Review of Political Economy

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/crpe20

Shaikh's Theory of Inflation: Empirical Evidence from European Countries (2001–20)

Oktay Ozden & Hakki Kutay Bolkol

REVIEW OF POLITICAL ECONOMY
https://doi.org/10.1080/09538259.2023.2196938

Shaikh's Theory of Inflation: Empirical Evidence from European Countries (2001–20)

Oktay Ozden [a] and Hakki Kutay Bolkol [b]

[a]Istanbul 29 Mayis University, Istanbul, Türkiye; [b]Marmara University, Istanbul, Türkiye

ABSTRACT
Anwar Shaikh has proposed the classical theory of inflation in his recent book *Capitalism, Competition, Conflict, Crisis*. Even though it is a relevant and well-founded heterodox theory, the empirical literature on the subject is scanty. In this article, we empirically evaluate the explanatory capabilities of Shaikh's theory of inflation for the case of Europe. We constructed GMM and Fixed Effects models for the panel of 23 European countries over the period 2001–20. The overall results demonstrated that Shaikh's classical theory of inflation generated empirically successful results in explaining the supply dynamics of European inflation, while it produced no statistically significant effect on the demand dynamics of inflation due to the European inflation level, as expected.

ARTICLE HISTORY
Received 19 July 2022
Accepted 25 March 2023

KEYWORDS
Anwar Shaikh; classical theory of inflation; endogenous money; GMM

JEL
CODES: E11; E12; E31; E41; E51; N14

1. Introduction

Shaikh, Maniatis, and Petralias (1999) proposed a throughput limit, which is subsequently called the rate of growth utilization, to explain inflation. It depends on the idea that the maximum sustainable rate of growth for the system is the rate of profit. While the actual rate of growth is getting close to the throughput limit, the economy becomes more inflation-prone (Shaikh, Maniatis, and Petralias 1999, p. 99). Handfas (2012) enhanced the idea within the framework of monetary endogeneity and suggested a demand-pull and supply-resistance model of inflation. Then, Shaikh (2016) improved the classical theory of inflation by adding demand dynamics. He proposed the recent version of the classical theory of inflation in which newly created purchasing power is a variable that controls the demand side of inflation while the rate of growth utilization and net profitability are two other variables, which control the supply side of inflation. Shaikh also provided Handfas' empirical evidence of the classical theory of inflation for ten countries, seven OECD countries (Canada, Germany, France, Japan, South Korea, the United Kingdom, and, the United States) and three developing ones (Mexico, Brazil, and South Africa). The results of the ARDL model are promising. The long-run results are statistically significant in all OECD countries, but there are weak results for developing countries due to the small sample size (p. 712). More recently, Barredo-Zuriarrain (2022) analyzed hyperinflation in Venezuela by using Shaikh's

CONTACT Oktay Ozden oozden@29mayis.edu.tr

classical theory of inflation. He highlighted how money creation plays an essential role in the demand-pull and the system's limitations, which is called the growth utilization rate. The findings demonstrated that the deficit monetization of the Public Oil Company 'PDVSA' is one of the factors behind the hyperinflation in Venezuela.

There is vast empirical literature about inflation dynamics for European economies. In the last two decades, researchers have generated a lot of empirical studies on the inflation dynamics of the Euro area. Empirical studies related to Euro areas are clustered mainly in three groups. The first group is about the reconstruction of the Phillips curve depending upon the characteristics of the European economies. It is a widely accepted phenomenon that European economies have strong labor organizations. This leads to the assumption of labor market rigidities in articles regarding European economies. One of the most cited studies on European inflation was conducted by Galı, Gertler, and Lopez-Salido (2001) provided evidence for the marginal cost-based Phillips Curve, subsequently called New Keynesian Phillips Curve (NKPc), for Europe between 1970 and 1998. NKPc depends on the assumption of labor market rigidities. Thus, real unit labor cost is a proxy for marginal cost. It is a labor share obtained by the ratio of compensation to employees to GDP. In the literature, the hybrid versions of NKPc emerged while studies on NKPc expanded. Paloviita (2006) implemented the NKPc and its hybrid specification for the Eurozone between 1977 and 2003. The findings suggested that NKPc can be used, but if non-rationalities in expectations are assumed, the hybrid model is more accurate. In the hybrid model, labor income share is used as a proxy for real marginal cost. Mazumder (2018) investigated the core inflation in the Euro area. The findings suggested that the explanatory power of the Phillips Curve with direct measures of inflation expectations from expert predictions is higher than the traditional Phillips curve covered by adaptive expectations. They also highlighted that short-term forecast in the Phillips Curve is important for European countries even if the literature suggests long-term forecast in the Phillips Curve. Moreover, they put forward evidence that 2 per cent anchor of ECB's inflation has become weak in recent years.

The second group concentrated on determinants of inflation. Golinelli and Orsi (2002) evaluated the inflation process in the transitory economies (Czechia, Hungary, and Poland). The results showed that the exchange rate is the core long-term variable affecting domestic prices. Inflation is also significantly influenced by demand-side pressure measured in terms of the output gap. Arratibel, Rodriguez-Palenzuela, and Thimann (2002) examined inflation dynamics in the EU-accession countries and found evidence of dual inflation covered by tradable and non-tradable commodities. The results suggest that international factors have an impact on inflation in tradable commodities while inflation in non-tradable commodities is determined strongly by domestic factors. Moreover, the effects of exchange rate regimes appear very differently over tradable and non-tradable commodities, and Balassa-Samuelson effect on inflation is negligible. Vašíček (2011) explained inflation dynamics for four central European economies (Czechia, Hungary, Poland, and Slovakia). The results demonstrated that inflation in those countries is driven mainly by external factors and the real marginal cost-based NKPc performs poorly. They intuitively explain the reason for higher inflation and that inflation persistence may be adaptive instead of rational price-setting behavior of domestic firms. Globan, Arčabić, and Sorić (2014) examined the domestic and external determinants of inflation for eight new EU member states (Bulgaria, Croatia, the Czech Republic, Hungary, Latvia, Lithuania, Poland, and Romania). The findings indicated that the inflation dynamics of those economies are mainly determined by foreign shocks in the medium run while domestic shocks influence inflation dynamics in the short run. After the Global Financial crisis, foreign components of inflation have weakened even if it varies from country to country. Abdih, Lin, and Paret (2018, p. 15–17) stated that the reasons behind the stickier inflation in the Euro area are slower wage growth and global reasons like falling energy prices. Boranova et al. (2021) investigated the effect of growing wages on core inflation for 27 European economies between 1995 and 2019. The results showed the positive impact of wage growth on inflation. However, the impact has weakened since the 2008 Financial Crisis. The financial crisis is a turning point for European economies. Especially after 2012, the Euro area passes through excessive disinflation. The reasons behind the disinflationary process may be classified as internal and external ones. Weak domestic demand is the main internal reason while falling energy and food prices are particular external factors (Constancio 2015, p. 456–460)

Within the second group, some studies evaluated the link between inflation and other factors such as monetary regime, inflation persistence, inflation uncertainty, perceptions, expectations, etc. For instance, Altissimo et al. (2006) used aggregate data and sectoral data separately and showed that inflation persistence seems very high at the aggregate level, but it appears weak in sectoral data mainly due to the effect of the transitory sectoral shocks. Baxa, Plašil, and Vašíček (2015) found that inflation targeting does not directly trigger changes in the inflation process for three central European countries (Czechia, Hungary, and Poland), which adopted inflation targeting. They found a heterogeneous effect that only Czechia reduced intrinsic inflation persistence. On the other hand, researchers developed models to understand inflation perceptions and expectations. For example, Döpke et al. (2008) investigated the validity of Carroll's sticky information model of inflation expectations in major European countries (France, Germany, Italy, and the United Kingdom). The findings showed that European households slowly adjust their information to the new information on average in twelve to eighteen months. Lein and Maag (2011) investigated the formation of household perceptions about the price level. They found inefficient and heterogenous inflation perceptions. The findings also revealed that households' inflation perceptions are sluggish to respond. They are less responsive to new information than inflation expectations. Fountas, Ioannidis, and Karanasos (2004) investigated the relationship between inflation and inflation uncertainty in European countries between 1960 between 1999. The findings demonstrated that inflation significantly increases inflation uncertainty in European countries except for Germany. In all countries except for the U.K., inflation uncertainty does not lead to a negative output effect.

