JOEEP

Journal Homepage: http://dergipark.org.tr/joeep

Araştırma Makalesi ● Research Article

Does Increasing the Inflation Target Have a Positive Effect on Macroeconomic Performance?*

Enflasyon Hedefinin Yükseltilmesi Makroekonomik Performansı Olumlu Etkiler Mi?

Emine Aybike Akkutay [a, **]

[a] Dr. Öğr. Görevlisi, Ankara Hacı Bayram Veli Üniversitesi, Polatlı Sosyal Bilimler Meslek Yüksekokulu, Finans, Bankacılık ve Sigortacılık Bölümü, 06900, Polatlı- Ankara/Türkiye
ORCID: 0000-0002-3580-0134

M A K A L E B İ L G İ S İ

Makale Geçmişi:
Başvuru tarihi: 16 Mayıs 2021
Düzeltme tarihi: 1 Ağustos 2021
Kabul tarihi: 21 Kasım 2020

Anahtar Kelimeler:
Enflasyon
Siyasi istikrarsızlık
Verimlilik

ÖZ

Bu çalışmada enflasyon hedeflemesinin makroekonomik performans üzerine etkileri politik makroekonomik çerçevede incelenmiştir. Bu bağlamda, enflasyon hedefinin yükseltilmesinin farklı etkileri dikkate alınarak uygun bir politik makroekonomi modeli geliştirilmiştir. Ayrıca enflasyonun çıktı üzerindeki olumsuz etkisi net verimlilik etkisi olarak ifade edilmiş ve net verimlilik etkisinin farklı durumları ele alınarak enflasyonun artırılmasıyla makroekonomik göstergeler üzerindeki etkileri gösterilmiştir. Elde edilen bulgulara göre, yüksek siyasi belirsizlik ortamında enflasyonun hedefinin yükseltilmesinin makroekonomik performans üzerine etkilerinin olumsuz olduğu görülmektedir.

A R T I C L E I N F O

Article history:
Received: May 16, 2021
Received in revised form: Agust 1, 2021
Accepted: Nov 21, 2020

Keywords:
Inflation
Political instability
Productivity

A B S T R A C T

In this study, the effects of inflation targeting on macroeconomic performance have been analyzed within a political macroeconomic framework. In this context, an appropriate political macroeconomic model has been developed by considering the different effects of raising the inflation target. In addition, the study examines the negative effect of inflation on output that is expressed as the net productivity effect and the effects of net productivity on macroeconomic performance under various states for an increase in the inflation target. According to the findings, it is seen that the effect of raising the inflation target on macroeconomic performance has a negative effect in an environment of high political uncertainty.

1. Introduction

The successful results of inflation targeting have increased the number of countries adopting this regime. In particular, developed countries with the set inflation target of 2% achieve price stability. However, new views have indicated that a higher inflation target would be more beneficial in countries experiencing economic recession (Krugman, 2014). According to Ball (2013), higher inflation target helps central banks achieve full employment. According to Blanchard, Arricia, and Mauro (2010), when the inflation rate is very low, allowing higher inflation can stimulate the economy and in turn increase demand, although politicians still need to be cautious. There are also many economists

* This article is derived from the doctoral thesis titled “Political macroeconomic dynamics of inflation: Theoretical application” prepared by Emine Aybike Akkutay and conducted under the supervision of Doç.Dr. Nil Demet Güngör at Atılım University.

** *Sorumlu yazar/Corresponding author*.
e-posta: *aybikeakkutay@gmail.com*

Atıf/Cite as: Akkutay, E. A. (2021). Does Increasing the Inflation Target Have a Positive Effect on Macroeconomic Performance?. *Journal of Emerging Economies and Policy*, 6(2), 310-318.
e-ISSN: 2651-5318.

(Ball and Loungani, 2014; Dorich et al. 2018; Yellen, 2015) who widely recommend higher inflation targets, especially in countries experiencing a recession. However, although some argue that a higher inflation target may have benefits as well as significant costs, in developing countries with high inflation that also raised their inflation target, macroeconomic indicators deteriorated further. To achieve favorable short-term outcomes in growth and unemployment rates, together with higher inflation target, a country should have strong macroeconomic indicators and a stable environment. However, macroeconomic and political instability lies at the root of the inability to achieve monetary (and price) stability in countries with long-standing histories of high inflation. These countries have chronically high budget deficits and public debts, as well as high inflation (e.g., Turkey's economy in the 1990s). There is plenty of empirical evidence that, in such countries, rising inflation reduces capital accumulation and productivity, and thus, economic growth (İsmihan et al., 2005).

In the 1970s, high inflation and low productivity were experienced together, which led to the view that inflation reduces productivity (Freeman and Yerger, 2000). According to De Gregorio (1992), the productivity of capital depends on employment. He argues that inflation affects growth by changing labor supply and demand, so increasing returns will decrease total employment. Thus, falling employment decreases the marginal productivity of capital. Christopoulos and Tsionas (2005) found a negative relationship between inflation and productivity growth in about half of the countries they studied. Narayan and Smith (2009) explained the inverse relationship between inflation and productivity. First, inflation can adversely affect production factors. Second, inflation distorts price signals, causing decision-makers to choose non-optimal production factors. Third, increasing uncertainty regarding inflation reduces firms' long-term basic research expenditure, thereby reducing productivity. Fourth, inflation reduces the incentive of employees to do business. Finally, inflation erodes tax cuts, which reduces capital accumulation and productivity. Many studies have also found a negative relationship between inflation and productivity (see Buck and Fitzroy1988; Becker and Gordon 2005; Burno and Easterly 1996; Barro 1995; Ram 1984).

Productivity is a crucial factor for economic inputs to generate growth. One of the key factors that increases productivity is political stability. Therefore, political economy models emphasize that both price and political stability are critical (Edwards, 1994). The political economy theory emphasizes that economic policies emerge within an institutional structure and as a result of a political struggle. Thus, the decisions of politicians affect the economy (Alesina and Perotti, 1994). However, government decisions can often lead to macroeconomic fluctuations (Lindbeck, 1976). In particular, a politician who lacks knowledge about how the economy functions and how policies affect it will not be successful, as can be seen from the experiences of various less developed countries (Romer and Romer, 1997).

