participants, this impact can have a significant lag. When central banks choose to increase the supply of money, the impact on prices at first can be minimal, since people may choose to increase their money balances. This is especially true in the circumstances of economic downturn when households and companies may want to have higher money balances as an insurance against uncertainty. However, once the need for higher money balances is no longer there, then market participants will choose to spend their money, and the impact on the prices of goods and services will come with a lag.

Moreover, subjectivist analysis recognizes that the trigger to spend money balances (and thus cause increase in prices) may come from factors which are not directly related to the actions of the central banks. Such events as instability of the financial system, or loss in the trust of the monetary system, may trigger a rapid response of market participants reducing their money balances and causing swift increase in prices. This can happen even without a more-than-usual increase in the supply of money. Examples of this in the context of Eurozone will be discussed in the discussion section below.

### 3.2. The quality of money

The subjective notion of the demand for money is substantiated in the discussion of the quality of money. This discussion gives us more insights into the elements of this demand, factors that can increase or decrease demand for money.

The theory of the quality of money maintains that the demand for money depends on the quality of money. Money's quality can be defined as *"the capacity of money, as perceived by actors, to fulfil all its main functions, namely to serve as a medium of exchange, as a store of wealth, and as an accounting unit"* (Bagus, 2009, pp. 22-23). The quality of money is one of the important factors, along with uncertainty, financial innovations (credit cards, ATM machines, MMMFs), frequency of payment, etc. that affect the reservation or cash-balance demand for money (Žukauskas & Hülsmann, 2019).

Money supply, according to this view, is just one of the factors of the quality of money. Existing total supply of money at any time does not matter in the sense that money can be used as a universal medium of exchange despite of the amount of monetary units available (lower amount just means lower price level). Money supply matters for the quality of money if we add the dimensions of time and changes in the supply of money. Changes in the supply of money influence the extent of the stability of purchasing power of money. However, there are a lot more factors or dimensions influencing the quality of money: *"As the purchasing power of money may change due only to a shift in the demand for money, the subjective valuation of money can change even with the expectation of a constant money supply."* (Bagus & Howden, 2016, p. 111)

The idea behind the quality of money is that central banks, through monetary policy, influence other (besides money supply) characteristics of money that are relevant for money users. Shift in these characteristics impact the quality and subjective value of money, and *"Changes in money's quality affect the demand for money and, consequently, its purchasing power."* Bagus (2015, p. 19).

According to Bagus (2015), there are objective qualities of "good" monetary systems. The quality of money is closely linked to the quality of a monetary regime, which can be defined as *"the capacity of a monetary system to provide an institutional framework for a good medium of exchange, store of wealth, and accounting unit."* (pp. 19-20)

According to Bagus (2015), the unit of account function is fulfilled by nearly all monetary systems equally well and it is impaired only in extreme situations. Thus, it is meaningful to concentrate on the characteristics of good medium of exchange and store of value.<sup>5</sup> The main requirements for money as a medium of exchange are low storage and transportation costs, easy handling, durability, divisibility, resistance to tarnish, homogeneity, and ease in recognition. However, *"These properties hardly change today as paper-based fiat standards have eased the physical*

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<sup>5</sup> According to Röpke (1954), money's functions often disappear in a certain order. First, money ceases to be a storage of wealth. Then, money uses its function as a unit of account. The last function that is lost in a hyperinflation is the function of medium of exchange.

*usability of the monetary unit, as well as the costs to provide it.*" (Bagus, 2015, p. 23) Another relevant property of a medium of exchange is the number of users, because more users imply more demand for the medium of exchange. *"As more people accept it in trade, the medium of exchange is more useful."* (Bagus, 2015, p. 23) Existence of ample non-monetary demand for the money as either a consumer good or a factor of production is yet another important characteristic for a medium of exchange. However, in fiat-money systems, where money is not redeemable, it does not have this property altogether.

One of its most important characteristics of money in the function of its store of value is the possibility of increases in its quantity. *"Different monetary regimes allow for different mechanisms to increase the quantity of money, thereby influencing money's quality. Thus, monetary systems may set strict and less strict limits for increases in the money supply."* (Bagus, 2015, p. 24) Stability of the financial system is also an important property of money and a factor of the store of value function of money.

*There are monetary regimes that are more prone to generate business cycles, over-indebtedness and illiquidity than other regimes. Business cycles, over-indebtedness and illiquidity may provoke interventions and bailouts on part of the government or monetary authorities. In the wake of the bailouts the quantity of money is often increased, or even the quality of the monetary system is diluted.* (Bagus, 2015, p. 24)

The independence of the monetary regime from the government and the restrictions set by the regime to eliminate or limit the manipulations by the government directed towards money is also important for money as a store of value. *"Interventions by the government often decrease the quality of money in its own favor by increases in money's quantity or through a deterioration in the reserves backing it."* (Bagus, 2015, p. 25)

To sum up, According to Bagus and Howden (2016, p. 113), the quality of money in its functions as a store of value and a medium of exchange can essentially change in five ways:

1. Evolution of quantity of money – supply of money in existence today and in the future;
2. Redemption ratio and changes in it (in the case of commodity money systems) – amount of and value of assets or other goods that back the currency (that money can be redeemed into);
3. Conditions and stability of the banking system – financially troubled, illiquid banking system increases risks of bail-outs, which may lead to higher quantity of money (if financed through debt monetization);
4. Organization of the monetary authority – which can mean:
  - a) Independence of the central bank (if central bank follows directives from the government this increases the risk of debt monetization to finance spending);
  - b) Accountability and transparency - if central bankers are accountable and responsible for their policies, and if there is transparency, this will improve the quality of money.



