Analyzing of consumer price index influence on inflation by multiple linear regression

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H I G H L I G H T S

- Inflation is one of the most important indicator for economy and markets.
- there is still missing gap about the factors analyzing which have influence on inflation.
- Multiple regression analysis to determine how consumer price index affect inflation.

A R T I C L E   I N F O

A B S T R A C T

Inflation is one of the most important indicator for economy and markets. Inflation represents a rate of rising of general level of prices for goods and services in regard to the currency falls of purchasing power. Although there many investigation of inflation phenomenon there is still missing gap about the factors analyzing which have influence on inflation. In this paper is applied multiple regression analysis to determine how consumer price index, monetary aggregates, discount rate, exchange rate affect inflation.

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1. Introduction

Inflation represent a rate of general price level increasing or rate of value of money decreasing. Inflation can has large consequences on the economic development. Therefore there is need for more investigations about the factors which have high influence on the inflation. Consequently, there are different attempts to analyze and define inflation in the most suitable ways.

For example in article [1] was modeled inflation forecasts as monotonically diverging from an estimated long-run anchor point towards actual inflation as the forecast horizon shortens where it was found that the estimated anchors across forecasters have tended to rise in recent years, along with the dispersion in estimates across forecasters. Article [2] used scanner data to estimate inflation rates at the household level. Lower-income households experience higher inflation, but most cross-sectional variation is uncorrelated with observables [2]. Households' deviations from aggregate inflation exhibit only slightly negative serial correlation. Almost all variability in a household's inflation rate comes from variability

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in household-level prices relative to average prices, not from variability in aggregate inflation [2]. A quantitatively analyzing og inflation dynamics in Sub-Saharan Africa (SSA) using a Global VAR model, which incorporates linkages among economies, as well as the role of regional and global demand and inflationary spillovers was performed in [3] where it was found that in the past 25 years, the main drivers of inflation have been domestic supply shocks and shocks to the exchange rate and monetary variables; but that, in recent years, the contribution of these shocks to inflation has fallen. Domestic demand pressures as well as global shocks, and particularly shocks to output, however, have played a larger role in driving inflation over the last decade. This implies a greater role of monetary policy as some SSA countries modernize their monetary policy frameworks [3]. A demand-led growth model which is constrained by economic policy was discussed in paper [4] where it was incorporated an inflation targeting regime in the sraffian supermultiplier model in order to analyze how economic policy can influence the growth rate of productive capacity. It was shown that inflation target system, in addition of not being neutral in terms of long run growth, also can lead to different outcomes in terms of functional income distribution [4]. Forecasting inflation is an important and challenging task. Paper [5] assumed that the core inflation components evolve as a multivariate local level process where it was proposed the use of a method called *"moments estimation through aggregation"* (M.E.T.A.), which reduces the computational costs significantly and delivers fast and accurate parameter estimates. It was found that our forecasts compare well with those generated by alternative univariate and multivariate models, as well as with those elicited from professional forecasters [5]. The nexus between excess currency growth and inflation in Australia was examined in paper [6]. Using different econometric techniques, it was examined how well excess money supply growth, measured in terms of currency, explains Australia's inflation over the long term from 1970–2015, and then more specifically before and after the adoption of inflation targeting [6]. A multicountry dataset to establish some empirical regularities on persistence and volatility of aggregate consumer prices for 135 countries since 1993 was used in article [7] where it was found that the both persistence and volatility to be low (high) in developed (developing) countries relative to the full sample average. Simulation results indicated that the model can replicate the degree of inflation persistence seen in the data for both developed and developing countries, but cannot generate the low levels of volatility observed in developed economies [7]. Inflation has been an important determinant of firm-level liquid asset holdings [8]. A comprehensive forecasting exercise to assess the out-of-sample forecasting performances of various econometric models for inflation across three dimensions: time, emerging markets (EMs) and models was carried out in article [9]. The results indicated that the forecasting performances of the different models change notably across both time and countries [9]. Dynamics of inflation persistence for a sample of advanced (Canada, Sweden, and the United Kingdom) and newly industrialized and emerging market (Chile, Israel, and Mexico) economies that adopted inflation targeting (IT) prior to the year 2000 was investigated in article [10]. It was found that the inflationary processes in Germany, the United States, and the three advanced economies are fractionally integrated, stationary, mean reverting, and share a common inflation persistence. On the other hand, the inflationary processes in the three emerging market economies are fractionally integrated, mean reverting, non-stationary, and do not share a common persistence with Germany and the United States [10]. Corporate investment by considering both external economic factor and managerial behavior, in particular the dynamic interaction between inflation uncertainty and managerial overconfidence by employing a sample of Chinese companies was studied in article [11] and the empirical findings demonstrated that lower inflation uncertainty increases over-investment, and managerial overconfidence exacerbates such effect. Inflation uncertainty is countercyclical and correlated with inflation disagreement, volatility, and the Economic Policy Uncertainty index [12]. Inflation uncertainty is lowest among high-income consumers, college graduates, males, and stock market investors [12]. Expectations of inflation play a critical role in the process of price setting in the market [13]. The effects of foreign exchange rate changes are analyzed in article [14]. In article [15] are analyzed entrepreneurship policies based on correcting macroeconomics, reform exchange rate, trade and industrial policy corrections.

Although there are different approaches for inflation analysis multiple regression analysis [16] will be used. Multiple linear regression analysis is often used to predict the outcome in different fields [17]. For example multiple regression analysis was used for estimation of groundwater seepage into circular tunnels was introduced [18], for quantitatively investigation of Degradation of Si-based photovoltaic (PV) modules after longtime outdoor exposure [19], to address the relationship between both gray and white matter (measured by magnetic resonance imaging in patients with brain lesion) and different effects in temporal preparation (Temporal orienting, Foreperiod and Sequential effects) [20], for dating of ink samples [21] and for engineering structures [22–27].

In this paper multiple linear regression (MLR) will be used for influence rate estimation based on different parameters. CPI (consumer price index) will be used as measurement indicator for inflation in European Union (EU) countries.

2. Methodology

MLR was performed for analysis of inflation. The case study is European Union. The model based on the following parameters:

- (PPI) Producer price index
- (ER) The Euro-national currency exchange rate
- (M) Broadest monetary aggregate in use
- (ES) National banks discount rates
- (NI) Net income