ZORAN JANEVSKI[1*]
TEA JOSIMOVSKA[2**]

338.516.47:338.46]:303.724(497.7)
(Original scientific paper)

DETERMINANTS OF PRICE EXPECTATIONS OF MANAGERS AND ENTREPRENEURS IN THE SERVICES SECTOR IN THE REPUBLIC OF NORTH MACEDONIA

Abstract: In this paper, we investigate the determinants of price expectations of managers and entrepreneurs in the services sector in the Republic of North Macedonia. The services sector is an important sector for the domestic economy, and inflation has a direct influence on the economic stability. In the last few months, we have witnessed significant price increases all over the world, and similarly, prices have also been rising significantly in the Republic of North Macedonia in recent months. In this paper, we try to investigate the drivers of price expectations that managers and entrepreneurs in firms in the services sector in North Macedonia have. By constructing an OLS regression model, we find that the price level from the previous month, demand expectations for the next three months, employment expectations for the next three months, and employment in the past three months are statistically significant, and have the expected positive sign, meaning that they are positively associated with the expectations for the future price level. However, after implementing the HAC Newey-West correction, we find that only the variable employment expectations for the next three months remains statistically significant.

Keywords: services, inflation, managers, entrepreneurs.
JEL Classification: E31, L26.

[1] * Director, full-time Prof., PhD., Institute of Economics, Ss. Cyril and Methodius University in Skopje, Republic of North Macedonia, e-mail: zoran.janevski@ek-inst.ukim.edu.mk
[2] ** MSc student, Institute of Economics, Ss. Cyril and Methodius University in Skopje, Republic of North Macedonia, e-mail: tea.josimovska@gmail.com

1. Introduction

The services sector is one of the most important sectors for the economy of the Republic of North Macedonia, alongside sectors such as trade, manufacturing, construction, etc. In 2020, the services sector was severely hit by the COVID-19 pandemic and as of 2022, it still continues to gradually recover, just like the overall domestic economy. An interesting feature of the services sector is that it is primarily consisted of micro and small business, in which most often the owner of the business serves as its manager and main entrepreneurial force. It is widely known that small businesses are in fact the engine of the economy and economic growth. Additionally, one of the most important conditions for a stable economic environment is a low and stable inflation rate. Past research has shown that high inflation has a negative effect on economic growth (Barro, 1995; Sarel, 1996; Akinsola & Odhiambo, 2017). On the other hand, low and stable inflation is perceived to be stimulating demand in the short-run and therefore is thought to have a positive impact on the economy, at least in the short-run. As a result of the global economic crisis caused by the pandemic, supply and demand forces have both contributed to a sharp rise in prices on a global scale. Similarly, in the last several months, inflation has been significantly increasing in the Republic of North Macedonia. For example, the annual inflation rate in North Macedonia was measured to be 6.7%, 7.6%, 8.8%, and 10.5% in January, February, March and April 2022 respectively, which indicates that inflation has been continuously increasing so far in 2022, while in 2021 and 2020, the annual inflation rate was 3.2% and 1.2% respectively[3]. Now, the questions which policymakers should answer are how to control this rise in prices and what measures should be taken in order to mitigate the negative effects of the rise in prices.

Understanding the behavior of economic agents is of crucial importance when designing and implementing economic policies. Having in mind that the behavior of economic agents depends on their perception of current trends and also expectations for the future, it is especially important to understand the determinants of their expectations. In other words, understanding what drives the expectations of economic agents for a certain aspect of the economy can help us gain a better insight into their behavior, hence their decision making process, which can then help us to understand the economy better. Moreover,

[3] Official data from the State Statistical Office of the Republic of North Macedonia. https://www.stat.gov.mk/

inflation expectations are of great importance for conducting monetary policy (Cunningham, Desroches, & Santor, 2010). Perhaps the most useful way of capturing economic agents' expectations regarding inflation is by conducting surveys. For example, Armantier et al. (2013) highlight the importance of expectations surveys. Moreover, Carlson and Parkin (1975) explore methods of estimating inflation expectations based on qualitative data from surveys.

