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Inflation Targeting or Fiscal Activism?

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Inflation Targeting or Fiscal Activism?*

Roberto M. Billi

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Abstract

I study the welfare performance of a policy regime of *fiscal activism* in which fiscal policy acts as an automatic stabilizer and controls inflation, while monetary policy pegs the nominal interest rate. When evaluated through the lens of a standard New Keynesian model, accounting for price and wage rigidities and for a zero lower bound (ZLB) on the nominal interest rate, fiscal activism can substantially outperform inflation targeting in the face of both demand shocks and technology shocks. Fiscal activism can also eliminate the occurrence of ZLB episodes.

Keywords: automatic stabilizers, fiscal and monetary interactions, government debt.

JEL: E24, E31, E52, E63.

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1 Introduction

The New Keynesian model with staggered price and wage setting allows to study the design of fiscal and monetary policy, while taking into account a zero lower bound (ZLB) constraint on the nominal interest rate. In a conventional policy regime of inflation targeting, and according to the terminology of Leeper (1991), active monetary policy aimed at controlling inflation is combined with passive fiscal policy ensuring debt sustainability.[1] As is well-known, however, inflation targeting can result in frequent and costly ZLB episodes, during which expansionary fiscal policy can serve to stabilize the economy. Ignoring the ZLB and the stabilization role of fiscal policy, another perspective, since Erceg, Henderson and Levin (2000), is that central banks could seek to stabilize the output gap in order to promote stability of price and wage inflation, and contribute to greater social welfare.

In light of such views, an alternative policy arrangement, explored in this paper, is one of *fiscal activism* in which fiscal policy sets net taxes as an automatic stabilizer and thereby controls inflation, while monetary policy pegs the nominal interest rate to its positive steady state and so ensures government debt sustainability. In particular, fiscal policy affects the economy through a wealth channel by generating movement of the real return of household debt holdings. There are positive wealth effects when the government debt level rises during recessions. Moreover, because the nominal interest rate is pegged above zero, fiscal activism eliminates the occurrence of ZLB episodes.

When compared to inflation targeting, the evaluation of fiscal activism in the context of the aforementioned New Keynesian model provides two main results. First, regardless of whether demand shocks or technology shocks are the source of fluctuations, fiscal activism generates expectations of future inflation which serve to stabilize economic activity during recessions. As a second result, furthermore, fiscal activism can substantially outperform inflation targeting in terms of social welfare when prices or wages are flexible. In relation to the existing literature, these findings complement the analysis by De Long and Summers (1986), Garín, Lester and Sims (2016), Bhattarai, Eggertsson and Schoenle (2018), Billi and Galí (2020), and Billi (2020), among others, who study the implications of nominal rigidities for active monetary policies, while implicitly assume fiscal policy is passive.

Next, Section 2 describes the model environment, then Section 3 presents the policy evaluation.

[1] For a discussion of the literature on interactions between monetary and fiscal policies and their role in determining macroeconomic outcomes, particularly the aggregate price level, see Leeper and Leith (2016).

2 The Model

The analysis uses a simple version of the New Keynesian model, augmented with a fiscal policy rule in which net taxes respond to the output gap as an automatic stabilizer. Derivations of the model can be found in Galí (2015, 2020). This section introduces the equations describing the equilibrium conditions, and then calibrates the model to recent U.S. data.

2.1 Private Sector

The behavior of the private sector is described by the equilibrium conditions that correspond to the closed-economy New Keynesian model with staggered price and wage setting à la Calvo. All equations are log-linearized around a steady state with zero price and wage inflation, and with a subsidy that exactly offsets the steady-state distortions resulting from price and wage markups.