- c) Central bank's constitution, that is its philosophy or doctrine (e.g. objectives and mandate of central bank (price stability vs. ancillary aims of full employment, increasing asset prices, maintenance of a currency), size of the target of price inflation, rule-based monetary policy vs. targeting of asset prices,
  - d) Staff and decision makers at the central bank, that influence monetary policy primarily through building consensus.
5. Quality of the central bank's balance sheet – the quality of reserves and assets that money is backed by in the balance sheet of central bank determines central bank's ability to retain and defend value of currency in the future.

Therefore, if we include the notion of the quality of money into our analysis, we can understand how the purchasing power of money can vary with a constant money stock, namely, when the perceived quality of money changes. The quality of money affects the purchasing power of money by first altering the demand for money, which reflects the changed valuation of a fixed quantity of money on each person's value scales. When the quality of money improves, the demand for money and, consequently, money's purchasing power will be higher than without this quality improvement. If subjective valuation of money falls, people will reduce their cash balances and prices will increase. Subjectivity of valuation and demand for money also means that changes in the perceived quality of money can be very abrupt (which would lead to a strong and quick change in the purchasing power of money), whereas changes in the quantity of money are usually gradual.

## 4. Discussion

In this paper we have looked at some of the empirical evidence concerning the connection between money supply and consumer prices in the Eurozone. The evidence about the link is either inconclusive in the sense that there is no strong empirical connection between the money supply and price inflation.

This proposes a theoretical conundrum about the nature of the relationship between money supply and prices. The quantity theory of money, which postulates a rather mechanical relationship between money supply and prices, can hardly account for the empirical evidence. The only way to explain it within this theoretical context is to claim, that the relationship between the money supply and prices works in the long run and may be impacted by other factors (e.g., lags, changes in the velocity of money) in the short run. This may be convincing to some, as economists are very used to distinguishing relationships in the long and short terms. However, this does not exactly give a lot of plausibility and consistency for the quantity theory of money. If it does not prove it wrong, at least it makes it unusable for the short-term analysis.

The subjectivist approach to the demand for money offers an answer to this conundrum. The approach suggests that prices of goods or services depend on the willingness of people to hold

money in their reserves. The demand for money is subjective, it depends on many factors that market participants hold important, e.g., the purchasing power of money, the stability of the financial system, the extent to which central banks convincingly present themselves as institutions that are responsible for stable and strong money. Money supply is one of the factors in the demand for money, but it can easily be countered by other subjective factors. If money supply is increasing, and people are willing to hold higher reserves of money, the impact on prices will be minimal. On the other hand, if people lose faith in money and become willing to reduce their money balances rapidly, the impact on prices will be swift and radical, even without big recent changes in the monetary policy.

The usefulness of the approach is showing the subjective nature of the relationship between monetary policy and prices. It gives an opportunity to reason about factors which lead people to have trust in money and hold particular amounts of money. It shows the possibility of swift changes, which are common when we talk about notions of trust, it explains the possibility and mechanism of run-away inflations. Subjectivist approach accepts the realistic motives of money holders. It may be a one step closer to a less mechanical analysis when it comes to the relationship between money and prices.

However, the downside of this approach is that it can never give a particular formula or quantitative relationship between the properties of money and monetary policy on the one hand, and the demand for money and prices, on the other hand. It can suggest important subjective factors, but the list can never be exhaustive. The important point of the subjectivist approach is that the absence of fixed quantitative relationship between money supply and prices in the empirical data does not prove that monetary policy is not responsible for changes in prices. The relationship may still stand, it just has to be supplemented by other subjective factors, which work simultaneously.

Let us focus on the Eurozone and see how different factors of monetary policy in the last 20 years and more recently may have impacted the quality and the demand for money. This discussion is by no means exhaustive and thorough. However, it offers new dimensions to the analysis of the connection between ECB and its monetary policy on the one hand and prices - on the other. Using this approach, we can reason about a broader array of factors beyond the quantity of money through which ECB and its policies influence the quality and demand for money, and in turn - prices in the Eurozone.

Factors of a qualitative nature impact the extent to which people trust money and the stability of its future purchasing price. One example of this is the communication and assurances about the future monetary policy by the managers of the central banks. Back in 2008, when the fall of the global financial services firm Lehman Brothers Holdings Inc. marked the beginning of the global financial crisis, Europe turned into an economic and sovereign debt crisis. The situation worsened in the second half of 2011, when financial markets started panicking due to the sovereign debt crisis in some of the Euro countries, primarily Greece. The stability of the financial system declined, bond yields of weak euro-member governments were soaring. This was the catalyst for

ECB president Mario Draghi to give his famous speech, in which he said that *“Within our mandate, the ECB is ready to do whatever it takes to preserve the euro”*. This speech was an important assurance to the markets which was successful in stabilizing the financial system and bringing back the trust in the stability of Euro, which in turn means the stabilization of the purchasing power of Euro.