In this paper, we are primarily interested in analyzing the drivers of the price expectations that managers and entrepreneurs in the services sector in North Macedonia have. Therefore, the research question that we attempt to answer is: *What are the determinants of the price expectations of managers and entrepreneurs in the services sector in the Republic of North Macedonia?* In the next section of the paper we elaborate the research method in more detail. Then, we present the empirical findings, and then we conclude with our final remarks and suggestions for future research.

2. Research method

This section of the paper is divided in two parts. The first part describes the variables and data that we use for our empirical investigation, while the second part describes the econometric approach that we employ in order to investigate the research question.

2.1 Variables and data

Based on our research question, the variable which we try to understand in more detail is in fact the *price expectations* of managers and entrepreneurs in the services sector in North Macedonia. Therefore, our dependent variable is *price expectations* and we try to explain it with a series of independent variables, such as: the price level in the domestic economy, business developments in the past three months in the services sector, demand in the past three months in the services sector, expected demand in the upcoming three months in the services sector, employment in the past three months in the services sector, and expected employment in the upcoming three months in the services sector.

We obtain the data for these variables from two sources. The first source is the main database of the State Statistical Office of the Republic of North Macedonia, and we obtain the data for the Consumer Price Index (CPI) from this database. The second source that we use is the website of the European Commission (EC), and we obtain the data for the rest of the variables (includ-

ing the dependent variable) from this site[4]. The EC conducts surveys across the European Union (EU) and the applicant countries on a monthly basis. The surveys are answered by representatives of different business sectors, and predominantly these representatives are in fact managers and entrepreneurs of companies which operate in the specific sectors. In this way, the EC can monitor and assess the perception of managers and entrepreneurs for the business situation in the most important business sectors in each of the EU and applicant countries. Specifically for our paper, we obtain the data from the survey results for the services sector in North Macedonia, for the period May 2008 – March 2022. Although the time series for the CPI is larger than the survey results, we take May 2008 as our initial observation in order for the different time series to be compatible for the regression analysis. All the data that we use is seasonally adjusted.

Table 1: Descriptive statistics

Date: 04/15/22 Time: 12:14
Sample: 2008M05 2022M03

	BUS_PAST_3M	CPI_SA	DEMAND_EXP_NEXT_3M	DEMAND_PAST_3M	EMPL_EXP_NEXT_3M	EMPL_PAST_3M	PRICES_EXP_NEXT_3M
Mean	-0.122754	109.0055	22.17605	2.046707	7.253293	2.004192	1.716168
Median	2.300000	109.8349	22.40000	5.300000	7.900000	2.000000	-0.100000
Maximum	19.80000	126.8382	47.00000	25.10000	23.10000	22.60000	33.50000
Minimum	-58.40000	97.88372	-43.10000	-64.10000	-8.900000	-17.90000	-9.600000
Std. Dev.	13.18170	6.090320	10.69308	14.23673	5.631953	6.521118	7.313936
Skewness	-2.050067	-0.074331	-1.503675	-2.323111	-0.324754	-0.027131	1.948021
Kurtosis	8.130092	2.871600	10.75124	9.705644	3.655432	5.078940	7.519822
Jarque-Bera	300.1055	0.268501	481.0008	463.0983	5.924691	30.09435	247.7719
Probability	0.000000	0.874371	0.000000	0.000000	0.051698	0.000000	0.000000
Sum	-20.50000	18203.92	3703.400	341.8000	1211.300	334.7000	286.6000
Sum Sq. Dev.	28843.69	6157.273	18980.76	33645.64	5265.336	7059.147	8879.946
Observations	167	167	167	167	167	167	167

[4] Link to the website: https://ec.europa.eu/info/business-economy-euro/indicators-statistics/economic-databases/business-and-consumer-surveys/download-business-and-consumer-survey-data/time-series_en

Table 2: Correlation between the variables

Covariance Analysis: Ordinary
Date: 04/15/22 Time: 12:17
Sample: 2008M05 2022M03
Included observations: 167