The supply side of the economy is described by the following equations representing the dynamics of price and wage inflation, π_t^p and π_t^w:

$$\pi_t^p = \beta E_t\{\pi_{t+1}^p\} + \varkappa_p \tilde{y}_t + \lambda_p \tilde{\omega}_t \tag{1}$$

$$\pi_t^w = \beta E_t\{\pi_{t+1}^w\} + \varkappa_w \tilde{y}_t - \lambda_w \tilde{\omega}_t \tag{2}$$

$$\tilde{\omega}_t \equiv \tilde{\omega}_{t-1} + \pi_t^w - \pi_t^p - \Delta\omega_t^n \tag{3}$$

where parameter β denotes the household's discount factor. $\tilde{y}_t \equiv y_t - y_t^n$ and $\tilde{\omega}_t \equiv \omega_t - \omega_t^n$ denote respectively the output and wage gaps, where $y_t^n \equiv \psi_{ya} a_t$ and $\omega_t^n \equiv \psi_{\omega a} a_t$ represent the (log) *natural* output and (log) *natural* wage (i.e. their equilibrium in the absence of nominal rigidities). a_t is an exogenous technology shock which follows an $AR(1)$ process with autoregressive coefficient ρ_a.

In addition, $\varkappa_p \equiv \frac{\alpha\lambda_p}{1-\alpha}$, $\varkappa_w \equiv \lambda_w\left(\sigma + \frac{\varphi}{1-\alpha}\right)$, $\lambda_p \equiv \frac{(1-\theta_p)(1-\beta\theta_p)(1-\alpha)}{\theta_p(1-\alpha+\alpha\epsilon_p)}$, $\lambda_w \equiv \frac{(1-\theta_w)(1-\beta\theta_w)}{\theta_w(1+\epsilon_w\varphi)}$, $\psi_{ya} \equiv \frac{1+\varphi}{\sigma(1-\alpha)+\varphi+\alpha}$ and $\psi_{\omega a} \equiv \frac{\sigma+\varphi}{\sigma(1-\alpha)+\varphi+\alpha}$. Parameters α, σ and φ denote respectively the degree of decreasing returns to labor in production, the household's coefficient of relative risk aversion and the curvature of labor disutility. Parameters $\theta_p \in [0,1)$ and $\theta_w \in [0,1)$ denote the Calvo indexes of price and wage rigidities, while $\epsilon_p > 1$ and $\epsilon_w > 1$ denote the elasticities of substitution among varieties of goods and labor services, respectively.

The demand side of the economy is described by a dynamic IS equation:

$$\widetilde{y}_t = E_t\{\widetilde{y}_{t+1}\} - \frac{1}{\sigma}\left(\hat{\imath}_t - E_t\{\pi^p_{t+1}\} - r^n_t\right), \tag{4}$$

where $\hat{\imath}_t = i_t - \rho$ denotes the nominal interest rate in deviation from its steady state, and the latter corresponds to the discount rate $\rho \equiv 1/\beta - 1 > 0$. The *natural* rate of interest is given by $r^n_t \equiv (1-\rho_z)z_t - \sigma(1-\rho_a)\psi_{ya}a_t$, where z_t is an exogenous discount factor shifter (aggregate-demand shock) which follows an $AR(1)$ process with autoregressive coefficient ρ_z.

2.2 Government Budget and Policy Regimes

The fiscal authority collects net taxes (*lump-sum taxes net of transfers*) and issues nominally riskless one-period bonds with a nominal yield i_t. After log-linearization around a zero inflation steady state, the government's flow-budget constraint takes the form:

$$\hat{b}_t = (1+\rho)\,\hat{b}_{t-1} + b\,(1+\rho)\,(\hat{\imath}_{t-1} - \pi_t) - \hat{\tau}_t, \tag{5}$$

where $\hat{b}_t \equiv (B_t - B)/Y$ and $\hat{\tau}_t \equiv (T_t - T)/Y$ denote, respectively, deviations of (real) government debt and net taxes from their steady state, expressed as a fraction of steady-state output. The parameter $b \equiv B/Y$ denotes the long-run debt target as a share of steady-state output.