Macroeconomic instability is primarily caused by political instability, which damages economic performance in many countries in terms of growth, private investment, taxation, public spending and investments, debt, and inflation (Aisen and Vega, 2013). Many studies have shown that political instability reduces productivity and hampers economic growth.

Political instability is mostly seen in relation to populist policies, which mainly stem from weak democratic institutions (Acemoğlu et al., 2013). If democratic institutions are lacking, macroeconomic performance may deteriorate, leading to government collapse and political turmoil. If the government is likely to change, then future policies are uncertain. The resulting risk adversely affects economic decision-makers by preventing them from making important economic decisions or forcing them to invest in other countries (Asteriou and Price, 2001). According to Alesina and Perotti (1996), political instability adversely affects investments and thus reduces growth. Their models show that inequality in income distribution increases socio-political instability, which in turn reduces investments. Fischer (1993) argues that policy-induced macroeconomic uncertainty due to high inflation or political instability reduces the efficiency of the price mechanism and suppresses productivity. Aizenman and Marion (1991) also demonstrate a negative relationship between growth and political instability, in that high political instability slows economic growth. A weak government and political conflict cause macroeconomic indicators to deteriorate.

The present study proposes the effects of the higher inflation to analyze macroeconomic performance. It examines the results of the higher inflation based on a theoretical model developed for this research. While the proposed model is based on growth policies, it also takes into account net productivity effects. The net productivity effect has been studied in three cases, which are greater than zero, lower than zero, and equal to zero. Also, the net productivity effect has been associated with political instability.

The study first discusses the theoretical model formulated for this study. Then, it presents the macroeconomic equilibrium solution of the model before interpreting the results.

2. The Model

2.1. Theoretical Model

In this section, this study presents a theoretical model, which is a simple two-period model of macroeconomic policymaking that features explicit interactions between a fiscal authority (the government) and a monetary authority (central bank). While the government determines fiscal policy, an independent central bank controls monetary policy. Policy decisions are taken simultaneously and not cooperatively. The government and central bank play the game of Nash equilibrium. In other words, while the government makes tax and spending decisions, the central bank determines the inflation rate. A similar version of the two-period macroeconomic model of Alesina and Tabellini (1987) and Ismihan (2009) is used to address the macroeconomic effects of the inflation targeting regime. To address the macroeconomic consequences of the inflation targeting regime, the inflation target is added to the loss functions in Ismihan (2009) equation (3.2) and (3.11). After this suggestion, the preferences of the central bank can be described by the following loss function:

$$L_t^{CB}=\frac{1}{2}\sum_{t=1}^{T=2}\beta_{CB}^{t-1}[\![\mu_1(\pi_t-\bar{\pi}_t)^2+(x_t-\bar{x}_t)^2]\!] \tag{1}$$

where L_t^{CB} indicates the welfare losses incurred by the independent central bank; μ_1 indicates the central bank's relative dislike for the deviations of inflation (π) from its target level ($\bar{\pi}$); β_{CB} is the discount factor of the central bank; π_t, indicates the inflation rate; $\bar{\pi}_t$ indicates the targeted inflation rate; and x_t and $\bar{x}_t$ represent the output and target output, respectively.

Similarly, the government's loss function is as follows:

$$L_t^{G}=\frac{1}{2}\sum_{t=1}^{T=2}\beta_{G}^{t-1}[\![\delta_1(\pi_t-\bar{\pi}_t)^2+(x_t-\bar{x}_t)^2+\delta_2(g_t-\bar{g}_t)^2]\!] \tag{2}$$

where L_t^G gives the government's welfare losses; β_G is the government's discount factor; g_t gives public expenditure (as a ratio of output); and $\bar{g}_t$ gives the targeted public expenditure. The coefficients δ_1 and δ_2 respectively indicate the government's dissatisfaction with deviations of inflation and public expenditure from their targets. The government's budget constraint is given in the equation below:

$$g_t+(1+r_{t-1})d_{t-1}=\tau_t+\pi_t+d_t \tag{3}$$

Technical details regarding the derivation of budget constraint are given in Appendix A. The left-hand side of the budget constraint consists of public spending and debt services (interest payments and principal payments). The right side consists of tax revenues, seigniorage revenues, and borrowings.

The production function of a representative competitive firm is $Y_t=A_tN_t^{\theta}$. Y_t gives the output in the period t; A_t represents the productivity level; N_t represents the labor force in the range $0<\theta<1$. Tax is levied on output at the rate of τ_t. The firm's profits are given by $P_t(1-\tau_t)A_tN_t^{\theta}-W_tN_t$. P_t gives the price level in the t period, while W_t gives the wage level in period t. The output supply function is $y_t=\alpha\left(\pi_t+\frac{a_t}{\theta}-\pi_t^e-\tau_t\right)+z$. Writing these terms in lowercase letters indicates that their logarithm is taken. $y_t=ln(Y_t)$, $\alpha=\theta/(1-\theta)$, $z=\alpha\,ln(\theta)$, and $ln(1-\tau)$ approximately equal $-\tau$.

In this model, (log) productivity is expressed as $a_t=a_0-\varphi\pi_t$ while φ is a measure of the negative effect of inflation on productivity ($\varphi>0$). Equation a_t is substituted in equation y_t above. Subtracting the constant term ($z'=z+\alpha\,a_0/\theta$) from y_t and normalizing it yields the normalized supply function:

$$x_t=\alpha(\pi_t-\gamma\pi_t-\pi_t^e-\tau_t) \tag{4}$$

where x represents the output logarithm; π_t is the inflation rate; τ_t is the tax rate; and $\gamma=\frac{\varphi}{\theta}$. $x_t=\alpha(\pi_t(1-\gamma)-\pi_t^e-\tau_t)$ by typing the net effect of $(1-\gamma)$ of inflation on output can be shown $[(1-\gamma)=\gamma^*]$. By simplifying the equation of x_t, $x_t=\alpha(\gamma^*\pi_t-\pi_t^e-\tau_t)$.

