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The Impact of Inflation Targeting on Inflation

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ABSTRACT

The **purpose** of the paper is to assess the impact of the transition to the inflation targeting regime on inflation in modern conditions. To achieve this goal, we carry out econometric modeling of the impact of this monetary policy regime on the dynamics of the overall price level. As an empirical strategy, we use the estimation of models with fixed effects on cross-country panel data containing information up to and including 2022. In addition, to clarify the long-term effects of changing the monetary policy regime, we use the difference of differences estimator with the inclusion of additional control variables. The modelling results demonstrate that even in today's shock conditions for the global economy, inflation targeting remains an effective tool for achieving price stability. This effect is observed for various subsamples of countries. In relation to Russia, it is important to **conclude** that inflation targeting is an effective tool for achieving price stability for oil-exporting countries.

Keywords: inflation; inflation targeting; difference in differences esimator; panel data; monetary policy; central bank

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INTRODUCTION

High and volatile inflation makes it difficult to predict future price levels, hinders households and firms from making sound investment decisions, and leads to inefficient allocation of limited resources. This exacerbates social inequality and slows down long-term economic growth [1]. In the context of such negative consequences, the primary task of central banks around the world is to maintain a low and stable level of inflation, which explains the widespread adoption of inflation targeting regimes.

According to the 2021 report on Exchange Arrangements and Exchange Restrictions (AREAER),[1] the IMF recognizes the inflation targeting regime in 45 countries, whose central banks not only set an inflation target but also directly engage in targeting it, without being distracted by other macroeconomic indicators.Such popularity of inflation targeting is due to the consensus in the scientific literature regarding the effectiveness of this regime in combating inflation. This consensus largely formed in the early 21st century, when low inflation was consistently observed in most developed countries for decades. Price stability was not shaken even by the Great Recession of 2008–2009. In many developing countries, including those that adopted inflation targeting, the rate of overall price growth also decreased on average. Therefore, it seemed that the task of combating inflation worldwide was solved.

However, starting from 2022, inflation in Russia and around the world, on the contrary, is increasing. Record rates of overall price growth were observed even in economies that had not seen double-digit inflation since the 1980s. At the same time, unemployment increased and overall economic activity decreased, which also limited the central banks' room for maneuver. Apparently, this effect is related to prolonged negative supply shocks resulting from the pandemic in 2020–

[1] URL: https://www.imf.org/en/Publications/Annual-Report-on-Exchange-Arrangements-and-Exchange-Restrictions/Issues/2022/07/19/Annual-Report-on-Exchange-Arrangements-and-Exchange-Restrictions-2021–465689 (accessed on 23.01.25).

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2021 and disruptions in logistics chains in 2022–2023. By now, this surge in inflation has only been partially mitigated, and the rate of price growth worldwide remains relatively high.

E. L. Goryunov and co-authors [2], considering possible scenarios of global inflation dynamics, note that the scenario of developed economies falling into a prolonged stagflation trap is quite realistic (although not the most likely yet). In this regard, the fight against inflation is becoming a relevant task again, and the inflation targeting regime is facing, perhaps, one of the main challenges in its more than thirty years of existence.

The effectiveness of traditional inflation targeting in the context of modern stagflation raises doubts among some researchers. This situation revives the previously quiet discussion about the advisability of abandoning this regime in its current form or at least revising the quantitative values of the monetary policy targets used [3].

Therefore, it seems important to understand to what extent recent data confirms the hypothesis that inflation targeting can reduce inflation.

In this regard, the aim of our work is to assess the impact of the transition to an inflation targeting regime on inflation under current conditions..

The novelty of our research compared to similar literature lies in the fact that we consider data from 2019–2022, during which the global economy faced significant shocks that led to an acceleration in the overall price level growth. We primarily focus on developed countries, as many of them have long since overcome the problem of inflation, even before the popularization of inflation targeting, and some researchers question the significance of this regime's contribution to the fight against inflation specifically in developed countries [4]. Moreover, we additionally evaluate the effect of inflation targeting for oil-exporting countries, as such economies are significantly oriented towards the external market, and therefore inflation in them can substantially depend on exchange rate fluctuations, which potentially affects the effectiveness of pure inflation targeting.

Our paper consists of three parts and a conclusion. The first part offers a literature review on the research topic. In the second part, we describe the empirical strategy and data. The third part contains the modeling results. In the conclusion, we summarize the research findings.

INFLATION TARGETING AND INFLATION

Early papers dedicated to analyzing the impact of inflation targeting on inflation date back to the period of relative macroeconomic stability in the 1990s and 2000s, before the onset of the global financial crisis [4–6]. The empirical strategy used here includes the difference-in-differences method and propensity score matching. The general conclusion of such studies is that inflation targeting weakly reduces inflation in countries where it was relatively low at the time of transition, and strongly reduces inflation in countries where it was high at the time of transition. Moreover, the transition to inflation targeting reduces not only the level of inflation but also its volatility [1].