Correlation Probability	BUS_PAST_3M_	CPI_SA_	DEMAND_EXP_NEXT_3M_	DEMAND_PAST_3M_	EMPL_EXP_NEXT_3M_	EMPL_PAST_3M_	PRICES_EXP_NEXT_3M_
BUS_PAST_3M	1.000000 -----						
CPI_SA	-0.234846 0.0023	1.000000 -----					
DEMAND_EXP_NEXT_3M	0.677289 0.0000	-0.057164 0.4631	1.000000 -----				
DEMAND_PAST_3M	0.957410 0.0000	-0.185815 0.0162	0.658354 0.0000	1.000000 -----			
EMPL_EXP_NEXT_3M	0.687995 0.0000	-0.001266 0.9870	0.668927 0.0000	0.674466 0.0000	1.000000 -----		
EMPL_PAST_3M	0.656085 0.0000	-0.466848 0.0000	0.533283 0.0000	0.652208 0.0000	0.559922 0.0000	1.000000 -----	
PRICES_EXP_NEXT_3M	0.157188 0.0425	0.265646 0.0005	0.310285 0.0000	0.173020 0.0254	0.358805 0.0000	0.173790 0.0247	1.000000 -----

Tables 1 and 2 show the descriptive statistics and correlation between the variables, respectively. Since the data for the variables (except for the CPI) is based on survey results, their interpretation is relatively simple: a higher value for each of the variables indicates perception of higher expected prices, better past business developments, bigger past and expected demand, and higher past and expected employment, respectively.

In table 2 we see that there is a very high correlation coefficient (0.96) between the variables *business developments in the past three months* and *demand in the past three months*, and this coefficient is statistically significant at all three levels of 0.1, 0.05, and 0.01 (p-value = 0), which makes sense since the variables are substantially similar to one another. Therefore, in order to avoid the possibility of multicollinearity in the regression model, we decide to exclude the variable *business developments in the past three months*, whereas we include the variable *demand in the past three months* in the model because there is a slightly higher correlation between this variable and the dependent variable (correlation coefficient of 0.17, statistically significant at the levels of 0.05 and 0.1), compared to the correlation between the dependent variable and the variable *business developments in the past three months* (correlation coefficient of 0.16, statistically significant at the levels of 0.05 and 0.1). Although the difference between the two coefficients is relatively small, we decide to continue our analysis with the variable *demand in the past three months,* because the higher correlation could indicate a slightly stronger relationship with the dependent variable compared to the variable *business developments in the past three months*. For the rest of the independent variables, the coefficients of

correlation are lower than 0.7, indicating that there does not exist high correlation between any of them, and thus, all of them can be included in the regression model.

2.2 Econometric model

In order to explore the research question in detail, we construct an Ordinary Least Squares (OLS) regression model, where the dependent variable is *price expectations for the next three months*, while the independent variables are *CPI, demand in the past three months, demand expectations for the next three months, employment in the past three months,* and *employment expectations for the next three months*. The regression model takes the following form:

$$\begin{aligned} &Price\ expexctations\ in\ the\ next\ 3m_t = \beta_0 + \beta_1 * CPI_{t-1} + \beta_2 * \\ &Demand\ expectations\ in\ the\ next\ 3m_t + \beta_3 * Demand\ in\ the\ past\ 3m_t + \beta_4 * \\ &Employment\ expectations\ in\ the\ next\ 3m_t + \beta_5 * Employment\ in\ the\ past\ 3m_t + \varepsilon_t \end{aligned} \quad (1)$$

In equation 1, we see that only the variable *CPI* is lagged for one period. The reason for that is that at the moment when the respondents answer the survey, they only know the price level of the previous month and they do not know the price level for the current month. In this way we also avoid reverse causality, in the sense that we investigate the causal effect of the past price level on price expectations, which helps us prevent potential endogeneity problems in our model.

3. Results

In this section of the paper we discuss the results of the regression and the diagnostics test which are necessary to be performed in order to assess the properties of our model.