In this model, $\gamma^*=1-\gamma$ gives the net effect of inflation on output. This effect depends on the magnitude of the (negative) effect of inflation on productivity—that is, the level of uncertainty in the political environment, as explained above. There are three different aspects of this net "efficiency" effect:

The first is when the net productivity effect is greater than zero ($\gamma^*>0$). This is the situation when political instability is (relatively) low or nonexistent.

The second case is when net productivity is less than zero ($\gamma^*<0$). Here, political instability is high, which may seriously affect the macroeconomic environment.

The third case is the special case ($\gamma=1$) when the net efficiency effect is equal to zero ($\gamma^*=0$).

2.2. Macroeconomic Outcomes

In the two-term dynamic model, the equilibrium solution is derived through backward induction. Technical details regarding the derivation of macroeconomic equilibrium solutions for the period t = 1 and t = 2 are given in Appendix B. From this point, first the second-period equilibrium results, and then the first term equilibrium results, are derived.

In Table 1, each row shows the macroeconomic equilibrium solution of the variable in the relevant row. In this framework, each relevant row in the table is the coefficient of the variable in the relevant column in the solution for that row variable. The first three rows in the table express the results for the t = 1 period, while the next three rows show the results for the t = 2 period. In this study, while analyzing the effects of increase in π_1, the meaning of rise in $\bar{\pi}_1(\partial\pi_1/\partial\bar{\pi}_1)$ was studied. In addition, another point highlighted in the study is the net productivity effect, and Table 2 shows this net effect with γ^*. The study is the net productivity effect, and Table 2 also shows this net effect with γ^*. As mentioned above, net productivity effect has three cases: (1) the net productivity effect is positive ($\gamma^*>0$); (2) the net productivity effect is negative ($\gamma^*<0$); and (3) the net productivity effect is zero ($\gamma^*=0$). Its interpretation is also explained in the next section.

2.3. Net Productivity, the Inflation Target, and Macroeconomic Performance

This study analyzes the effect of political instability on productivity and macroeconomic performance. While examining this effect, a macroeconomic policy game was set up and it demonstrated that inflation has a negative effect on productivity. Inflation creates uncertainty and the reception of fewer resources with the available inputs. Therefore, resource allocation deteriorates. As mentioned in the introduction and theoretical model, the net effect of inflation on output is called the net productivity effect, and it is associated with political instability. In this section, the study has presented the consequences of the net productivity effect for macroeconomic outcomes.

Evaluating Table 1, the first-period variables affect the second-period variables. In fact, when the net effect of inflation on output is positive, $\gamma^* > 0$, in the first period by enhanced inflation, the policymaker who takes priority growth policies reaches intended outcomes in the second period. On the other hand, when a reverse situation in a sense net productivity effect is negative, $\gamma^* < 0$, macroeconomic outcomes are unimproved in the second period by increasing inflation in the first period. The final situation is when net productivity is zero, $\gamma^* = 0$; by increasing inflation, there are no impacts on the first- and second-period outcomes. In this study, productivity has an intertemporal effect on macroeconomic outcomes.

<u>*Proposition 1*</u>: The effects of higher inflation rate on the second-period macroeconomic performance are appointed by the net productivity effect, $(1 - \gamma) = \gamma^*$.

Table 1. Macroeconomic Outcomes

Variables	$\phi\overline{\pi_1}$	$\phi\overline{g_1}$	$\phi\overline{x_1}$	$\phi\overline{\pi_2}$	$\phi\overline{g_2}$	$\phi\overline{x_2}$
π_1	$\frac{\psi H \delta_2}{\alpha^2} + \psi H + P$	$\frac{\psi H \delta_2(\gamma^*)}{\mu_1}$	$\frac{\psi H \delta_2(\gamma^*)}{\mu_1 \alpha}$	$-\frac{\psi H \delta_2(\gamma^*)^2}{\mu_1(1+r_1)}$	$\frac{\psi H \delta_2(\gamma^*)}{\mu_1(1+r_1)}$	$\frac{\psi H \delta_2(\gamma^*)}{\mu_1 \alpha(1+r_1)}$
$\bar{g}_1 - g_1$	$-\psi H(\gamma^*)$	ψH	$\frac{\psi H}{\alpha}$	$-\frac{\psi H(\gamma^*)}{(1+r_1)}$	$\frac{\psi H}{(1+r_1)}$	$\frac{\psi H}{\alpha(1+r_1)}$
$\bar{x}_1 - x_1$	$-\frac{\psi H(\gamma^*)\delta_2}{\alpha}$	$\frac{\psi H \delta_2}{\alpha}$	$\frac{\psi H \delta_2}{\alpha^2}$	$-\frac{\psi H\delta_2(\gamma^*)}{\alpha(1+r_1)}$	$\frac{\psi H \delta_2}{\alpha(1+r_1)}$	$\frac{\psi H\delta_2}{\alpha^2(1+r_1)}$
π_2	$-\frac{\psi\delta_2(\gamma^*)^2}{\mu_1} P(1+r_1)$	$\frac{\psi \delta_2(\gamma^*)}{\mu_1} P(1+r_1)$	$\frac{\psi \delta_2(\gamma^*)}{\mu_1 \alpha} P(1+r_1)$	$\psi + \frac{\psi \delta_2}{\alpha^2} + \frac{\psi H\delta_2(\gamma^*)}{\mu_1}$	$\frac{\psi \delta_2(\gamma^*)P}{\mu_1}$	$\frac{\psi \delta_2(\gamma^*)P}{\mu_1 \alpha}$
$\bar{g}_2 - g_2$	$-\psi(1+r_1)P(\gamma^*)$	$\psi(1+r_1)P$	$\psi(1+r_1)\frac{P}{\alpha}$	$-\psi(\gamma^*)P$	$\left(1 - \psi(\Phi+H)\right)$	$\frac{\psi P}{\alpha}$
$\bar{x}_2 - x_2$	$-\frac{\psi\delta_2}{\alpha}(1+r_1)P(\gamma^*)$	$\frac{\psi \delta_2}{\alpha}(1+r_1)P$	$\frac{\psi \delta_2}{\alpha^2}(1+r_1)P$	$-\frac{\psi \delta_2(\gamma^*)P}{\alpha}$	$\frac{\psi \delta_2}{\alpha} P$	$1 - \frac{\psi\delta_2}{\alpha^2} H + F$