The third group concentrates on subjects such as inflation differentials and convergence among European economies. Studies show that there is no pure convergence among European economies. For instance, Rogers (2001) presented evidence of price level convergence among European countries, especially for tradable commodities, and showed that prices between 1990 and 1999 became less dispersed. Busetti et al. (2006) analyzed the convergence properties of inflation rates among the members of the European Monetary Union between 1980 and 2004. They demonstrated the validity of the convergence hypothesis between 1980 and 1997. However, they found evidence of diverging behaviors in the sample when the period begins with the birth of the euro. Economies form two main clusters: a lower inflation group that includes France, Germany, Belgium, Austria, and Finland, and a higher inflation group that comprises Spain, the Netherlands, Portugal, Greece, and Ireland. Italy stands in between the two groups. Egert (2007) evaluated inflation differences among EU-27 countries and found weak and negligible evidence for the Balassa-Samuelson effect in the transition economies because they have different economic structures compared with old EU members. These differences lead to different rates of inflation. Egert also suggested that inflation persistence and cyclical effect measured by output gap and unit labor cost are particularly significant determinants of rates of inflation in both transition economies and old members of the European Union. Horvath and Koprnická (2008) explained the determinants of inflation differences among new EU members between 1997 and 2007. The results demonstrated that appreciation in the exchange rate and rising price level are related to the narrower inflation difference compared to the Euro area. However, a positive output gap and fiscal deficit appear to contribute to the growing inflation difference. Moreover, price level convergence has an impact on inflation differences, but, they stated that real convergence factors are more important than cyclical variation. Stylianou (2022) examined the main factors behind inflation differentials in the Euro area between 1999 and 2018. They found three main structural breaks in 2004, 2008, and in 2010. The results suggested that inflation differentials may decrease and become less persistent if productivity growth increases and if the real effective exchange rates decrease and become less heterogeneous among members of the Economic and Monetary Union.

Some studies focused on the relationship between inflation and productivity growth while explaining the issue of convergence. Tsionas (2003) empirically analyzed the relationship between inflation and productivity for 15 European economies between 1960 and 1997. The results revealed that there is no long-run cointegration between variables. Besides, the findings do not support the idea that nominal convergence in terms of rates of inflation has a real impact on productivity. Christopoulos and Tsionas (2005) evaluated the link between inflation and productivity growth in 15 European economies between 1961 and 1999. Empirical results support the real convergence in the Euro area, especially convergence to 2 per cent European inflation is a base to trigger real economic convergence among members of the European Union. They found unidirectional causality from inflation to productivity growth in the long run.

The classical theory of inflation is a recent heterodox inflation theory, which is relevant and well-founded, but the empirical literature on the subject is not sufficient. Thus, more empirical work is needed. Therefore, the aim of this paper is to empirically evaluate the explanatory capabilities of Shaikh’s theory of inflation in the European case between 2001 and 2020. Europe has its own characteristics. In the empirical studies, researchers used proxies for labor cost and particularly emphasized labor market rigidities. Therefore, we also try to modify the classical theory of inflation in order to improve its capabilities in the case of Europe.

The remaining part of our paper consists of five sections. Section Two introduces Shaikh’s classical theory of inflation. In Sections Three to Six, we respectively present data, theoretical construction for Europe, methodology, and empirical findings. Lastly, in Section Seven, we conclude our paper.

2. Shaikh's Classical Theory of Inflation

The early development of Shaikh's classical theory of inflation in his 1999 paper concentrates on the relationship between the rate of profit and inflation. In the economy, the rate of profit is the maximum sustainable rate of growth for the system. The maximum sustainable rate of growth was first called the 'throughput limit' by Shaikh, Maniatis, and Petralias (1999). The main idea behind the throughput limit is that a demand policy, aiming to reduce the rate of unemployment, accelerates the actual rate of growth, but the level of growth is constrained by the throughput limit. That is to say, if for any reason the gap between the throughput limit and the actual growth rate is narrowed, there will be a decrease in the possibility of output growth. Then, it pressures prices, and the economy will become inflation-prone (p. 99). The idea of throughput limit enables us to explain the supply dynamics of inflation. Shaikh subsequently renamed the throughput limit 'growth utilization rate.' r'. The rate of growth utilization (RGU)[1] is derived from investment expenditures divided by aggregate profits. It is simply investment profit ratio ($r' = I/P$). This is a substitute for the rate of capacity utilization and also the rate of employment (Shaikh 2016, p. 695). It depends upon the capitalist decision on how much money out of profit will be reinvested. Thus, this decision precisely determines the level of employment and level of capacity utilization.

Shaikh's theory has similar characteristics to the theory of Dumenil and Levy (1999) that price movements depend upon the position of the actual capacity utilization rate compared with the normal rate of capacity utilization. So, the variation of price responds to the deviation of the rate of capacity utilization from the capacity utilization rate targeted by enterprises[2] (p. 689). Both models assume that labor is not a constraint; there is an unemployment pool in the system. Therefore, the wage rate is fixed. According to Dumenil and Levy (1999, p. 704), an increase in the real wage rate causes larger capacity utilization and consequently a larger profit rate and investment in the short run. However, a larger rate of real wage does not influence capacity utilization in the long run because it is assumed that capacity utilization remains at a normal level in the long run. The rate of profit and growth is smaller if capacity utilization reached its target value. On the other hand, Shaikh does not distinguish the time period into the short run and long run. In his theory, a larger rate of real wage directly influences the rate of growth utilization because it reduces profit share and consequently private investment, which is the engine of growth. Moreover, a larger wage rate is related to the pool of unemployment. If the unemployment pool shrinks while the government conducts stimulus policies, the result is a higher wage rate. Consequently, Dumenil and Levy assumed that the actual rate of capacity utilization reaches a normal level in long run. However, there is no guarantee or notion that the actual rate of growth utilization reaches the maximum rate of growth without stimulus policy possibly conducted by the government in the theory of Shaikh.

Shaikh rewrites the RGU (r') in terms of 1 minus the RGU ($1 - r'$) in order to make a parallel with the Phillips Curve. This is a rate of unutilized growth capacity, which also means unemployment.

[1]It is different from standart rate of profit, $r = P/K$, which is aggregate profits divided by value of capital.

[2]Capacity utilization rate is targeted by enterprises because demand is jerky. So, they need large production capacity in order to keep their capabilities to meet demand and supply shocks.

Furthermore, Shaikh defined net profitability, which is also called net real incremental rate of profit, $rr_I^{'}$. It is calculated by a change in current real gross profit, ΔPGR_t, minus interest rate, i, times the real gross investment of the previous year, IGR_{t-1}, divided by the real gross investment of the previous year, IGR_{t-1} (p. 696).

$$rr_I^{'} \approx \frac{\Delta PGR_t - i\ .\ \ IGR_{t-1}}{IGR_{t-1}} \tag{1}$$

An increase in the net real incremental rate of profit motivates capitalists to increase their production. This creates pressure on the prices to fall while production increases. So, it is a kind of correction term to the rate of growth utilization. Consequently, the net real incremental rate of profit and RGU are supply-side determinants of Shaikh's theory of inflation.