The dimensions of the quality of money discussed above allow for another insight which is related to the long-term shift in ECB’s monetary policy. The instruments through which ECB conducts monetary policy have changed significantly over its 20 years of existence. The monetary authority officially has terminated only few of the instruments of monetary policy. However, the shift happened by the introduction of new instruments which have crowded-out the old ones. As was analyzed by Žukauskas (2020), monetary policy based on short-term lending through marginal refinancing, which represents conventional monetary policy, where replaced by longer-term lending through longer-term refinancing operations by 2007, which were eventually replaced by asset purchase programs by 2015. In March of 2020, the ECB introduced emergency asset purchase program similar to its predecessors as a response to the coronavirus (COVID-19) outbreak.

Importantly, the introduction of unconventional monetary policy instruments has changed some of the restrictions on the actions of the ECB that were present in conventional instruments (e.g. Žukauskas (2020)). There has been an increase in the discretion of the central bank, allowing for more direct targeting of particular markets of financial assets and even countries. Moreover, with unconventional monetary instruments came the big expansion of the type of securities that the central bank purchases, there was an increase in the maturity of these instruments. Lastly, programs of non-conventional instruments became significantly higher in scale; they have caused more rapid expansion of the balance sheet of the central bank. All these changes alleviated the ECB from the restrictions it had when it relied on conventional instruments of monetary policy. These changes may be seen as useful for those who conduct monetary policy, but at the same time, they may be seen as reducing the quality of money by those who are concerned about the powers of central banks and their even less restricted ability to produce currency without limitations.

Another dimension in the quality of money is the independence of the central bank, which is traditionally understood as important in reducing the risk of central banks accommodating political aims and monetizing public debt by issuing new money. A recent working paper by ECB contended that climate change should concern monetary authorities because *“temperature plays a non-negligible role in driving medium-term price developments”* (Faccia, Parker, & Stracca, 2021, p. 1). The emergence of climate discussion on the radar of ECB is alarming from the point of view of political independence of monetary authority which is important as a safeguard of long-term stability of money and its purchasing power. There is no limit to the factors including and beyond the climate change that may impact prices in the economy, and if this warrants future

monetary actions and interventions, there is a great risk that the long-term stability of money as the primary purpose of ECB may be compromised.

Lastly, in the analysis of the connection between money and prices the subjectivist approach invites to discuss broader implications of monetary policy on the economy. Fiat money is not backed by and cannot be redeemed for particular goods as in the systems of commodity money. However, fiat money derives its purchasing power from the ability to purchase goods and services produced in the economy. Thus, the impact of monetary policy on the productivity of economy matters for the value and purchasing power of money in the long term.

Low nominal and negative real interest rates impair the process of capital allocation in the economy. Interest rates play an important role of steering scarce capital to its most productive uses. The ability to borrow with negative interest rates which are artificially manufactured by the monetary policy means that investments which are eligible in such environment do not have to produce economic value. This essentially means misallocation of capital and loss in the productivity of the economy. The ability to borrow with negative interest rates also creates perverse incentives for public sector and its spending. The internal incentive to scrutinize the functions and spending of the public sector greatly diminishes when accommodated by the monetary authority it can raise funds at ease and with no interest.

# CONCLUSIONS

- The growth in the money supply in the Eurozone has accelerated since the pandemic and has caused concerns about the impact of monetary policy on the prices of goods and services. Consumer prices are increasing significantly faster than the 2 percent target.
- The quantity theory of money proposes an intuitive and simple explanation about the link between monetary policy (particularly – money supply) and prices. However, quantitative approach is problematic in analyzing the link between money and prices in the short run, or when the velocity of money and other factors in the economy may change significantly.
- The subjectivist approach to the relationship between money and prices suggests that prices of goods or services depend on the willingness of people to hold money. The demand for money is subjective, it depends on many factors that market participants hold important, e.g. the purchasing power of money, the stability of the financial system, the extent to which central banks convincingly present themselves as institutions that are responsible for stable and strong money. Money supply is one of the factors in the demand for money, but it can easily be countered by other factors.
- If money supply is increasing, and people are willing to hold higher reserves of money, the impact on prices will be minimal. On the other hand, if people lose faith in money and become willing to reduce their money balances rapidly, the impact on prices will be swift and radical, even without big recent changes in the monetary policy. The important point of the subjectivist approach is that the absence of fixed quantitative relationship between money supply and prices in the empirical data does not prove that monetary policy is not responsible for changes in prices.
- The long-term shift of ECB's monetary policy from conventional to unconventional instruments has alleviated the ECB from some of the restrictions it had when it relied on conventional instruments. These changes are concerning in the sense of increased power of the central bank and its less restricted ability to produce currency without limitations.

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