Note: $u_t = \phi_{\bar{g}_1} \overline{g_1} + \phi_{\bar{x}_1} \overline{x_1} + \phi_{\bar{\pi}_1} \overline{\pi_1} + \theta_{\bar{g}_2} \overline{g_2} + \phi_{\bar{x}_2} \overline{x_2} + \phi_{\bar{\pi}_2} \overline{\pi_2}$

$\Phi = \frac{\delta_2}{\alpha^2} + \frac{(\gamma^*)^2\delta_2}{\mu_1} > 0,\ \psi = \frac{1}{(1+\Phi)} > 0,\ F = 1 - \frac{\delta_2}{\alpha^2}\psi > 0,\ D = \frac{\alpha^2\delta_1\delta_2(\gamma^*)^2+\delta_2\mu_1^2+\alpha^2\mu_1^2}{\alpha^2\mu_1^2}(\psi)^2 > 0,\ \widehat{\Lambda} = (1+r_1)\beta_H D > 0,\ \Gamma = \frac{\widehat{\Lambda}}{\psi} > 0,\ P = \frac{1}{1+(1+r_1)\Gamma} > 0,\ H = (1+r_1)\Gamma P > 0,\ \widehat{Y} = \left(1 - \frac{\delta_2}{\alpha^2}\psi H\right)$

(i) When net productivity effect is positive $(\gamma^* > 0)$, the higher the inflation rate in the first period, the lower the public spending and the output gaps; therefore, the macroeconomic performance in the final period is better. That is, the higher $\bar{\pi}_1$, the lower π_2, $(\bar{g}_2 - g_2)$, and $(\bar{x}_2 - x_2)$.

(ii) When net productivity effect is zero $(\gamma^* = 0)$, a change in inflation rate in the first period does not affect the second-period macroeconomic performance.

(iii) When net productivity effect is negative $(\gamma^* < 0)$, the higher the inflation rate in the first period, the higher the public spending and the output gaps; therefore, the second-period macroeconomic performance worsens. That is, the higher $\bar{\pi}_1$, the higher the π_2, $(\bar{g}_2 - g_2)$, and $(\bar{x}_2 - x_2)$.

Proof: The derivative of π_2 with respect to $\bar{\pi}_1$ is $-\frac{\psi\delta_2(\gamma^*)^2}{\mu_1} P(1+r_1)$, which is negative. Similarly, the derivatives of $(\bar{g}_2 - g_2)$, and $(\bar{x}_2 - x_2)$ with respect to $\bar{\pi}_1$, are $-\psi(1+r_1)P(\gamma^*)$ and $-\frac{\psi\delta_2}{\alpha}(1+r_1)P(\gamma^*)$, which are unambiguously negative, given that γ^*, ψ, δ_2, μ_1, P, and α are positive.

<u>*Proposition 2:*</u> The effects of higher inflation rate on the first-period macroeconomic performance are brought about by the net productivity effect, $(1 - \gamma) = \gamma^*$.

(i) When net productivity effect is positive $(\gamma^* > 0)$, the higher the inflation rate in first period, the lower is the public spending and the output gaps; therefore, the macroeconomic performance in the first period is better. That is, the higher the $\bar{\pi}_1$, the lower the π_1, $(\bar{g}_1 - g_1)$, and $(\bar{x}_1 - x_1)$.

(ii) When net productivity effect is zero $(\gamma^* = 0)$, a change in inflation rate in the first period does not affect the first-period macroeconomic performance, if $\gamma^* = 0$.

(iii) When net productivity effect is negative $(\gamma^* < 0)$, the higher inflation rate in the first period, the higher the public spending and the output gaps; therefore, the first-period macroeconomic performance worsens. That is, the higher the $\bar{\pi}_1$, the higher the π_1, $(\bar{g}_1 - g_1)$, and $(\bar{x}_1 - x_1)$.

Proof: The derivative of π_1 with respect to $\bar{\pi}_1$ is $\frac{\psi H \delta_2}{\alpha^2} + \psi H + P$, which is positive. Similarly, the derivatives of $(\bar{g}_1 - g_1)$, and $(\bar{x}_1 - x_1)$ with respect to $\bar{\pi}_1$, are respectively $-\psi H(\gamma^*)$ and $-\frac{\psi H(\gamma^*)\delta_2}{\alpha}$ which is unambiguously negative, given that γ^*, ψ, H, δ_2, P, and α are positive.

Propositions 1 and 2 demonstrate the effects of higher inflation on macroeconomic performance. From this point of view, the influence of inflation on the macroeconomic outcome is contingent on the net productivity effect. Therefore, when the net productivity effect is positive ($\gamma^* > 0$), increasing inflation has a favorable effect in the first and the second period. On the contrary, if net productivity is negative ($\gamma^* < 0$), increasing inflation has an adverse effect on macroeconomic performance. When $\gamma^* < 0$, the higher the inflation rate in the first period, the higher is the public spending and the output gaps in both the first and second periods. In the special case when net productivity is equal to zero, rising inflation does not affect the other variables. As a result, for high inflation to have favorable results on growth (in the short term), strong macroeconomic indicators and political stability must have been.

In the study, it is discussed that inflation has a negative effect on productivity, and in the second part of the study, this effect is shown with "φ." In addition to this, the net effect of inflation on output is represented by "γ^*." This term, expressed as the net productivity effect, has been associated with political stability. When political stability is ensured in a country, better economic agreement and trust will be provided, and it will support the long-term economic activities, hence sustainable development would be achieved. By promoting the investment environment, it can be easier to achieve the desired results in growth policies. On the contrary, in the presence of political instability, populist policies and weak governments are in question. This creates an environment of uncertainty and negatively affects productivity.