Table 3: Regression results

Dependent Variable: PRICES EXP NEXT 3M
Method: Least Squares
Date: 04/16/22 Time: 18:23
Sample (adjusted): 2008M06 2022M03
Included observations: 166 after adjustments

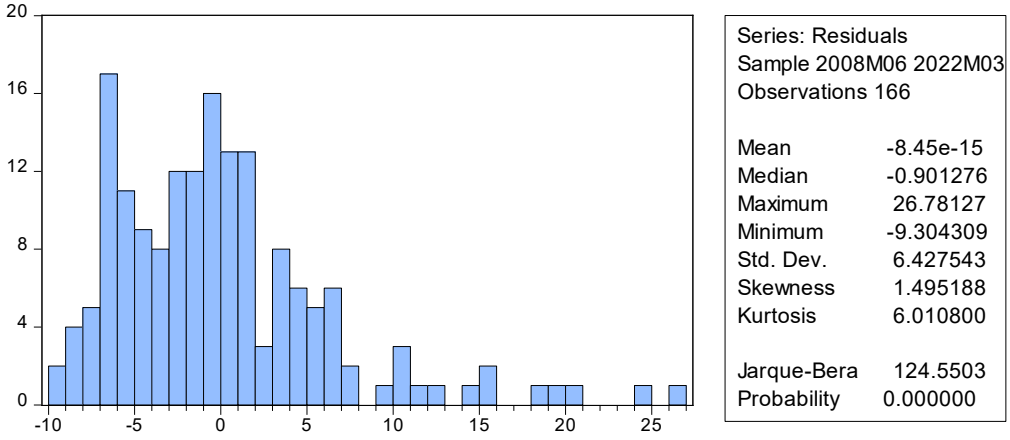
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-45.42641	10.99955	-4.129843	0.0001
CPI SA(-1)	0.385546	0.102578	3.758562	0.0002
DEMAND EXP NEXT 3M	0.120147	0.069446	1.730088	0.0855
DEMAND PAST 3M	-0.091291	0.056833	-1.606310	0.1102
EMPL EXP NEXT 3M	0.307290	0.140989	2.179537	0.0308
EMPL PAST 3M	0.206897	0.124475	1.662159	0.0984

R-squared	0.212859	Mean dependent var	1.627108
Adjusted R-squared	0.188261	S.D. dependent var	7.244671
S.E. of regression	6.527201	Akaike info criterion	6.625309
Sum squared resid	6816.696	Schwarz criterion	6.737790
Log likelihood	-543.9006	Hannan-Quinn criter.	6.670966
F-statistic	8.653445	Durbin-Watson stat	0.383232
Prob(F-statistic)	0.000000		

In table 3 we see the results from the regression model estimated with the OLS estimator. All of the parameters have the expected positive sign and are statistically significant at least at the 0.1 level of significance, except for the parameter of the variable *demand in the past three months*, which has a negative coefficient, but at the same time is not statistically significant for any of the three levels of significance (p-value = 0.11). The results indicate that a higher price level in the previous month, higher demand expectations for the upcoming three months, higher employment expectations for the upcoming three months, and higher employment in the previous three months are all associated with higher prices expectations for the upcoming three months, meaning that all of these independent variables have a positive effect on the price expectations in the services sector in North Macedonia. However, the adjusted R-squared has a relatively low value of around 0.19, indicating that only around 19% of the variability of the dependent variable is explained by the included independent variables in the model, meaning that there are probably other variables which could additionally explain the dependent variable better. In the next phase of the research, we check the main Gauss-Markov assumptions in order to make sure that the OLS estimator is the best linear unbiased estimator (BLUE) that can be applied to our dataset.

The first assumption which states that the model should be linear in the parameters is satisfied (equation 1). Another assumption which is satisfied is that the data we obtain is randomly selected from the population. Then, as we see in Table 2, there is no high degree of correlation between the independent variables that we include in the model, which indicates that the assumption that the independent variables should not be highly collinear is also satisfied.

Graph 1: Test for normality of the residuals



The next assumption is that the residuals follow a normal distribution. However, as Graph 1 shows, it is evident that the residuals do not have a normal distribution. In fact, the Jarque-Bera statistic has a p-value of 0, meaning that we reject the null hypothesis of normality of the residuals. Although this could potentially be a problem, it is something that happens quite often, especially when dealing with financial data. One way of solving it is by introducing additional observations for each of the variables. However, since we use all the observations that were available in the databases of the EC, we are unable to introduce additional observations for the period before May 2008. Therefore, we continue working with the data as if the error term had a normal distribution.