On the demand side of inflation, the endogenous money framework is required to be considered because credit is the essence of purchasing power (pp). Credit money is the general form of money in the modern fiat money system. It is approximately equivalent to more than 92 per cent of the total money supply in a modern economy. Banks endogenously create credit when agents demand it (Moore 1983, 1988; Lavoie 1984; Graziani 1989, 2003; Pollin 1991; Palley 1994). According to Shaikh (2016), in the fiat money system, a change in purchasing power is derived from a change in foreign and domestic sources of credit plus the current account deficit (or surplus) of the external sector.

$$\Delta PP = \Delta Credit_D + \Delta Credit_F + CA \tag{2}$$

An important point here, the fiat money system provides technically limitless creation of public and private money. Newly created purchasing power causes additional production, undesired depletion in inventories, a backlog of orders and deliveries, and also a rise in prices. Therefore, we need to note that growth rate of nominal output $g_Y \equiv \Delta Y/Y_{-1}$ is a function of new purchasing power. It is consistent with both the Keynesian and Monetarist approaches (p. 698).

$$g_Y = f(pp) \tag{3}$$

Actual output growth is influenced positively by newly created purchasing power and net profitability; and negatively by the growth utilization rate (p. 702). These are denoted in the fourth equation below. The interaction between variables is exactly nonlinear because there is no guarantee of a linear increase in actual output while the level of newly generated purchasing power rises.

$$g_{YR} = f(\underbrace{pp}_{+}, \underbrace{rr_I^{'}}_{+}, \underbrace{r'}_{-}) \tag{4}$$

The difference between the growth rates of the nominal output and the real output is nothing but the rate of inflation, by definition.

$$\pi = g_Y - g_{YR} \tag{5}$$

Therefore, the substitution of the third and fourth equation into the fifth one provides the classical theory of inflation in which the fiat money inflation is influenced; positively by purchasing power, pp, because some portion of purchasing power may not be absorbed by the current supply, negatively by net profitability, $rr_I^{'}$, since it increases the growth of real output, and positively by the rate of growth utilization, r' because it limits the growth of real output (p. 702). In function (6), the first variable represents the pull of purchasing power. The second variable indicates the difference between the rate of return on investment and the interest rate. The last one represents the tightness of the economy measured by the RGU rather than the employment rate or capacity utilization. In this function, both the demand and supply sides are controlled. The first variable controls the demand dynamics of inflation, while others control the supply dynamics of inflation.

$$\pi = f(\underbrace{pp}_{+}, \underbrace{rr_I^{'}}_{-}, \underbrace{r'}_{+}) \tag{6}$$

In function (6), the last term is equivalent to the rate of employment. If we rewrite the RGU in terms of 1 minus the RGU, we obtain a rate of unutilized growth (RUG), which is equivalent to the rate of unemployment. Now, we have a Phillips-type inflation curve in terms of $(1 - r^{'})$. As in the standard Phillips Curve, the rate of inflation declines in the case of a growing rate of unutilized capacity $(1 - r^{'})$, when all other things are fixed. Therefore, the remaining terms may appear as potential shift factors (p. 703).

$$\pi = f(\underbrace{pp}_{+}, \underbrace{rr_I^{'}}_{-}, \underbrace{(1 - r')}_{-}) \tag{7}$$

There may be at least three types of scenarios, as shown in Figure 1, in which the rate of inflation (π) is on the y-axis, and the rate of unemployment (υ) is on the x-axis. The first scenario illustrated in (a) represents what we call an effective stimulus policy. In this case, we assume that the actual RGU is not close to the maximum RGU. This means that economy has a growth potential. If state announces a new stimulus plan, it increases purchasing power, and thus accelerates aggregate demand. Therefore, the Phillips-type inflation curve $(1 - r^{'})$ shifts to the right (Pc_1 to Pc_2) at initial. Then, it shifts back (Pc_2 to Pc_3) because supply dynamics absorbs a significant portion of newly created purchasing power. That is to say, the second term is strictly increased. So, the effect of net profitability offsets the effect of purchasing power pulled by the stimulus. Consequently,

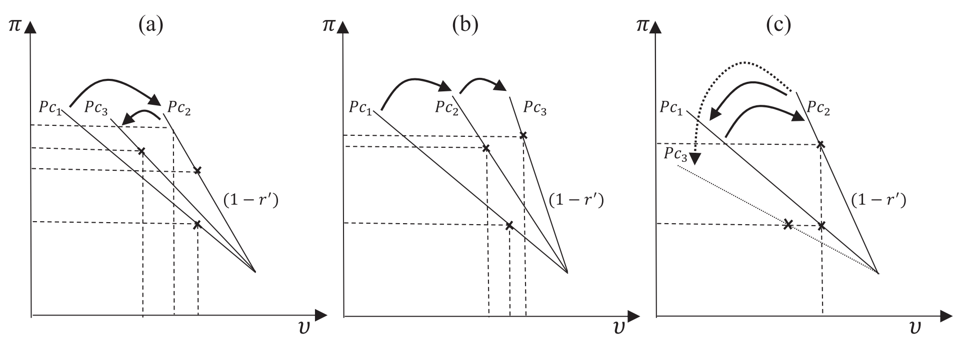

Figure 1. Stimulus Policy under three different assumption.

Note: π is the rate of inflation and υ is the rate of unemployment.

a stimulus policy was achieved to reduce the rate of unemployment with a small variation in the rate of inflation.

The second scenario shown in (b) represents what we call an ineffective stimulus policy due to the assumption that the actual RGU is close to the maximum RGU. This assumption means that the economy is tight and growth potential is weak. In this turn, if the state implements stimulus policies, the Phillips-type inflation curve $(1 - r^{'})$, shifts to the right (Pc_1 to Pc_2) at initial. However, the result of stimulus may be highly inflationary, since growth potential is weak under the assumption that the actual RGU is close to the maximum RGU. Consequently, supply dynamics may not offset the effect of new purchasing power created by the state. And more importantly, if this causes a decline in net profitability $(rr_I^{'})$,[3] Phillips-type inflation curve $(1 - r^{'})$, continues to shift to the right (Pc_2 to Pc_3) because a reduction in net profitability causes an increase in the unemployment rate. This is nothing but stagflation, which means raising the rate of inflation and the rate of unemployment simultaneously.

The third scenario illustrated in (c) represents what we call a powerful stimulus policy due to the assumption that the actual RGU is far from the maximum RGU. This assumption leads to a more rapid growth potential for the economy. Therefore, if the state conducts a stimulus policy, this may be more powerful and productive due to the position of the actual RGU. The Phillips-type inflation curve $(1 - r^{'})$, shifts to the right (Pc_1 to Pc_2) at initial. Then, it may turn back to the initial point (Pc_2 to Pc_1), since supply dynamics may fully absorb newly created purchasing power. If we assume that such a stimulus may pump employment significantly, the Phillips-type inflation curve $(1 - r^{'})$, may shift behind the initial point (Pc_2 to Pc_3). Therefore, this is nothing but a high economic growth without inflation.[4]

Consequently, effectiveness of stimulus depends upon the situation of the supply side of the economy. If the economy is (not) tight as a result of the situation that the actual RGU is (not) close to the maximum RGU, the demand pull of new purchasing power created by state is not (is) absorbed by supply dynamics. For instance, while economy is tight if stimulus reduces net profitability, the result may be devastating. The main channel behind this is possibly between stimulus and net profitability. If stimulus policies increase aggregate demand and thus increase wage share, the rate of profit falls. The rate of profit is the main determinant of growth. Therefore, firms begin to fire laborers during fall in net profitability.

Furthermore, Shaikh states that RGU and net profitability may empirically be correlated. Therefore, the restricted version as shown (8) below is available. Restrictive version is that the rate of inflation is determined positively by the demand pull of new purchasing power and positively or negatively by the supply resistance represented by RGU. Also, net effect of the supply resistance depends strictly upon the weights of net profitability, and rate of growth utilization. Shaikh proposes rate of growth utilization instead of net profitability to control supply resistance, since RGU is widely available and is also equivalent to

[3]As argued above, employment channel triggered by stimulus policy may affect profitability negatively. So, a fall in profitability may be a result of an increase in wage share due to rising aggregate demand or shrinking pool of unemployment.

[4]In this case, inflation is not a case. Prices may change but very little and negligible.

the rate of employment.

$$\pi = f(\underbrace{pp}_{+}, \underbrace{r'}_{+/-}) \tag{8}$$

3. Data

In equation 8, there are two main variables that control the supply and demand sides of inflation. Shaikh (2016) suggested relative new purchasing power (RNPP) to explain the demand pull of inflation. New purchasing power is the sum of the change in total credit (household, private, and government credits) plus current account deficit or surplus. Shaikh defined RNPP by dividing new purchasing power by gross domestic product (p. 896). We use European Central Bank database for credit series. They are measured in millions of euros. Also, Gross Domestic Product and Current Account Balance are provided by the European Commission database.

On the supply side, we calculate the RGU, which is private investment divided by gross operating surplus.[5] It means how much money is used out of the profit. Gross operating surplus, by the way, is obtained from production activities before the account has been taken out of the interest, rents, and other payable charges. It is the balancing item of the generation of income accounts and sums up all surpluses of the various industries and institutional sectors. And then private investment is the gross fixed capital formation of the private sector. It is derived from the differences between the total economy and the government sector. In this paper, rather than using the RGU, we prefer to use RUG[6] in order to derive Phillips Curve as Shaikh (2016) did. It is calculated by one hundred minus RGU. RUG is equivalent to the rate of unemployment. Using RUG, we may make a parallel with the Phillips Curve, which depends upon the unemployment rate. This data is supplied by the European Commission.