Consequently, the effect of the higher inflation target on macroeconomic performance is examined. During the evaluation of this effect, the net effect of inflation on output was analyzed and was associated with political stability. In previous studies, only the effects of a higher inflation target on growth were discussed. According to Ball and Loungani (2014), increasing the inflation target, which was set by central banks as approximately 2%, to 4% would be more beneficial than costly to the economy. Blanchard et al. (2010) included in their studies that the inflation target should be set as 4%. They argued that the benefits and costs of inflation should be reviewed. They have included in their studies that inflation has many costs, but they emphasized that it is necessary to look at whether these costs outweigh the benefits. They argued that a loose monetary policy should be implemented to overcome the recession period at very low inflation rates, and the recovery in demand should be ensured. According to Ball, there is a consensus on targeting inflation around the world at 2%. However, Ball (2013) argued that setting the inflation target at 4% both eases the constrains on monetary policy stemming from the zero bound on interest rates and may reduce the effects of downward nominal wage rigidity on employment. Krugman (2014) discussed in detail the claims of Ball and Blanchard that higher inflation targets have strong effects on the economy. Krugman said that it was difficult to achieve low inflation after the 1970s and that trying to change this target today would damage the credibility of central banks. However, by giving the example of the recession period in Japan, he argued that it is difficult to escape from the low inflation trap and that the inflation target should be increased at the right times by taking extra precautions. All these studies are based on the literature and discuss the benefits of raising the inflation target. The contribution of this study is to evaluate the effects of the higher inflation target on macroeconomic performance by considering the three aspects of the net productivity effect. These three aspects of the net productivity effect arise due to political stability. In addition to previous studies, the effects of political stability on productivity and macroeconomic performance are assessed. This relationship was examined via the theoretical model developed in this study. According to findings of the developed model, in the case of political stability, successful results will be obtained in growth policies with the inflation target increasing with the less negative effect of inflation on productivity. On the contrary, when political instability prevails, the negative effect of inflation on productivity increases, and it has been shown that the increase in inflation negatively affects macroeconomic results. Therefore, by emphasizing the importance of political stability, the consequences of the increase in inflation on growth policies are presented.

3. Conclusion

In this study, a theoretical model was analyzed within a political macroeconomic framework to determine its effects on the two-period model. The study derived and interpreted the changes in macroeconomic indicators after the higher inflation.

The analysis shows that inflation reduces output and productivity. Many studies have demonstrated the inverse relationship between inflation and output, especially since the 1970s. Inflation reduces productivity by creating uncertainty, which in turn can reduce growth. This uncertainty can also reduce the output rate by causing investment rates to fall. Accordingly, this study assumed that inflation damages productivity and impairs resource allocation. Its macroeconomic balance results are in this direction. However, the effect of inflation on productivity was expressed in terms of net productivity and evaluated within the framework of three cases: net productivity greater than zero, less than zero, and equal to zero.

In the first case, the net productivity effect is greater than zero while political instability is low. In the second case, net productivity is less than zero and political instability is high, which damages the macroeconomic environment. The third case is a special case where the net efficiency effect is equal to zero.

Politics and the economy are intertwined as economic policies are shaped by the political conjuncture. Political stability strengthens the institutional infrastructure to allow more transparent and reliable policies. In such an environment, the goals and instrumental independence of the central bank increases, which enables it to be more successful in achieving its inflation target. In a reliable economic environment in which the level of welfare increases, the level and efficiency of investment also increase. On the other hand, political instability weakens the institutional infrastructure, which reduces the credibility of decisions regarding the next period. This damages the independence of the central bank so that price stability cannot be achieved. Another main reason for the weakness of institutional infrastructure in the presence of political instability is populist policies. Along with populist policies, high and short-term public expenditure increase inflation with artificial wage increases and other public transfers. This situation is mostly seen when governments seeking re-election increase pre-election output. However, this strategy can distort resource allocation and decrease efficiency.

The study analyzed the success of the growth policies by increasing inflation in a simple two-period model of macroeconomic policy whereby the government is responsible for fiscal policy and the central bank is responsible for monetary policy. In this model, where net productivity is greater than zero, increasing inflation rises the public expenditure rate and output rate. Where net productivity is less than zero, increasing inflation decreases the public expenditure rate and output rate. In the special case when net productivity is equal to zero, rising inflation does not affect the other variables. Therefore, macroeconomic and political stability is necessary for successful growth policies after rising inflation. In addition, macroeconomic indicators are negatively affected in countries with political instability. In this case, when the government intervenes in monetary policy and pressurizes the central bank, it damages the latter's independence so that its monetary policies are unsuccessful. Nevertheless, countries with high inflation that cannot successfully implement inflation targeting regime increase their inflation rates, which creates macroeconomic instability. The emphasis on growth policies among developing countries both increases and causes fluctuations in inflation.

In conclusion, inflation adversely affects productivity, thus reducing output. One of this study's most important contributions is its inclusion of the net productivity effect in the model and comparison of the net productivity effect in three different cases after increasing inflation. The study's analysis of these three cases showed that output cannot always be raised by increasing inflation and demonstrated the effect of political stability on macroeconomic indicators.

References

Acemoğlu, D., & Egorov, G. & Sonin, K. (2013). A political theory of populism. *The Quarterly Journal of Economics, 128*(2), 771–805.

Aisen, A., & Veiga, F., J. (2013). How does political instability affect economic growth? *European Journal of Political Economy, 29*(1), 151-167.

Aizenman, J., & Marion, N. (1991). Policy uncertainty, persistence and growth. *NBER Working Papers Series*, No. 3848, Cambridge, 1-31.

Akkutay, E. A. (2019). Enflasyonun Politik Makroekonomik Dinamikleri: Teorik Uygulama. Doktora Tezi, Atılım Üniversitesi, Sosyal Bilimler Enstitüsü, Ankara.

Alesina, A., & Perotti, R., (1994). The political economy of growth: A critical survey of the recent literature. *The World Bank Economic Review, 8*(3), 351-371.

Alesina, A., & Perotti, R., (1996). Income distribution, political instability and investment. *European Economic Review, 40*(6), 1203-1228.

Alesina, A., Tabellini, G., 1987. Rules and discretion with non-coordinated monetary and fiscal policy. *Economic Inquiry, 25*(4), 619-630.

Asteriou, D., & Price, S., (2001). Political Instability and Economic Growth: UK Time Series Evidence. *Scottish Journal of Political Economy, 48*(4), 383-399.

Ball, L. (2013). The case for four percent inflation. *Central Bank Review 13*(2), 17-31.