The mentioned papers instill some optimism regarding the success of inflation targeting during the period of great moderation; however, they leave open the question of how this regime operates under conditions of strong shocks. M. Pourroy [7] attempted to fill this gap by investigating how effective inflation targeting was during the Great Recession. Modeling using the difference-in-differences method revealed that this regime contributes to the rapid adaptation of the economy to the consequences of the crisis, which is reflected in a more accelerated recovery of output. At the same time, hybrid inflation targeting, within which the central bank considers not only inflation but also smooths exchange rate volatility, proves to be a more effective regime

compared to pure inflation targeting, where monetary authorities ignore any other goals besides the inflation target. Experimental confirmation of the advantages of mixed targeting over pure targeting has also been obtained in work [8]. In work [9], modeling was also carried out taking into account data from the period of the global financial crisis of 2008–2009. Based on the analysis of dynamic panel models with fixed effects, it has been shown that inflation targeting contributes to reducing inflation in developing countries.

Another argument in favor of the effectiveness of inflation targeting can be considered the work of M. Fratzscher et al. [10]. The peculiarity of this study is that it analyzes the effectiveness of this regime under conditions of severe exogenous shocks —natural disasters that have a direct negative impact on the economy through the destruction of physical capital and durable goods. In order to capture a sufficient number of such episodes, the study uses a broad sample of 76 countries (both developed and developing) over the period from 1980 to 2015, and based on this, a dynamic panel model is constructed. As a result of the evaluation, the authors find that inflation targeters cope better with the consequences of shocks than countries with other monetary policy regimes. This superiority manifests in less significant reactions of inflation and output to negative shocks, in particular:

the level and volatility of inflation increase as a result of natural disasters less than under alternative monetary policy regimes, with the average rate of price growth remaining at a lower level for four years after the exogenous shock;

under inflation targeting, GDP experiences a smaller immediate decline, recovers faster, and, moreover, subsequently settles at a higher level than under other monetary policy regimes.

Such results have passed a robustness check, during which the authors took into account the quality of public institutions and the presence of various fiscal rules in some of the countries included in the sample. Moreover, inflation targeters managed to better anchor inflation expectations after exogenous shocks.

It can be concluded that the literature has identified some evidence in favor of the idea that inflation targeting allows for successful combat against inflation not only under conditions of macroeconomic stability but also during crises caused by cyclical fluctuations in economic activity or other reasons. In our paper, we will test this conclusion by supplementing the data with periods of the COVID-19 pandemic, as well as the current period of geopolitical instability.

DATA AND EMPIRICAL STRATEGY

Following the approach [4], we use data from all developed countries that are members of the Organisation for Economic Co-operation and Development: Australia, Canada, Finland, New Zealand, Spain, Sweden, the United Kingdom, the United States, Japan, Denmark, Austria, Belgium, Ireland, Italy, the Netherlands, Portugal, Norway, Switzerland, Germany, and France. Additionally, to study the effectiveness of inflation targeting in oil-exporting countries, we analyze data from the fifteen largest oil exporters. These include Canada and Norway, as well as Saudi Arabia, Russia, Iraq, Canada, the UAE, Kuwait, Iran, Venezuela, Angola, Nigeria, Norway, Kazakhstan, Mexico, Oman, and Brazil.

Information on inflation rates and the dynamics of other macroeconomic indicators is taken from the International Monetary Fund's database. Modern statistics on the monetary policy regimes used are taken from the Annual Report on Exchange Arrangements and Exchange Restrictions (2022), while earlier data are from the paper [11].

To assess the impact of the transition to inflation targeting on the level of inflation, we use two approaches: the difference-in-differences method, as well as panel models with fixed and random effects.

The first approach is based on the traditional starting point of research on the effectiveness of inflation targeting — the paper [4]. In addition to the monetary policy used, we consider whether the country is an oil exporter or not:

$$INFL_{i,post} - INFL_{i,pre} = \beta_0 + \beta_1 IT_i + \\ + \beta_2 IT_i OilExp_i + \beta_3 INFL_{i,pre} + \varepsilon_i,$$

where $INFL_{i,post}$ and $INFL_{i,pre}$ — average inflation rates in i-country — over the five years before the transition to inflation targeting and average inflation rates over the five years after the transition to this monetary policy regime; IT_i — dummy variable equal to one for inflation-targeting countries; $OilExp_i$ — dummy variable equal to one for oil-exporting countries; ε_i — random regression errors.