Growth utilization is a ratio that consists of the ratio of private investment to gross operating surplus. These two variables are measured in millions of euros and yearly data. On the other hand, total credit data and its components (household, private, and government credits) are quarterly data measured in millions of euros. We select the first quarter of credit data for each economy. Also, the current account balance, which is a component of relative purchasing power, is also yearly, measured in billions[7] of euros.

The dependent variable in this study is the growth of GDP deflator (GDEF). This series is supplied by the World Development Indicators. It is the ratio of Gross Domestic Product in current local currency to Gross Domestic Product in constant local currency. So, it includes price movements that originated from supply and demand factors.

We constructed a panel dataset between 2001 and 2020 for European economies. These economies are Australia, Belgium, Czechia, Germany, Estonia, Spain, Finland, France, the United Kingdom, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg,

[5]Gross operating surplus is suggested by Shaikh as a proxy of the rate of profit (p. 896).

[6]For instance, while the rate of growth utilization is 80 per cent, if you subtract 80 from 100, you have a 20 percent unutilized rate of growth utilization. In addition, we may think that 100 percent growth utilization means that capitalists decide to invest of the whole profit.

[7]It is converted into a million level.

Latvia, Malta, the Netherlands, Poland, Portugal, Sweden, Slovenia, and Slovakia. We have 20 years and 23 economies. In addition, we separated our sample into two. The first subpanel covers the period between 2001 and 2009, while the second subpanel includes the period between 2010 and 2020.

4. Supply Resistance and Demand Pull in the European Economies

RGU is the core variable in Shaikh's classical theory of inflation. It represents supply resistance, which absorbs some portion of inflation, while aggregate demand is rising. Figure 2 shows the RGU in the 23 European economies between 2001 and 2020. It is obviously seen that there is a structural change after the 2008 Financial Crisis. RGU has fallen in all European economies. It means that capitalists decided to invest less money out of profit in the post-crisis period. Therefore, growth utilization falls. Besides, this fact requires an analysis of the post-crisis period (2010–20) separately.

On the other hand, this means that there is growth potential. So, it is convenient to the cases (a or b) illustrated in Figure 1. According to Shaikh's theory, there would be a possibility of success in conducting stimulus policy during this period. However, European authorities did not prefer an expansionary policy in the post-crisis period. Figure 3 shows the growth of total credit (household, private, and government credits). It seems clear that European authorities followed a contractionary credit policy instead of pumping credit into their economy in the post-crisis period. According to Shaikh's classical theory of inflation, if European economies followed a stimulus policy, it would not be inflationary.

Consequently, European states did not create new purchasing power to stimulate their economy even though there was space for growth potential. This fact also appears in

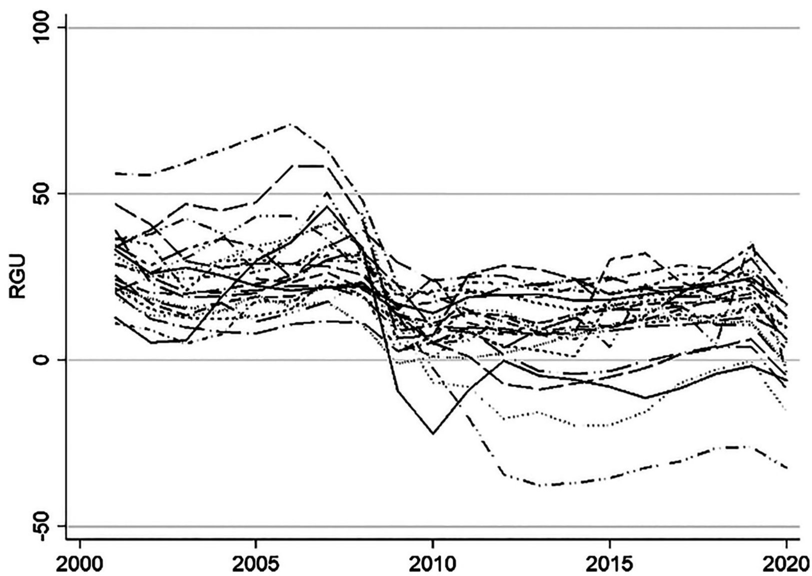

Figure 2. Rate of growth utilization in the 23 European economies.

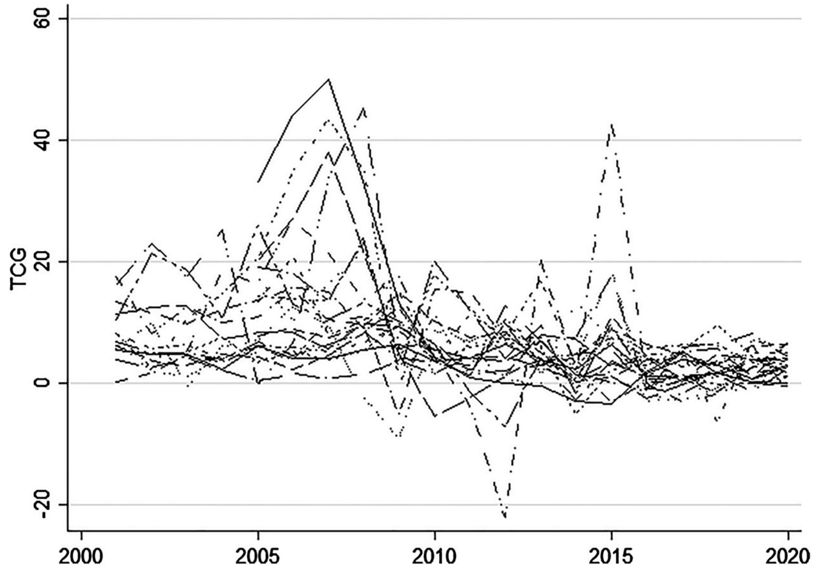

Figure 3. Total Credit Growth in the 23 European economies.

Figure 4, which shows relative new purchasing power in 23 European economies between 2001 and 2020. There is no significant rise in the post-crisis period.

5. Methodology

When we divide the time horizon into two sub-periods, 2001–09 and 2010–20, there is no need to apply unit root tests due to the limited time period. However, for the whole time

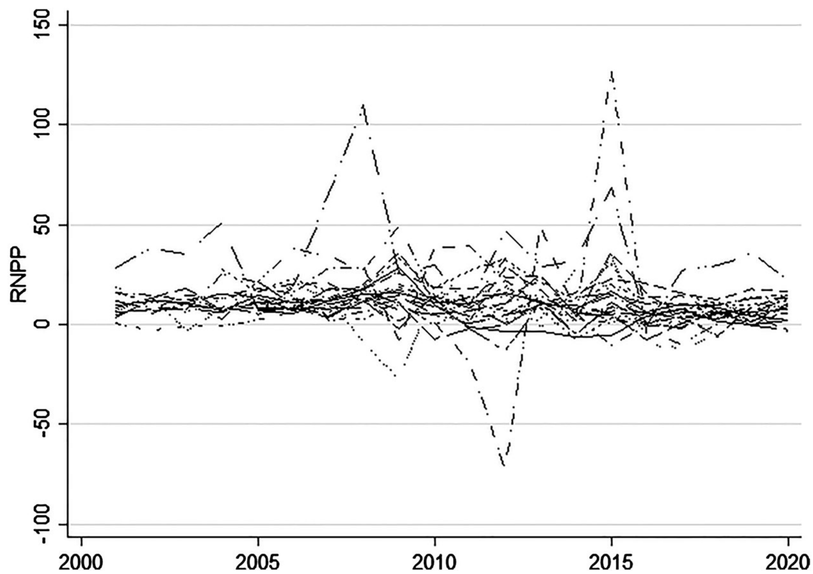

Figure 4. Relative new purchasing power in the 23 European economies.

period (2001–20), first-generation unit root tests and second-generation unit root tests are applied in order to investigate the stationarity of the variables.