Ball, L. M. & Loungani, M. P. (2014). The case for long run inflation target for four percent, *IMF Working Paper*, WP/14/92.

Barro, R., (1995). Inflation and Economic Growth. *NBER Working Paper Series*, No. 5326, 1-22.

Becker, I. D., & Gordon, R. (2005). Where Did the Productivity Growth Go? Inflation Dynamics and the Distribution of Income. *Brookings Papers on Economic Activity, 2*, 67-150.

Blanchard, O., Arricia, G., Mauro, P. (2010). Rethinking macroeconomic policy. *Journal of Money, Credit and Banking 42*(6), 199-215.

Buck, A. J., & Fitzroy, F. (1988). Inflation and Productivity Growth in the Federal Republic of Germany, *Journal of Post Keynesian Economics, 10*(3), 428-444.

Burno, M., & Easterly, W. (1996). Inflation and Growth: In Search of a Stable Relationship. *Economic Research Federal Reserve Bank of St. Louis, 78*(3), 139-146.

Christopoulos, D. K. & Tsionas, E. G., (2005). Productivity growth and Inflation in Europe: Evidence from Panel Cointegration Tests. *Empirical Economics 30*, 137-150.

De Gregorio J. (1992). The effects of inflation on economic growth: Lessons from Latin America. *European Economic Review, 36,* 417–425.

Dorich, J., Nicholas, L., Vadym, L. & Rhys R. M. (2018). Could a higher inflation target enhance macroeconomic stability? *Bank of Canada Staff Working Paper No.2018-17*.

Edwards, S. (1994). The political economy of inflation and stabilization in developing countries. *Economic Development and Cultural Change, 42(*2), 235-266.

Fischer, S. (1993). The role of macroeconomic factors in growth. *Journal of Monetary Economics, 32*, 485-512.

Freeman, D.G., & Yerger, D. B. (2000). Does Inflation Lower Productivity? Time Series Evidence on the Impact of Inflation on Labor Productivity in 12 OECD Nations*. Atlantic Economic Journal*, *28*, 315-332.

İsmihan, M., & Metin-Özcan, K., & Tansel, A. (2005). The role of macroeconomic instability in public and private capital accumulation and growth: The case of Turkey 1963-1999. *Applied Economics 37*(2), 239-251.

İsmihan, M. (2009). The role of political stability in macroeconomic performance, Germany: VDM Verlag Dr. Müller

Krugman, P. (2014). Inflation Targets Reconsidered. (conference presentation). Monetary Policy in a Changing Financial Landscape, European Central Bank Forum on Central Banking: Portugal, 110-122.

Lindbeck, A. (1976). Stabilization policy in open economies with endogenous politicians. *The American Economic Review, 66(*2), 1-19.

Narayan, P., & Smyth R. (2009). The effect of inflation and real wages on productivity: new evidence from a panel of G7 countries. *Applied Economics 41*(10), 1285-1291.

Ram, R. (1984). Causal Ordering Across Inflation and Productivity Growth in The Post-War United States. *The Review of Economics and Statistic, 66*(3), 472-477.

Romer, C., & Romer D. (1997). Institutions for Monetary Stability. In: Cristina D. Romer & David H. Romer (Eds.) Reducing Inflation: Motivation and Strategy, Chicago: University of Chicago Press, pp. 307-334.

Yellen, J. L. (2015): Inflation Dynamics and Monetary Policy, Speech at the Philip Gamble Memorial Lecture, University of Massachusetts, Amherst, Massachusetts, September 24, Board of Governors of the Federal Reserve System.

APPENDICES

Appendix A

Derivation of Budget Constraint

The nominal budget constraint in period t is as follows:

$$P_tG_t+(1+r_{t-1})P_tD_{t-1}=\tau_tP_tX_t+(M_t-M_{t-1})+P_tD_t \quad (1)$$

where P_t represents price level, G_t represents government spending, r_{t-1} represents real interest rate in period t - 1, and D_t represents the real value of new debt issue in period t - 1. τ_t represents tax rate, P_tX_t represents nominal income, M_t represents money supply, and D_tt represents the real value of new debt issue in period t.

Now, dividing both sides of above equation with nominal income P_tX_t gives the following:

$$g_t+(1+r_{t-1})d_{t-1}=\tau_t+\frac{\Delta M_t}{P_tX_t}+d_t \quad (2)$$

Money demand equation is based on a simple quantity theory framework.

$$M_t=kP_t\widetilde{X} \quad (3)$$

where $\widetilde{X}$ is some measure of (real) output which is independent of tax rate ($k \geq 0$). In this way, total seigniorage revenue ($\frac{\Delta M_t}{P_t}$) is given by

$$\frac{\Delta M_t}{P_t}=\pi_tk\widetilde{X} \quad (4)$$

where $\pi_t=\frac{\Delta P_t}{P_t}$.

In the study of Ismihan (2009), the budget constraint is obtained by making use of the above equation and when $\widetilde{X}$ converges to X_t.

$$g_t+(1+r_{t-1})d_{t-1}=\tau_t+k\pi_t+d_t \quad (5)$$

Following a lot of literature (Alesina and Tabellini, 1987; Debelle and Fischer, 1994; Ismihan and Özkan, 2004; and Ismihan, 2009), the budget constraint was rewritten assuming k = 1: Equation (3).

Appendix B

Derivation of the Equilibrium Policy Outcomes of the Basic Dynamic Model

In this two-period setup, equilibrium outcomes are derived by backward induction. Therefore, policy outcomes and welfare losses for t = 2 are derived first. Then, equilibrium outcomes for t = 1 are derived.

t = 2;

$$L_2^{CB}=\frac{1}{2}\left[\mu_1(\pi_2-\overline{\pi}_2)^2+(\alpha(\pi_2-\gamma\pi_2-\pi_2^e-\tau_2)-\overline{x}_t)^2+\mu_2\left(g_2-\overline{g}_2\right)^2\right] \quad (6)$$

The reaction function of the Central Bank, which is the first ordering condition for π_2, gives the following equation:

$$\pi_2=\frac{\mu_1\overline{\pi_2}+(\gamma^*)[\alpha^2\pi_2^e+\alpha^2\tau_2+\alpha\overline{x}_2]}{\mu_1+\alpha^2(\gamma^*)^2} \quad (7)$$

By converting the output supply function to the loss function, the policy maker's Lagrange function can be written as:

$$L_2^G=\frac{1}{2}\left[\delta_1(\pi_2-\overline{\pi}_2)^2+(\alpha(\pi_2-\gamma\pi_2-\pi_2^e-\tau_2)-\overline{x}_2)^2+\delta_2\left(g_2-\overline{g}_2\right)^2\right]+\lambda_2\left(g_2-\tau_2-\pi_2\right) \quad (8)$$

where λ_2 is the Lagrange multiplier related to the budget constraint of fiscal authority.