Such long-term averages, like $INFL_{i,post}$ and $INFL_{i,pre}$, allow capturing the long-term effect of the change in the monetary policy regime on inflation, separating it from short-term cyclical fluctuations. For countries in the control group (that is, for countries that did not switch to inflation targeting), the boundary point between the before and after periods is the sample average year of the transition to inflation targeting for the countries in the experimental group.

As already noted in the review of the work, adding the regressor $INFL_{i,pre}$ to the right side of the equation helps solve the endogeneity problem and distinguish the mean reversion effect (coefficient β_3) from the effect of transitioning to an inflation targeting regime, the magnitude of which is indicated by the β_1 (дfor non-oil-exporting countries) or the sum of the coefficients $\beta_1 + \beta_2$ (for oil-exporting countries).

In this specification, if we conclude that the coefficient β_1 is less than zero, it will mean that target countries have indeed managed to achieve a stronger reduction in the inflation rate compared to countries using an alternative monetary policy regime. Furthermore, a negative coefficient value β_2 will indicate that for oil-exporting countries, inflation targeting contributes more significantly to disinflation compared to countries that are not oil-exporting.

The second approach involves estimating the model on panel data with random or fixed effects and a number of control variables: the primary balance of the government budget (the overall difference between government revenues and expenditures, excluding interest payments on accumulated government debt) and the level of imports of goods and services (both variables taken as a percentage of GDP). This choice is based on the paper [12] and allows for the consideration of the features of fiscal policy, which may affect the effectiveness of the actions of monetary authorities. Country effects capture those specific socio-economic and demographic characteristics of economies that change slowly over time, as well as the initial level of economic development, so there is no need to consider these factors as separate control variables [13].

Thus, the evaluated specification of the equation looks as follows:

$$INFL_{it} = \beta_0 + \beta_1 * IT_{it} + \beta_2 * govpribal_{it} + \beta_3 * import_{it} + \\ + \beta_4 * OilExp_i + \beta_5 * IT_{it} * OilExp_i + \mu_i + \varepsilon_{it},$$

where $INFL_{it}$ — the level of inflation in i-country; IT_{it} — dummy variable equal to one if i-country targeted inflation in year t; $govpribal_{it}$ — the level of the primary balance as a percentage of GDP in i-country in year t; $import_{it}$ — the level of imports of goods and services as a percentage of GDP in i-country in year t; $OilExp_i$ — dummy variable equal to 1 for oil-exporting countries; μ_i —country fixed effect; ε_{it} — random regression errors.

To verify the robustness of the results, we also evaluated bidirectional models that account for time effects.

RESULTS OF MODELING AND STABILITY CHECK

The obtained estimates of the parameters of the difference-in-differences model are

Table 1

Assessment of the Influence of Inflation Targeting on Inflation Using the Difference-in-Differences Estimation

	Dependent variable:		
	$INFL_{i,post} - INFL_{i,pre}$		
Variable	**Full sample**	**Oil exporters**	**Non-oil exporters**
IT_i	−3.464***	−5.365***	−0.966***
	(1.103)	(1.934)	(0.342)
$INFL_{i,pre}$	−0.318**	−0.425***	−0.801***
	(0.148)	(0.156)	(0.055)
Constant	2.229***	5.570***	1.815***
	(0.671)	(1.371)	(0.275)
Number of observations	30	12	18
R-squared	0.521	0.702	0.908

Source: Compiled by the authors.

Notes: Robust standard errors are reported in parentheses under the coefficient estimates; ** and *** indicate the significance level of 5% and 1%, respectively.

presented in *Table 1*. The calculations were carried out for both the full sample and separately for countries that export and do not export energy resources.

Based on the analysis of the obtained results, it can be concluded that the transition to inflation targeting on average helps countries in the fight against inflation, reducing its level by 3–4 percentage points. Oil-exporting countries manage to reduce the level of inflation more effectively when transitioning to IT than countries whose economies are not focused on oil exports: while in the first group the transition to the new policy allowed an average reduction of inflation by approximately 5 percentage points under otherwise equal conditions, in the second group the similar effect was only 1 percentage point. This difference can partly be explained by the fact that among oil exporters there are developing countries for which the transition to inflation targeting is more important in terms of combating high rates of overall price level growth [14].

The level of inflation in the economies of countries before transitioning to inflation targeting is also a significant factor in determining its level after the transition, meaning that the mean reversion effect identified in work [4] is also observed in recent data.