As for empirical techniques, both fixed effects and dynamic models were used. The reason for using fixed-effects (F.E.) models is that the analysis was done on the basis of European countries. Therefore, within variations have to be taken into consideration. Additionally, the Hausman test results have already suggested the fixed effects model. The model is given below.

$$GDEF_{it} = \beta_0 + \beta_1 RNPP_{it} + \beta_2 RUG_{it} + \sum_{t=1}^{j} \delta_t YEARDUMMY_t + a_i + u_{it} \quad (9)$$

i: is the notation for countries; t: is the notation for time; u: is the error term; a_i: time invariant unobserved effects also called as unobserved heterogeneity (unobserved differences between cross-sectional units); YEARDUMMY: time-dummies; j: number of years.

Fixed effects methodology uses deviations from the time averages of the data for each cross-sectional units (also called deviations from group means).

$$GDEF_{it} - \overline{GDEF}_i = \beta_0 + \beta_1(RNPP_{it} - \overline{RNPP}_i) + \beta_2(RUG_{it} - \overline{RUG}_i) + \sum_{t=1}^{j} \delta_t YEARDUMMY_t + (a_i - \bar{a}_i) + (u_{it} - \bar{u}_i) \quad (10)$$

where $\overline{GDEF}_i = \frac{1}{T}\sum_{t=1}^{T} GDEF_{it}$, $\overline{RNPP}_i = \frac{1}{T}\sum_{t=1}^{T} RNPP_{it}$, $\overline{RUG}_i = \frac{1}{T}\sum_{t=1}^{T} RUG_{it}$, $\bar{u}_i = \frac{1}{T}\sum_{t=1}^{T} u_{it}$. a_i is differenced out because it is time invariant it's average is also a_i because a_i is the part of composite error term ($v_{it} = a_i + u_{it}$) a_i is correlated with independent variables which makes estimates biased. This problem is solved by differencing out the a_i.

On the dynamic model side, GMM (generalized method of moments) methodology was used. The most important motivation to use this methodology is that it alleviates the problem of endogeneity. To open this issue in the context of our study, there are other factors affecting the dependent variable other than existing independent variables. That is called omitted variable bias, which is one of the sources of endogeneity. We tried to add some control variables such as labor share, profit share, trade union density, collective bargaining coverage rate. However, none of them improved the explanatory power of the model.[8] Therefore, we followed the GMM technique that uses lagged dependent variable as an independent variable. The motivation behind this methodology is that this variable includes all other factors. By construction, the unobserved panel-level effects are correlated with the lagged dependent variables. This situation makes the standard estimator inconsistent. For this reason, the need to use a dynamic model arises. As a dynamic model, we used GMM model because it provides consistent results under the presence of different sources of endogeneity like unobserved heterogeneity, simultaneity

[8]None of them entered the model in a statistically significant way. We controlled labor share as a proxy for real marginal cost. It is proposed by New Keynesians (Galı and Gertler, 1999). However, it does not statistically explain the variation of the GDP deflator.

and dynamic endogeneity (Wintoki, Linck, and Netter 2012; Ullah, Akhtar, and Zaefarian 2018). GMM estimators are also designed to handle the joint endogeneity of explanatory variables via the creation of a matrix of internal instruments which also deal with endogeneity of regressors and another set to deal with correlation between lagged dependent variable and MA(1) error term (Doytch and Uctum 2011, p. 415). The model includes p lags of the dependent variable as covariates and contains unobserved panel-level effects (fixed or random). Let's construct our dynamic model:

$$GDEF_{it} = \alpha + \gamma GDEF_{it-1} + \beta RNPP_{it} + \delta RUG_{it} + \sum_{t=1}^{j} \theta_t YEARDUMMY_t + \varepsilon_{it} \quad (11)$$

$\varepsilon_{it} = \nu_{it} + e_{it}$. ν_{it} and e_{it} represents time-invariant unobserved effects and idiosyncratic errors respectively.

In the dynamic panel, inclusion of lagged dependent variable causes a violation of orthogonality assumption (Oseni 2016, p. 107). This is because of the dependency of lagged dependent variable on ε_{it-1} (function of ε_{it}). As $\varepsilon_{it} = \nu_{it} + e_{it}$, $E(GDEF_{it-1}\varepsilon_{it}) \neq 0$. In order to eliminate this problem Arellano and Bond (1991) proposed to eliminate the time-invariant unobserved effects by taking first differences. After this methodology, equation 11 becomes:

$$\begin{aligned} GDEF_{it} - GDEF_{it-1} = {} & \alpha + \gamma(GDEF_{it-1} - GDEF_{it-2}) + \beta(RNPP_{it} - RNPP_{it-1}) \\ & + \delta(RUG_{it} - RUG_{it-1}) + \sum_{t=1}^{j} \theta_t YEARDUMMY_t + (e_{it} \\ & - e_{it-1}) \end{aligned} \quad (12)$$

However, due to the existing gaps in the data, orthogonal deviations, proposed by Arellano and Bover (1995), were used instead of first differences. This methodology requires that the forward orthogonal-deviations be transformed instead of the first difference. In this methodology, observations are subtracted from the average of all available future observations (we use * superscript to indicate average of all future observations) rather than subtracted from previous observations. Then equation 12 can be written as:

$$\begin{aligned} GDEF_{it} - GDEF^{*} = {} & \alpha + \gamma(GDEF_{it-1} - GDEF^{*}) + \beta(RNPP_{it} - RNPP^{*}) \\ & + \delta(RUG_{it} - RUG^{*}) + \sum_{t=1}^{j} \theta_t YEARDUMMY_t + (e_{it} - e^{*}) \end{aligned} \quad (13)$$

If we show orthogonal deviations by Δ, equation 13 can be written as:

$$\begin{aligned} \Delta GDEF_{it} = {} & \alpha + \gamma \Delta GDEF_{it-1} + \beta \Delta RNPP_{it} + \delta \Delta RUG_{it} + \sum_{t=1}^{j} \theta_t YEARDUMMY_t \\ & + \Delta e_{it} \end{aligned} \quad (14)$$

System GMM has some advantages over classical difference GMM. Therefore, system GMM was preferred for this study. System GMM also uses instruments for level equation, while difference GMM uses instruments only for differences or orthogonal deviation equations. According to Arellano and Bover (1995) and Blundell and Bond

(1998) this corrects any bias that would emerge using the standard difference GMM estimator. Specifically, system GMM improves efficiency since it allows for more instruments (Roodman 2009, p. 86). Moreover, we have some gaps in our data, and the difference GMM magnifies it (this is the main motivation for the creation of System GMM) (p. 104). Last but not least, in contrast to difference GMM, system GMM does not expunge fixed effects (p. 114). This situation is very vital for our study. Therefore, we preferred the system GMM in this study.

Furthermore, a two-step system GMM methodology was used in this study. A two-step estimator uses the estimates of the first step in order to estimate the parameters of interest. A two-step estimator is asymptotically more efficient than a one-step estimator, but its standard errors are biased downward. Windmeijer (2005) solved this issue by developing a finite sample correlation matrix. Roodman (2009) states that with the finite sample correlation matrix methodology, a robust two-step estimator is more efficient than one-step robust estimates.

The number of instruments was collapsed[9] in order to deal with excessive numbers of instrumental variables because, in GMM, the suggested rule of thumb is to keep the number of instruments equal or smaller than the number of groups.

Diagnostic tests take an essential place in GMM methodology. In order to mention consistent estimators in GMM, the validity of moment conditions must be satisfied. However, there is no direct way to test this issue. On the other hand, the validity of over-identifying conditions can be tested with the Sargan test and Hansen test, but if the disturbances are heteroskedastic, the distribution of the Sargan test cannot be defined. Therefore, in the two-step estimator case, since biased-corrected standard errors (WC-robust standard errors) obtained by using a finite sample correlation matrix were used, it is necessary to use the Hansen test. Roodman (2009) also states that the standard procedure in the two-step estimator is to use the Hansen test because it is robust to non-i.i.d. (independently and identically distributed) errors. Therefore, according to Hansen test results, we can define whether the instruments are valid. However, the moment conditions are only valid in the case of no serial correlation in the idiosyncratic errors. In this respect, Arellano-Bond Test provides the result of whether there is a serial correlation in the first differenced errors. The first differenced errors are first-order serially correlated when idiosyncratic errors are i.i.d.. Therefore, the first differenced errors need to be autocorrelated at order one. However, there must be no autocorrelation at order two. When these conditions are met, it can be stated that the moment conditions are valid.