Table 4: Test for serial correlation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	145.5022	Prob. F(2,158)	0.0000
Obs*R-squared	107.5863	Prob. Chi-Square(2)	0.0000

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 04/16/22 Time: 18:23
Sample: 2008M06 2022M03
Included observations: 166
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.732789	6.597226	-1.020548	0.3090
CPI SA(-1)	0.070066	0.061592	1.137580	0.2570
DEMAND EXP NEXT 3M	-0.014815	0.041481	-0.357162	0.7214
DEMAND PAST 3M	0.044681	0.034085	1.310870	0.1918
EMPL EXP NEXT 3M	-0.077148	0.084449	-0.913540	0.3624
EMPL PAST 3M	0.023286	0.074374	0.313099	0.7546
RESID(-1)	0.682709	0.079659	8.570370	0.0000
RESID(-2)	0.200984	0.081794	2.457216	0.0151

R-squared	0.648110	Mean dependent var	-8.45E-15
Adjusted R-squared	0.632520	S.D. dependent var	6.427543
S.E. of regression	3.896383	Akaike info criterion	5.604967
Sum squared resid	2398.725	Schwarz criterion	5.754943
Log likelihood	-457.2123	Hannan-Quinn criter.	5.665843
F-statistic	41.57205	Durbin-Watson stat	1.912855
Prob(F-statistic)	0.000000		

The next assumption states that the residuals are not serially correlated. If they are, then there is a chance that the OLS estimator is not BLUE. The null hypothesis in the Breusch-Godfrey Correlation LM test states that the residuals do not have a serial correlation. However, both statistics in this case have a p-value of 0, meaning that we reject the null hypothesis of no serial correlation, which translates into the notion that the residuals in our model are serially correlated. Since serial correlation usually affects only the efficiency of the estimator, this means that there is a chance that the OLS estimator is not the most efficient one. This means that we would have to correct the standard errors of the estimated parameters, which would then change the t-statistics and p-values for each of the estimated parameters accordingly. On the other hand, since serial correlation does not affect the property of unbiasedness of

the OLS estimator, the values of the estimated parameters remain the same. Before making any changes to the standard errors, we first check the last assumption which states that the residuals should not have heteroscedasticity, but in fact should be homoscedastic. In other words, the residuals should have a constant variance.

Table 5: Test for heteroscedasticity

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	5.003046	Prob. F(5,160)	0.0003
Obs*R-squared	22.44425	Prob. Chi-Square(5)	0.0004
Scaled explained SS	52.24034	Prob. Chi-Square(5)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 04/16/22 Time: 18:21
Sample: 2008M06 2022M03
Included observations: 166

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-525.6290	146.7295	-3.582298	0.0005
CPI_SA(-1)	5.021123	1.368349	3.669476	0.0003
DEMAND_EXP_NEXT_3M	-0.504985	0.926375	-0.545120	0.5864
DEMAND_PAST_3M	-0.842977	0.758124	-1.111924	0.2678
EMPL_EXP_NEXT_3M	3.790860	1.880735	2.015627	0.0455
EMPL_PAST_3M	2.912870	1.660446	1.754270	0.0813

R-squared	0.135206	Mean dependent var	41.06443
Adjusted R-squared	0.108182	S.D. dependent var	92.20011
S.E. of regression	87.07023	Akaike info criterion	11.80678
Sum squared resid	1212996.	Schwarz criterion	11.91926
Log likelihood	-973.9629	Hannan-Quinn criter.	11.85244
F-statistic	5.003046	Durbin-Watson stat	0.702554
Prob(F-statistic)	0.000276		

The null hypothesis for the Breusch-Pagan-Godfrey test for heteroscedasticity states that the residuals have a constant variance, or in other words they are homoscedastic. However, the three statistics of this test have a p-value of 0, indicating that we reject the null hypothesis, which means that the residuals in our model do not have a constant variance, or in other words, they are heteroscedastic. This means that there is a chance that the OLS estimator is not BLUE. Similar to serial correlation, heteroscedasticity affects the efficiency of

the estimator, while it does not affect the unbiasedness, meaning that we would have to correct only the standard errors of the estimated parameters.

Since we find that both serial correlation and heteroscedasticity are present in our model, we correct the standard errors of the estimated parameters by using the HAC Newey-West correction technique. After implementing that correction, we obtain the following regression results.