The first-order conditions for τ_2 *ve* g_2 can be written as follows:

$$-\alpha(\alpha(\pi_2-\gamma\pi_2-\pi_2^e-\tau_2)-\overline{x}_2)=\lambda_2 \quad (9)$$

$$\delta_2\left(\overline{g_2}-g_2\right)=\lambda_2 \quad (10)$$

By eliminating λ_2 from above two-equation system, the following equation is obtained.

$$\left(\overline{g}_2-g_2\right)=-\frac{\alpha}{\delta_2}(\alpha(\pi_2-\gamma\pi_2-\pi_2^e-\tau_2)-\overline{x}_2) \quad (11)$$

Combining the above equation with the budget constraint, the government's reaction function is obtained,

$$\tau_2=\frac{1}{\delta_2+\alpha^2}\left[\left(\alpha^2(\gamma^*)-\delta_2\right)\pi_2-\alpha^2\pi_2^e-\alpha\overline{x_2}+\delta_2\overline{g}_2+\delta_2(1+r_1)d_1\right] \quad (12)$$

After applying the rational expectations condition on the above two reaction functions, equilibrium values of π_2 *ve* τ_2 are obtained by substituting relevant reaction function into each other. Similarly, the equilibrium values of g_2 *ve* x_2 are arrived at by using the budget constraint and output supply function.

$$\pi_2=\left(\psi\left(\frac{\delta_2}{\alpha^2}\right)+\psi\right)\overline{\pi}_2+\frac{\delta_2\gamma^*}{\mu_1}\psi\left[\frac{1}{\alpha}\overline{x}_2+\overline{g}_2+(1+r_1)d_1\right] \quad (13)$$

$$\tau_2=\left(-\psi\left(\frac{\delta_2}{\alpha^2}\right)-\psi\gamma\right)\overline{\pi}_2+\left(\psi\left(\frac{\delta_2}{\alpha^2}\right)-\frac{\delta_2}{\mu_1}\psi\gamma(\gamma^*)\right)\left(\overline{g}_t+(1+r_1)d_1\right)+\left(-\psi-\frac{\delta_2}{\mu_1}\psi(\gamma^*)\right)\frac{1}{\alpha}\overline{x}_t \quad (14)$$

$$g_2=\psi\left[(\gamma^*)\overline{\pi}_2+\Phi\ \overline{g}_2-\frac{1}{\alpha}\overline{x}_2-(1+r_1)d_1\right] \quad (15)$$

$$x_2=F\,\overline{x}_2+\frac{\delta_2}{\alpha^2}\psi\left((\gamma^*)\overline{\pi}_2-\overline{g}_2-(1+r_1)d_1\right) \quad (16)$$

By substituting these optimal policy outcomes into the loss function, a final period loss of $(\delta_2/2)D\left(\overline{x_2}/\alpha+\overline{g}_2+(1+r_1)d_1\right)^2$ is obtained, where $\left(D=\frac{\alpha^2\delta_1\delta_2(\gamma^*)+\delta_2\mu_1^2+\alpha^2\mu_1^2}{\alpha^2\mu_1^2}\psi^2\right)$.

t = 1

The loss function obtained by the Central Bank by accepting the government's decisions as data in the first period is as follows:

$$L_1^{CB} = \frac{1}{2}\mu_1(\pi_1 - \overline{\pi}_1)^2 + \frac{1}{2}(\alpha(\pi_1 - \pi_1^e - \tau_1) - \overline{x}_1)^2 \tag{17}$$

In this period, the central policy maker minimizes its intertemporal loss function with respect to π_1, t_1, and g_1 *ve* d_1. Formally by substituting equilibrium values from $t = 2$ and output supply function (in $t = 1$) into the intertemporal loss function in the first-period Lagrangean of policy maker can be written as follows:

$$L_1^G = \frac{1}{2}\left[\delta_1\pi_1^2 + (\alpha(\pi_1 - \pi_1^e - \tau_1) - \overline{x}_1)^2 + \delta_2\left(g_1 - \overline{g}_1\right)^2\right] + \beta_H(\delta_2/2)D\left(\overline{x}_2/\alpha + \overline{g}_2 + (1 + r_1)d_1\right)^2 + \lambda_1\left(g_1 - \tau_2 - \pi_2 - d1\right) \tag{18}$$

where λ_1 is the Lagrange multiplier related to budget constraint of central policy baker in the first period. First-order conditions for π_1, τ_1, and g_1 *and* d_1 can be written as follows, respectively:

$$\delta_1(\pi_1 - \overline{\pi_1}) + \alpha(\alpha(\pi_1 + \gamma^2\pi_1 - 2\gamma\pi_1 - \pi_1^e + \gamma\pi_1^e - \tau_1 + \gamma\tau_1) - \overline{x_1} + \gamma\overline{x_1}) = \lambda_1 \tag{19}$$

$$-\alpha(\alpha(\pi_1 - \gamma\pi_1 - \pi_1^e - \tau_1) - \overline{x_1}) = \lambda \tag{20}$$

$$\delta_2\left(\overline{g}_1 - g_1\right) = \lambda_1 \tag{21}$$

$$(1 + r_1)\beta_G\delta_2 D\left(\overline{x_2}/\alpha + \overline{g}_2 + (1 + r_1)d_1\right) = \lambda_1 \tag{22}$$

After eliminating λ_1 from the above system and imposing rational expectations condition, the relevant equations are combined with budget constraint and output supply function to find equilibrium values for the first period.