6. Empirical Findings

For the first-generation unit root tests, we used Levin, Chien-Fu Lin, and Chia-Shang Chu (LLC) (2002) and Fisher-PP developed by Maddala and Wu (1999), as well as Choi (2001) utilizing Fisher (1925 [1932]) results. The first-generation unit root tests ignore cross-sectional dependence. Although Baltagi (2008) states that cross-sectional dependency is a problem for macro panels with long time series (over 30 years),

[9]One instrument for each variable and lag distance (for each year, the previous year is taken as an instrument.), rather than one for each time period, variable, and lag distance. In other words, when instruments are collapsed, the number of instruments for lag distance does not increase cumulatively.

Table 1. Unit root tests.

Variables (in levels)	Specification	First Generation Unit Root Tests: Common Unit Root LLC	First Generation Unit Root Tests: Individual Unit Root Fisher-PP	Second Generation Unit Root Tests: Pesaran CIPS
GDEF	Constant	0.0006***	0.0000***	<0.01*** (t-stat: −3.1678, cv at 1%: −2.38)
	Constant and trend	0.0742*	0.0000***	<0.01*** (t-stat: −3.4391, cv at 1%: −2.91)
RNPP	Constant	0.0000***	0.0000***	<0.01*** (t-stat: −3.3659, cv at 1%: −2.42)
	Constant and trend	0.0000***	0.0000***	<0.01*** (t-stat: −3.4223, cv at 1%: −2.97)
RUG	Constant	0.0461**	0.0063***	<0.05** (t-stat: −2.4190, cv at 5%: −2.25)
	Constant and trend	0.0171**	0.2056	> = 0.10 (t-stat: −2.5537, cv at 10%: −2.70)

Notes: (1) Probability values are given. (2) For the first-generation unit root tests, the Null hypothesis is unit root while in second generation unit root tests null hypothesis (3) *, **, *** represents stationary at 10%, 5%, and 1% respectively (4) For the first-generation unit root tests, the Newey-West bandwidth is automatically selected using the Barlett Kernel method. (5) For second-generation panel unit root tests maximum lag is taken as 2, and Akaike information criterion is used for lag selection. (6) cv: critical value.

and Friedman's test of cross-sectional independence states that there is no cross-sectional dependency (test stat: 28.343, Prob: 0.1646), we also reported second generation unit root tests results. For the second-generation panel unit root tests, we used Pesaran CIPS tests developed by Pesaran (2007). Unit root test results state that GDEF and RNPP are stationary in level. For RUG, out of 6 statistics, 4 statistics state that it is stationary in levels. That's why we regard this variable as stationary (Table 1).

Restrictive model (8) of classical theory of inflation includes variables which control supply and demand dynamics of inflation. We followed Shaikh's (2016, p. 896) calculations in deriving variables. In explaining supply dynamics of inflation, we used unutilized growth capacity to make parallel with the Phillips Curve. According to estimation results given in Tables 2 and 3, RUG has statistically significant and negative impact on European inflation for the sample 2001–20 both in Fixed Effect and GMM estimations. When we investigate subsamples' results, RUG has statistically significant impact in Fixed Effect for the sample 2001–09 and in GMM for the sample 2010–20. On demand dynamics of inflation, we used relative new purchasing power. Findings demonstrated no statistically significant impact of RNPP on European inflation in all samples.

It is expected that the effect of RNPP on the rate of inflation becomes stronger while the newly created purchasing power is getting larger. Harberger (1988, 223) showed the relationship between rate of world inflation and growth in domestic credit between 1970 and 1988, and Ramamurthy (2014) displayed an updated version of Harberger's dataset for the period between 1988 and 2011 (as cited by Shaikh 2016, pp. 718–719). However, these studies demonstrated no relation between the rate of inflation and growth in domestic credit if the rate of inflation in range between 0 and 20 per cent occurred. After the rate of inflation exceeds 20 per cent, a positive relation between growth in domestic credit and the rate of inflation is the case. Therefore, the rate of inflation

Table 2. Results of fixed effects estimation.

Fixed Effects Model (Dependent variable: GDEF)						
	2001–09		2010–20		2001–20	
Variables	Coefficients	Standard errors	Coefficients	Standard errors	Coefficients	Standard errors
RNPP	−0.0284	0.0178	−0.0013	0.0056	−0.0058	0.0038
RUG	−0.1269***	0.0275	0.0165	0.0220	−0.0514***	0.0090
YR2001	−0.3711	0.8696			−1.5741**	0.6130
YR2002	−0.0703	0.5804			−1.6033***	0.4981
YR2003	−0.1229	0.4369			−1.8273***	0.4266
YR2004	0.2306	0.4201			−1.4166**	0.5529
YR2005	0.6054	0.3567			−0.9264**	0.4468
YR2006	1.1511**	0.5478			−0.2852	0.5615
YR2007	0.3316	0.5042			−0.8948**	0.3749
YR2008	−2.1824**	1.0954			−3.7837***	0.9893
YR2009					−2.7117***	0.4440
YR2010			−1.2111***	0.4210	−1.4615***	0.3925
YR2011			−1.3690***	0.4308	−1.7575***	0.3893
YR2012			−1.7270***	0.5169	−1.9724***	0.5064
YR2013			−1.9768***	0.4492	−2.1210***	0.4383
YR2014			−1.6471**	0.6889	−1.8535***	0.6833
YR2015			−2.2248***	0.5650	−2.4648***	0.5560
YR2016			−1.3837***	0.3887	−1.8398***	0.3511
YR2017			−1.0403**	0.4188	−1.5733***	0.3808
YR2018			−0.8410	0.5186	−1.4260***	0.5058
YR2019			−1.0079*	0.5622	−1.7937***	0.6030
CONSTANT	12.3764***	2.4791	1.6844	2.1205	8.1590***	0.9583
R-square (within)	0.3503		0.2055		0.3054	
Prob > F	0.0000		0.0000		0.0000	
Number of obs.	168		251		414	
Number of groups	23		23		23	

Notes: standard errors are robust standard errors. (2) ***/**/* indicate significance at 1%, 5% and 10% respectively. (3) for sample 2001–09 yr2009, for sample 2010–20 yr2020, for sample 2001–20 yr2020 dropped due to collinearity.

among European countries is roughly 2 per cent. We consider that this is a reason why RNPP is not found to be statistically significant.[10]

Consequently, when Fixed Effect and GMM results in Tables 2 and 3 are examined together, the supply side yields result in line with the theory, while the demand side has no significant effect due to the inflation level, as expected.

In Fixed Effect estimations, the empirical results were checked for heteroskedasticity and were corrected using robust standard errors. According to Baltagi and Baltagi (2008), other diagnostic tests for standard static panel data analysis like serial correlation and cross-sectional dependence are problems associated with macro panels with long time series (over 30 years). On the other hand, according to diagnostic tests of the dynamic models of this study, the moment conditions are valid. In other words, the models passed the diagnostic tests. The null hypothesis of the Hansen test, which states that over-identifying restrictions are valid, was accepted for each model. Moreover, the null hypothesis of the Arellano Bond test for zero autocorrelation, which states that there is no autocorrelation, was rejected (according to 5 per cent significance level) for order one and accepted for order two for all the models. Furthermore, as mentioned before, for fixed effects models, the heteroskedasticity problem was corrected using robust standard error.

[10]No linearity between RNPP and GDEF may also be seen in scatter plots given in the Appendix.

Table 3. Results of system GMM estimation.