The model underwent two robustness checks. First, we altered the sample: regardless of the exclusion from or inclusion in the sample of countries that faced hyperinflation during the period under consideration (Angola and Brazil), the conclusion about the sign of the inflation targeting effect remains unchanged. Second, we implemented a placebo test, in which countries were randomly assigned to the experimental group. When countries were randomly assigned to the experimental group, the impact effect became insignificant, which serves as indirect confirmation of the adequacy of the methodology used.

The results of the model evaluation using the second approach (panel models with control variables) are presented in *Table 2*. The first column contains the model without country effects, the second and third with fixed and random effects, respectively. The Hausman test does not reject the hypothesis of the consistency of the random effects

Table 2

Assessment of the Influence of Inflation Targeting on Inflation Using the Models with Fixed and Random Effects

	Dependent variable:		
	$INFL_{it}$		
Variable	Pooled	Fixed effects	Random effects
IT_{it}	−1.641***	−2.673**	−2.510***
	(0.623)	(1.065)	(0.921)
$OilExp_i$	9.472**		10.026***
	(3.714)		(3.737)
$IT_{it} * OilExp_i$	−7.864**	−11.015	−10.759
	(3.510)	(7.653)	(7.020)
Control variables	Yes	Yes	Yes
Fixed effects	No	Yes	No
Random effects	No	No	Yes
F-test	p-value < 0.05		
Breusch-Pagan test		p-value < 0.05	
Hausman test			p-value > 0.05
Number of observations	996	996	996
R-squared	0.210	0.111	0.121

Source: Compiled by the authors.

Notes: Robust standard errors are reported in parentheses under the coefficient estimates; F-test — test to check the hypothesis of the absence of fixed effects; Breusch-Pagan test — test to check the hypothesis of the absence of random effects; Hausman test — test to check the hypothesis of the validity of estimates in a model with random effects; *, ** and *** indicate the significance level of 10%, 5% and 1%, respectively.

model estimates. The conclusions regarding the implications of implementing inflation targeting as a result of applying these two approaches remain robust, so the choice between them is not critical. Additionally, we estimated a two-way panel model, but formal tests did not confirm the necessity of including time dummy variables in the regression.

The coefficient estimates obtained from the implementation of the second approach correspond to the results of the difference-in-differences method: the application of inflation targeting is associated with a lower level of inflation. This effect of inflation targeting remains statistically significant at least at the five percent level in all specified models. The difference in conclusions is that in this case, we do not observe significant differences in the effect of inflation targeting in oil-exporting countries compared to the rest of the sample.

For additional verification of the robustness of the obtained conclusions, it would be advisable to increase the sample size by including a greater number of countries, which would allow for conclusions that are valid for developing economies that are not oil exporters. Such an expansion of the research object remains outside the scope of our work; however, it certainly represents an area of interest for the future.

CONCLUSION

In the course of econometric modeling, we have found evidence that inflation targeting contributes to the reduction of inflation. Moreover, this effect is observed both in developed countries, characterized by relatively low rates of overall price level growth, and in oil-exporting countries, some of which have faced prolonged periods of high inflation in recent decades. For economies

that were initially characterized by high inflation, the benefit of transitioning to inflation targeting is more significant. However, the effectiveness of this regime is maintained even when accounting for differences in the initial inflation level (i.e., the average inflation level over the five years prior to the transition to targeting) in the model construction.

Econometric estimates show the effectiveness of inflation targeting even when considering the most recent data, that is, data related to the pandemic periods and the current global stagflation.

A possible explanation for this result is the anchoring of inflation expectations near the inflation target for those countries that have long and successfully been inflation targeters. In other words, in countries that have been targeting inflation for a long time, economic agents, when forming expectations, are more oriented towards the inflation target and the forecasts of the central bank than towards fluctuations in economic conditions caused by contemporary global shocks. As a result, when contracts are concluded, the expected price increase specified in them turns out to be less significant, which prevents inflation from accelerating. As I. Buono and S. Formai [15] show, the anchoring of inflation expectations, firstly, plays an important role in the dynamics of inflation after crises, and secondly, can be easily lost if monetary policy is not sufficiently consistent.

In such conditions, abandoning inflation targeting or even revising the inflation target appears impractical, as any of these decisions will inevitably undermine the credibility of central bank commitments, leading to increased inflation expectations and, consequently, raising the likelihood of an accelerated inflation scenario not only in the medium term but also in the long term.

The possible theoretical contribution of our work lies in demonstrating evidence in favor of the effectiveness of the inflation targeting regime under conditions of strong inflationary pressure faced by the global economy. We hope that this result will also contribute to the discussion on what the regime of Russian monetary policy should be. Within this discussion, arguments are made both for and against the use of inflation targeting [16, 17]. The practical value of our work, as we see it, lies in the fact that the obtained estimates can be used to justify the choice of the monetary policy format in contemporary conditions.

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