Table A. First- and Second-Period Macroeconomic Equilibrium Outcomes

$\pi_1=\psi H(\gamma^*)\frac{\delta_2}{\mu_1}\left[\left(\frac{1}{\alpha}\right)\overline{x}_1+\overline{g}_1+\frac{1}{(1+r_1)}\left[\left(\frac{1}{\alpha}\right)\overline{x}_2+\overline{g}_2-(\gamma^*)\overline{\pi}_2\right]\right]+\left[\psi H+\frac{\delta_2\psi H}{\alpha^2}+P\right]\overline{\pi}_1$
$\tau_1=\left[-\psi H\left(\frac{\delta_2}{\alpha^2}+\gamma\right)-P\gamma\right]\overline{\pi}_1+\left[\frac{\delta_2}{\alpha^2}\psi H-\frac{\delta_2(\gamma^*)\psi H\gamma}{\mu_1}\right]\left(\overline{g}_1+\frac{1}{(1+r_1)}\left[\left(\frac{1}{\alpha}\right)\overline{x}_2+\overline{g}_2-(\gamma^*)\overline{\pi}_2\right]\right)+\left[-\psi H\left(\frac{1}{\alpha}+\frac{\delta_2(\gamma^*)}{\alpha\mu_1}\right)-\frac{P}{\alpha}\right]\overline{x}_1$
$g_1=\psi H\left[(\gamma^*)\overline{\pi}_1-\left(\frac{1}{\alpha}\right)\overline{x}_1-\frac{1}{(1+r_1)}\left[\left(\frac{1}{\alpha}\right)\overline{x}_2+\overline{g}_2-(\gamma^*)\overline{\pi}_2\right]\right]+(1-\psi H)\overline{g}_1$
$x_1=\frac{\delta_2}{\alpha}\psi H\left[(\gamma^*)\overline{\pi}_1-\overline{g}_1-\frac{1}{(1+r_1)}\left[\left(\frac{1}{\alpha}\right)\overline{x}_2+\overline{g}_2-(\gamma^*)\overline{\pi}_2\right]\right]+\widehat{\Upsilon}\,\overline{x}_1$
$d_1=-\frac{H}{(1+r_1)}\left[\left(\frac{1}{\alpha}\right)\overline{x}_2+\overline{g}_2-(\gamma^*)\overline{\pi}_2\right]+P\left[\left(\frac{1}{\alpha}\right)\overline{x}_1+\overline{g}_1-(\gamma^*)\overline{\pi}_1\right]$
$\pi_2=\left[\left(\psi+\psi\frac{\delta_2}{\alpha^2}\right)+\psi H(\gamma^*)\frac{\delta_2}{\mu_1}\right]\overline{\pi}_2+\psi P(\gamma^*)\frac{\delta_2}{\mu_1}\left[\left(\frac{1}{\alpha}\right)\overline{x}_2+\overline{g}_2+(1+r_1)\left[\left(\frac{1}{\alpha}\right)\overline{x}_1+\overline{g}_1-(\gamma^*)\overline{\pi}_1\right]\right]$
$\tau_2=\left[-\psi\left(\frac{\delta_2}{\alpha^2}+\gamma\right)+\left(\frac{\delta_2}{\alpha^2}\psi H-\frac{\delta_2(\gamma^*)\gamma}{\mu_1}\psi H\right)(\gamma^*)\right]\overline{\pi}_2+\left[-\psi\left(\frac{1}{\alpha}+\frac{\delta_2(\gamma^*)}{\alpha\mu_1}\right)-\left(\frac{\delta_2}{\alpha^2}\psi-\frac{\delta_2(\gamma^*)\psi\gamma}{\mu_1}\right)H/\alpha\right]\overline{x}_2$ $+\left(\frac{\delta_2}{\alpha^2}\psi-\frac{\delta_2(\gamma^*)\psi\gamma}{\mu_1}\right)P\left[\overline{g}_2+(1+r_1)\left[\left(\frac{1}{\alpha}\right)\overline{x}_1+\overline{g}_1-(\gamma^*)\overline{\pi}_1\right]\right]$
$g_2=\psi P\left[(\gamma^*)\overline{\pi}_2-\left(\frac{1}{\alpha}\right)\overline{x}_2+(1+r_1)\left[(\gamma^*)\overline{\pi}_1-\left(\frac{1}{\alpha}\right)\overline{x}_1-\overline{g}_1\right]\right]+\psi(H+\Phi)\overline{g}_2$
$x_2=\frac{\delta_2}{\alpha}\psi P\left[(\gamma^*)\overline{\pi}_2-\overline{g}_2+(1+r_1)\left[(\gamma^*)\overline{\pi}_1-\left(\frac{1}{\alpha}\right)\overline{x}_1-\overline{g}_1\right]\right]+\left[F+\left(\frac{\delta_2}{\alpha^2}\psi H\right)\right]\overline{x}_2$

Note: $u_t = \phi_{\bar{g}_1}\overline{g}_1 + \phi_{\bar{x}_1}\overline{x}_1 + \phi_{\bar{\pi}_1}\overline{\pi}_1 + \theta_{\bar{g}_2}\overline{g}_2 + \phi_{\bar{x}_2}\overline{x}_2 + \phi_{\bar{\pi}_2}\overline{\pi}_2$. $\Phi = \frac{\delta_2}{\alpha^2} + \frac{(\gamma^*)^2\delta_2}{\mu_1} > 0$, $\psi = \frac{1}{(1+\Phi)} > 0$, $F = 1 - \frac{\delta_2}{\alpha^2}\psi > 0$, $D = \frac{\alpha^2\delta_1\delta_2(\gamma^*)^2+\delta_2\mu_1^2+\alpha^2\mu_1^2}{\alpha^2\mu_1^2}(\psi)^2 > 0$, $\widehat{\Lambda} = (1 + r_1)\beta_H D > 0$, $\Gamma = \frac{\widehat{\Lambda}}{\psi} > 0$, $P = \frac{1}{1+(1+r_1)\Gamma} > 0$, $H = (1 + r_1)\Gamma P > 0$, $\widehat{\Upsilon} = \left(1 - \frac{\delta_2}{\alpha^2}\psi H\right) > 0$