Two Step System GMM (Dependent variable: GDEF)						
	2001–09		2010–20		2001–20	
Variables	Coefficients	Standard errors	Coefficients	Standard errors	Coefficients	Standard errors
$(GDEF)_{t-1}$	0.5380***	0.1233	0.1643	0.1047	0.4641***	0.0399
RNPP	−0.0198	0.0163	−0.0006	0.0052	−0.0120	0.0088
RUG	−0.0254	0.0209	−0.0297**	0.0119	−0.0237***	0.0064
YR2002	0.3161	0.4595				
YR2003	−0.1236	0.4596				
YR2004	0.8018**	0.3526				
YR2005	0.8540**	0.3479				
YR2006	1.0537*	0.5648				
YR2007	0.3615	0.4379				
YR2008	−1.4214	0.8861			−2.5443**	0.9722
YR2011			−0.1781	0.2896		
YR2012			−0.2868	0.3604		
YR2013			−0.5059	0.3389		
YR2014			0.0048	0.3642		
YR2016			−0.7139**	0.2771		
YR2017			0.1511	0.2103		
YR2018			0.3226	0.2534		
YR2019			−0.0151	0.5553		
YR2020			1.3611***	0.3433		
CONSTANT	2.7794	2.0176	4.1853***	1.1224	3.3956***	0.5830
Number of obs.	157		228		408	
Number of groups	23		23		23	
Number of Instruments	18		22		23	
Prob > F	0.0000		0.0000		0.0000	
Arellano-Bond test for AR(1) in first differences Prob > z	0.032		0.035		0.001	
Arellano-Bond test for AR(2) in first differences Prob > z	0.420		0.184		0.406	
Hansen test of overid. Restriction Prob >chi2	0.471		0.228		0.215	

Notes: standard errors are WC-robust standard errors. (2) ***/**/* indicate significance at 1%, 5% and 10% respectively. (3) Hansen Test null hypothesis: overidentifying restrictions are valid. (4) Arellano-Bond test (for zero autocorrelation in first-difference errors) null hypothesis: no autocorrelation. (5) for sample 2001–09 yr2001 and yr2009, for sample 2010–20 yr2010 and yr2016 dropped due to collinearity. (6) year dummies cannot be used for sample 2001–20 since in this case the number of instruments exceeded the number of groups. Only yr2008 crisis dummy is used.

7. Conclusion

Shaikh's theory of inflation is one of the well-founded and relevant heterodox theories of inflation. However, even though it has a strong theoretical construction, more empirical studies on this subject are needed because there are very weak empirical studies on this theory. Therefore, the aim of this study is to empirically evaluate the explanatory power of Shaikh's classical theory of inflation in 23 European economies between 2001 and 2020. According to our empirical findings, Shaikh's classical theory of inflation generated empirically successful results in explaining supply dynamics of European inflation, while it produced no statistically significant effect for the demand dynamics of inflation due to the European inflation level, as expected.

We tried to add control variables such as labor share as a proxy for labor cost and profit share as a proxy for markup. However, they did not generate statistically significant results. Moreover, we tried to control the effect of labor institution by using some variables such as trade union density and collective bargaining coverage rate because the trade unions and laborers are strong in European countries. However, none of them improved the explanatory power of Shaikh's model.

Furthermore, there are distributional factors behind inflation in the heterodox literature. Conflicting claims over income distribution is an important fact for the price movements. Shaikh's theory of inflation directly concentrates on the limit of expansion of a system, which is rate of profit, instead of distributional factors. In particular, institutional power of labor unions and worker movements are facts for European economies. Knowing this, even if we tried to improve Shaikh's theory of inflation by adding some variables, which may reflect distribution determinants of inflation, they did not generate statistically significant results. We leave this issue for future research.

Acknowledgements

We have greatly benefited from comments by Erinç Yeldan, Ozgur Orhangazi, Gozde Corekcioglu, Ilhan Dogus, Hasan Tekguc and two anonymous referees. We would also like to thank for the valuable comments of the participants of the Historical Materialism 2022 Conference in Istanbul and the 24th Annual Conference of the Association for Heterodox Economics at the SOAS University in London. Any remaining errors are our own.

Disclosure Statement

No potential conflict of interest was reported by the author(s).

ORCID

Oktay Ozden http://orcid.org/0000-0001-5739-8783
Hakki Kutay Bolkol http://orcid.org/0000-0002-8979-4462

References

Abdih Y., L. Lin, and A. C. Paret. 2018. 'Understanding Euro Area Inflation Dynamics: Why So Low for So Long?', IMF Working Paper WP/18/188.
Altissimo, F., L. Bilke, A. Levin, T. Mathä, and B. Mojon. 2006. 'Sectoral and Aggregate Inflation Dynamics in the Euro Area.' *Journal of the European Economic Association* 4 (2–3): 585–593.
Arellano, M., and O. Bover. 1995. 'Another Look at the Instrumental Variable Estimation of Error-Components Models.' *Journal of Econometrics* 68 (1): 29–51.
Arellano, M., and S. Bond. 1991. 'Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations.' *The Review of Economic Studies* 58 (2): 277–297.
Arratibel, O., D. Rodriguez-Palenzuela, and C. Thimann. 2002. 'Inflation Dynamics and Dual Inflation in Accession Countries: A New Keynesian Perspective.' Available at SSRN 357345.
Baltagi, B. H., and B. H. Baltagi. 2008. *Econometric Analysis of Panel Data (Vol. 4)*. Chichester: Wiley.
Barredo-Zuriarrain, J. 2022. 'Credit-Fueled Demand and Shrinking Aggregate Supply: A Study on the Hyperinflation in Venezuela.' *Review of Political Economy*, 1–21.
Baxa, J., M. Plašil, and B. Vašíček. 2015. 'Changes in Inflation Dynamics Under Inflation Targeting? Evidence from Central European Countries.' *Economic Modelling* 44: 116–130.
Blundell, R., and S. Bond. 1998. 'Initial Conditions and Moment Restrictions in Dynamic Panel Data Models.' *Journal of Econometrics* 87 (1): 115–143.
Boranova, V., R. Huidrom, S. Nowak, P. Topalova, V. Tulin, and R. Varghese. 2021. 'Wage Growth and Inflation in Europe: A Puzzle?' *Oxford Economic Papers* 73 (4): 1427–1453.

Busetti, F., L. Forni, A. Harvey, and F. Venditti. 2006. 'Inflation Convergence and Divergence within the European Monetary Union.' ECB Working Paper No. 574. Available at SSRN: https://ssrn.com/abstract = 872684.

Choi, I. 2001. 'Unit Root Tests for Panel Data.' *Journal of International Money and Finance* 20 (2): 249–272.

Christopoulos, D. K., and E. G. Tsionas. 2005. 'Productivity Growth and Inflation in Europe: Evidence from Panel Cointegration Tests.' *Empirical Economics* 30: 137–150.

Constancio, V. 2015. 'Understanding Inflation Dynamics and Monetary Policy.' *Speech at the Jackson Hole Economic Policy Symposium* 29: 455–483.

Döpke, J., J. Dovern, U. Fritsche, and J. Slacalek. 2008. 'The Dynamics of European Inflation Expectations.' *The BE Journal of Macroeconomics* 8 (1): 1–21.

Doytch, N., and M. Uctum. 2011. 'Does the Worldwide Shift of FDI from Manufacturing to Services Accelerate Economic Growth? A GMM Estimation Study.' *Journal of International Money and Finance* 30 (3): 410–427.

Duménil, G., and D. Lévy. 1999. 'Being Keynesian in the Short Term and Classical in the Long Term: The Traverse to Classical Long-term Equilibrium.' *The Manchester School* 67 (6): 684–716.

Egert, B. 2007. 'Real Convergence, Price Level Convergence and Inflation Differentials in Europe.' William Davidson Institute Working Papers Series, (wp895).

Fisher, R. A. 1925 [1932]. *Statistical Methods for Research Workers*. Edinburgh: Oliver and Boyd.

Fountas, S., A. Ioannidis, and M. Karanasos. 2004. 'Inflation, Inflation Uncertainty and a Common European Monetary Policy.' *The Manchester School* 72 (2): 221–242.

Galı, J., and M. Gertler. 1999. 'Inflation Dynamics: A Structural Econometric Analysis.' *Journal of Monetary Economics* 44 (2): 195–222.

Galı, J., M. Gertler, and J. D. Lopez-Salido. 2001. 'European Inflation Dynamics.' *European Economic Review* 45 (7): 1237–1270.

Globan, T., V. Arčabić, and P. Sorić. 2014. 'Inflation in new EU member states: A domestically or externally driven phenomenon?' EFZG working paper series, (05).

Golinelli, R., and R. Orsi. 2002. 'Modelling Inflation in EU Accession Countries: The Case of the Czech Republic, Hungary and Poland.' *Free University Berlin, Jean Monnet Centre of Excellence*.

Graziani, A. 1989. *The Theory of the Monetary Circuit*. Thames Papers in Political Economy, London: Thames Polytechnic.