In (5) the government debt issuance $\hat{b}_t$ is determined by three components. First, the cost to refinance (roll over) the government debt held by the public. Second, the real interest cost to service the debt outstanding $(\hat{\imath}_{t-1} - \pi_t)$, which constitutes a *wealth channel* of fiscal and monetary policy through changes to the real return of household debt holdings. Third, the fiscal balance net of any interest payments (the primary surplus). The analysis focuses on two policy regimes, characterized by the behavior of fiscal and monetary policy, as explained next.

Inflation targeting (IT). Under IT, active monetary policy aimed at controlling inflation is combined with passive fiscal policy ensuring debt sustainability. In particular, monetary policy follows a truncated Taylor-type rule with a ZLB constraint ($i_t \geq 0$ implying $\hat{\imath}_t \geq -\rho$):

$$\hat{\imath}_t = \max\left[-\rho, \hat{\imath}^*_t\right], \tag{6}$$

where $\hat{\imath}^*_t = \phi_i \hat{\imath}^*_{t-1} + (1-\phi_i)\left(\phi_p \pi^p_t + \phi_y \tilde{y}_t\right)$ can be interpreted as a *shadow* nominal interest rate in deviation from steady state. This rule can be viewed as capturing in a parsimonious way the behavior

of central banks in many advanced economies. In addition, fiscal policy follows a simple rule with net taxes reacting to movement of government debt:

$$\hat{\tau}_t = \psi_\tau \hat{b}_{t-1}. \tag{7}$$

Combining (5) and (7) reveals that the stock of outstanding debt $\hat{b}_{t-1}$ is rolled over with a coefficient of $1+\rho-\psi_\tau$, which is smaller than unity if $\psi_\tau > \rho$. This condition means that fiscal policy is focused on stabilizing debt, while monetary policy controls inflation.

Fiscal activism (FA). Under the FA regime, by contrast, active fiscal policy controls inflation while passive monetary policy ensures debt sustainability. Namely, monetary policy is assumed to permanently peg the nominal interest rate to its steady state ($i_t = \rho > 0$ for all t):

$$\hat{\imath}_t = 0. \tag{8}$$

At the same time, fiscal policy follows a simple rule in which net taxes respond to movement of the output gap:

$$\hat{\tau}_t = \psi_y \tilde{y}_t, \tag{9}$$

where $\psi_y > 0$, so fiscal policy acts as an automatic stabilizer. Given the peg on the nominal interest rate, (5) and (9) imply that fiscal policy alone generates movement of the real return of household debt holdings, as needed to ensure debt sustainability. For example, higher government debt during a recession results in expectations of higher future inflation, which can serve to boost current aggregate demand and make the recession less deep. Thus, the presence of this wealth channel will be key for the performance of FA, relative to IT.

2.3 Calibration

The model's calibration is conventional and largely follows Galí (2015). The discount factor β is set to 0.995 so the steady-state real interest rate is 2 percent annual ($\rho = 0.005$). I set $\alpha = 0.25$, $\sigma = 1$ and $\varphi = 5$. The elasticities of substitution ϵ_p and ϵ_w are set respectively to 9 and 4.5. I set $\theta_p = \theta_w = 0.75$, consistent with an average duration of price and wage spells of one year.

Under IT, I use standard Taylor rule coefficients $\phi_p = 1.5$ and $\phi_y = 0.125$, with smoothing

coefficient $\phi_i = 0.8$ close to typical estimates. I set $b = 4$ which corresponds to a debt target equal to 100% of annual GDP. Fiscal policy is focused on stabilizing debt with $\psi_\tau = 0.2 > \rho$ and $\psi_y = 0$. The persistence parameters of the shocks ρ_a and ρ_z are set to 0.8. The standard deviations of the shocks σ_a and σ_z are set respectively to 0.074 and 0.099 so that, conditional on technology shocks or demand shocks as the source of fluctuations, IT generates an incidence of hitting the ZLB near 25%. Under the FA regime, monetary policy pegs the nominal interest rate to its steady state, while fiscal policy is aimed at stabilizing economic activity with $\psi_\tau = 0$ and $\psi_y = 1$, so net taxes adjust one-to-one to the output gap.