Table 6: Regression results with the HAC Newey-West correction

Dependent Variable: PRICES_EXP_NEXT_3M
Method: Least Squares
Date: 04/16/22 Time: 18:17
Sample (adjusted): 2008M06 2022M03
Included observations: 166 after adjustments
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 5.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-45.42641	26.40029	-1.720678	0.0872
CPI SA(-1)	0.385546	0.253063	1.523518	0.1296
DEMAND EXP NEXT 3M	0.120147	0.079786	1.505866	0.1341
DEMAND PAST 3M	-0.091291	0.077319	-1.180702	0.2395
EMPL EXP NEXT 3M	0.307290	0.165625	1.855342	0.0654
EMPL PAST 3M	0.206897	0.188176	1.099488	0.2732

R-squared	0.212859	Mean dependent var	1.627108
Adjusted R-squared	0.188261	S.D. dependent var	7.244671
S.E. of regression	6.527201	Akaike info criterion	6.625309
Sum squared resid	6816.696	Schwarz criterion	6.737790
Log likelihood	-543.9006	Hannan-Quinn criter.	6.670966
F-statistic	8.653445	Durbin-Watson stat	0.383232
Prob(F-statistic)	0.000000	Wald F-statistic	3.548884
Prob(Wald F-statistic)	0.004531		

As evident from Table 6, after introducing the HAC Newey-West correction, we obtain different standard errors for each of the parameters, although the estimated parameters remain the same, as already discussed. Hence, the t-statistics and the p-values for the estimated parameters are now different, and the only variable which remains statistically significant at the level of 0.1 is the variable *employment expectations for the next three months*, while the rest of the independent variables are now statistically insignificant at each of the three levels of statistical significance (0.01, 0.05, and 0.1). This means that after correcting for the presence of both serial correlation and heteroscedasticity, the only variable which has an effect on the *price expectations for the upcoming*

three months is the variable *expectations for the employment in the upcoming three months,* and that effect is positive. The practical interpretation of this result is that in the services sector in North Macedonia, the only determinant of price expectations of the managers and entrepreneurs is their expectations for the employment in that sector. In other words, when managers and entrepreneurs in the services sector expect higher employment, they also expect rise in prices.

Conclusion

In this paper, we attempt to determine the drivers of price expectations of managers and entrepreneurs in the services sector in North Macedonia. By relying on monthly data obtained from the State Statistical Office of North Macedonia and the European Commission, we construct an OLS regression model with which we try to explain the dependent variable *price expectations*. Although the initial results suggest that the *lagged price level, demand expectations, employment expectations,* and *past employment* are statistically significant and have a positive influence on the *price expectations*, the residuals exhibited both serial correlation and heteroscedasticity. After introducing the HAC Newey-West correction, the only variable that remained statistically significant was the variable *employment expectations*. Hence, the only determinant of *price expectations* is *employment expectations.*

This paper has a few drawbacks. For instance, the adjusted R-squared is around 0.19, meaning that we should probably focus on finding additional independent variables that would have bigger explanatory power. Furthermore, this type of research can be done for the other sectors of the economy and that would help us form a more general understanding of what drives the price expectations at the country-level. Additionally, this research can also be done in a more international setting which would enable us to see differences and similarities between the drivers of price expectations in different countries.

References

1 Akinsola, F.A. and Odhiambo, N.M., 2017. Inflation and economic growth: A review of the international literature.

2 Armantier, O., Bruine de Bruin, W., Potter, S., Topa, G., Van Der Klaauw, W. and Zafar, B., 2013. Measuring inflation expectations. *Annu. Rev. Econ.*, *5*(1), pp.273-301.

3 Barro, R.J., 1995. Inflation and economic growth.

4 Carlson, J.A. and Parkin, M., 1975. Inflation expectations. *Economica*, *42*(166), pp.123-138.

5 Cunningham, R., Desroches, B. and Santor, E., 2010. Inflation expectations and the conduct of monetary policy: A review of recent evidence and experience. *Bank of Canada Review*, *2010* (Spring), pp.13-25.

6 Sarel, M., 1996. Nonlinear effects of inflation on economic growth. *Staff Papers*, *43*(1), pp.199-215.