Graziani, A. 2003. *The Monetary Theory of Production*. Cambridge: Cambridge University Press.

Handfas, A. 2012. 'Demand Pull and Supply Resistance in a Classical Inflation Model.' Doctoral disser., New School University.

Harberger, A. C. 1988. 'World Inflation Revisited.' In *Economic Effects of the Government Budget*, edited by E. Helpman, A. Razin, and E. Sadka. Cambridge, MA: MIT Press.

Horvath, R., and K. Koprnická. 2008. 'Inflation Differentials in New EU Member States: Empirical Evidence.' *Czech Journal of Economics and Finance (Finance a Uver)* 58 (07–08): 318–328.

Lavoie, M. 1984. 'The Endogenous Flow of Credit and the Post Keynesian Theory of Money.' *Journal of Economic Issues* 18 (3): 771–797.

Lein, S. M., and T. Maag. 2011. 'The Formation of Inflation Perceptions: Some Empirical Facts for European Countries.' *Scottish Journal of Political Economy* 58 (2): 155–188.

Levin, A., C.-F. Lin, and C.-S. J. Chu. 2002. 'Unit Root Test in Panel Data: Asymptotic and Finite Sample Properties.' *Journal of Econometrics* 108 (1): 1–24.

Maddala, G. S., and S. Wu. 1999. 'A Comparative Study of Unit Root Tests with Panel Data and a New Simple Test.' *Oxford Bulletin of Economics and Statistics* 61 (1): 631–652.

Mazumder, S. 2018. 'Inflation in Europe After the Great Recession.' *Economic Modelling* 71: 202–213.

Moore, B. J. 1988. 'The Endogenous Money Supply.' *Journal of Post Keynesian Economics* 10 (3): 372–385.

Moore, B. J. 1983. 'Unpacking the Post Keynesian Black Box: Bank Lending and the Money Supply.' *Journal of Post Keynesian Economics* 5 (4): 537–556.

Oseni, I. O. 2016. 'Exchange Rate Volatility and Private Consumption in Sub-Saharan African Countries: A System-GMM Dynamic Panel Analysis.' *Future Business Journal* 2 (2): 103–115.

Palley, T. I. 1994. 'Competing Views of the Money Supply Process: Theory and Evidence.' *Metroeconomica* 45 (1): 67–88.
Paloviita, M. 2006. 'Inflation Dynamics in the Euro Area and the Role of Expectations.' *Empirical Economics* 31 (4): 847–860.
Pesaran, M. H. 2007. 'A Simple Panel Unit Root Test in the Presence of Cross Section Dependence.' *Journal of Applied Econometrics* 22 (2): 265–312.
Pollin, R. 1991. 'Two Theories of Money Supply Endogeneity: Some Empirical Evidence.' *Journal of Post Keynesian Economics* 13 (3): 366–396.
Ramamurthy, B. 2014. 'Consumer Expenditures, Household Production and Inflation: Gender and Macroeconomic Considerations.' PhD disser., New School for Social Research.
Rogers, J. 2001. *Price Level Convergence, Relative Prices, and Inflation in Europe* (No. 699). Board of Governors of the Federal Reserve System (US).
Roodman, D. 2009. 'A Note on the Theme of Too Many Instruments.' *Oxford Bulletin of Economics and Statistics* 71 (1): 135–158.
Shaikh, A. 2016. *Capitalism: Competition, Conflict, Crises*. New York: Oxford University Press.
Shaikh, A. M., T. Maniatis, and N. Petralias. 1999. 'Explaining Inflation and Unemployment: An Alternative to Neoliberal Economic Theory.' In *Contemporary Economic Theory* (pp. 89–112). London: Palgrave Macmillan.
Stylianou, T. 2022. 'Inflation Differentials among European Monetary Union Countries: An Empirical Evaluation with Structural Breaks.' *National Institute Economic Review, First View*: 1–19.
Tsionas, E. 2003. 'Inflation and Productivity: Empirical Evidence from Europe.' *Review of International Economics* 11 (1): 114–129.
Ullah, S., P. Akhtar, and G. Zaefarian. 2018. 'Dealing with Endogeneity Bias: The Generalized Method of Moments (GMM) for Panel Data.' *Industrial Marketing Management* 71: 69–78.
Vašíček, B. 2011. 'Inflation Dynamics and the new Keynesian Phillips Curve in Four Central European Countries.' *Emerging Markets Finance and Trade* 47 (5): 71–100.
Windmeijer, F. 2005. 'A Finite Sample Correction for the Variance of Linear Efficient two-Step GMM Estimators.' *Journal of Econometrics* 126 (1): 25–51.
Wintoki, M. B., J. S. Linck, and J. M. Netter. 2012. 'Endogeneity and the Dynamics of Internal Corporate Governance.' *Journal of Financial Economics* 3 (105): 581–606.

Appendix

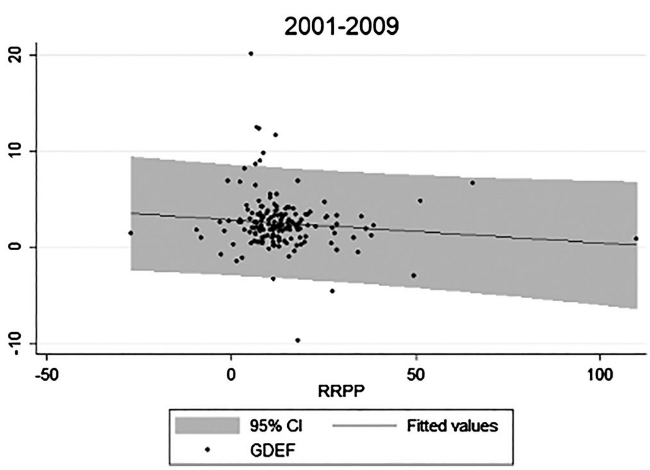

Figure A1. Linear Prediction Plots for the relation between RNPP and GDEF with 95% CI, 2001–09 (Based on the Standard Error of the Forecast).

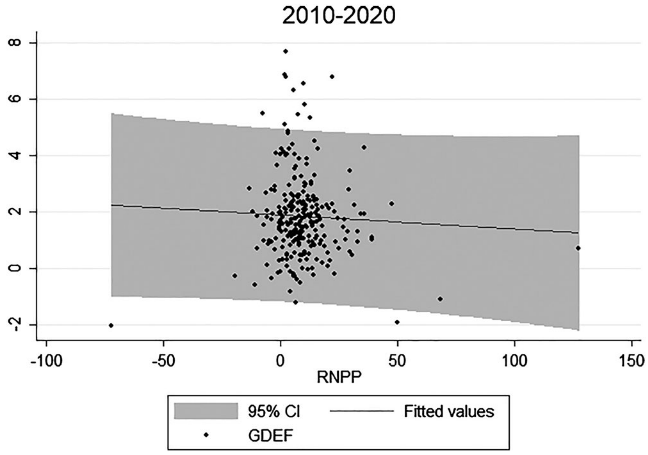

Figure A2. Linear Prediction Plots for the relation between RNPP and GDEF with 95% CI, 2010–20 (Based on the Standard Error of the Forecast).

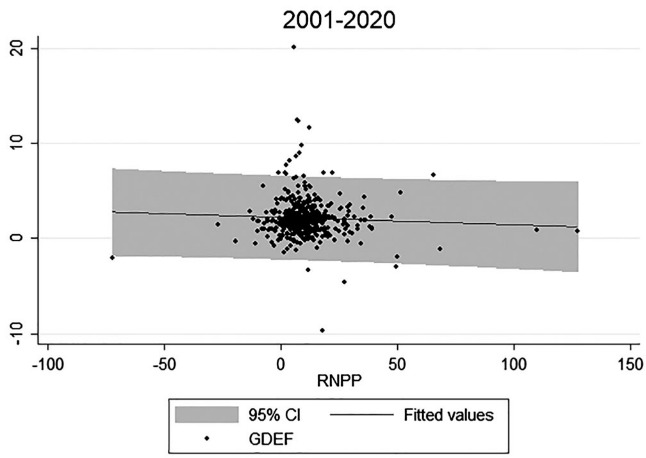

Figure A3. Linear Prediction Plots for the relation between RNPP and GDEF with 95% CI, 2001–20 (Based on the Standard Error of the Forecast).