3 The Policy Evaluation

I now compare the performance of fiscal activism (FA) versus inflation targeting (IT), with and without ZLB. I first show the dynamics arising from shifts in preferences and technology, and then provide a welfare analysis conditional on each type of shock.[2]

Shown are the dynamic responses of key variables in deviation from steady state. Figure 1 displays the responses to a *negative* demand shock, large enough to drive the nominal interest rate to the ZLB for several quarters under the IT regime.[3] When demand is weak, the output gap falls under both IT and FA, but the depth of the recession and the behavior of prices and wages depends on the policy regime in place. In particular, the output gap falls less under FA than IT if the ZLB is taken into account. Under FA, price and wage inflation fall much less on impact and then overshoot during the economic recovery, because of the wealth effect from higher government debt. Debt rises as net taxes are cut one-to-one with the fall in the output gap, while the nominal interest rate peg allows price inflation to rise, relative to IT. Figure 2 displays the responses to a *positive* technology shock, and the outcomes remain qualitatively similar to the previous figure. Overall, compared to the deflation and long period at the ZLB under IT, the FA regime avoids the ZLB and results in expectations of future inflation which serve to stabilize economic activity during recessions.

Next, I use as a welfare metric the second-order approximation of the average welfare loss experienced by the representative household as a consequence of fluctuations around an efficient steady state with zero price and wage inflation. This social welfare loss is expressed as a fraction of steady-state consumption:

[2] The model outcomes are obtained with Dynare (`https://www.dynare.org`) using an extended-path method.
[3] In the figures, variables are shown in quarterly rates (not annualized).

$$\mathbb{L} = \frac{1}{2}\left[\left(\sigma + \frac{\varphi+\alpha}{1-\alpha}\right) var\left(\tilde{y}_t\right) + \frac{\epsilon_p}{\lambda_p} var\left(\pi_t^p\right) + \frac{\epsilon_w(1-\alpha)}{\lambda_w} var\left(\pi_t^w\right)\right], \tag{10}$$

where the welfare loss has three components, respectively associated with the volatilities of the output gap, price inflation, and wage inflation. A discussion can be found in Galí (2015).

The welfare of the representative household will depend on the presence of both price and wage rigidities.[4] Table 1 shows the (total) welfare loss $\mathbb{L}$ conditional on demand shocks or technology shocks buffeting the economy, respectively in the top and bottom panels. When facing demand shocks and the ZLB, the FA and IT regimes perform similarly in welfare terms if prices and wages are rigid (first column). What if either prices or wages are fully flexible? If prices are flexible (second column), as expected both regimes become more effective in welfare terms, but the improvement in performance is larger under FA than IT. If wages are flexible (third column), while as expected both regimes become less effective, the deterioration in performance is much larger under IT than FA, especially if facing the ZLB. The reason is that wage flexibility and the ZLB increase volatility of price inflation (not shown), as illustrated by Billi and Galí (2020) for an IT regime. Finally, if both prices and wages are flexible (fourth column), the welfare loss is zero under both IT and FA. In the bottom panel of the table, a similar pattern emerges if facing technology shocks and the ZLB.

In summary, within a New Keynesian model accounting for price and wage rigidities and for a ZLB constraint on the nominal interest rate, FA performs similarly to IT in terms of welfare in the face of both demand shocks and technology shocks. However, FA substantially outperforms IT when prices or wages are flexible. Furthermore, IT results in frequent and costly ZLB episodes, while FA avoids the ZLB entirely by employing fiscal policy as an automatic stabilizer.

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[4] In (10) the parameters θ_p and θ_w enter respectively through λ_p and λ_w, to which they are inversely related. Thus, if prices are flexible $var\left(\pi_t^p\right)$ is irrelevant for welfare, while if wages are flexible $var\left(\pi_t^w\right)$ is irrelevant for welfare.

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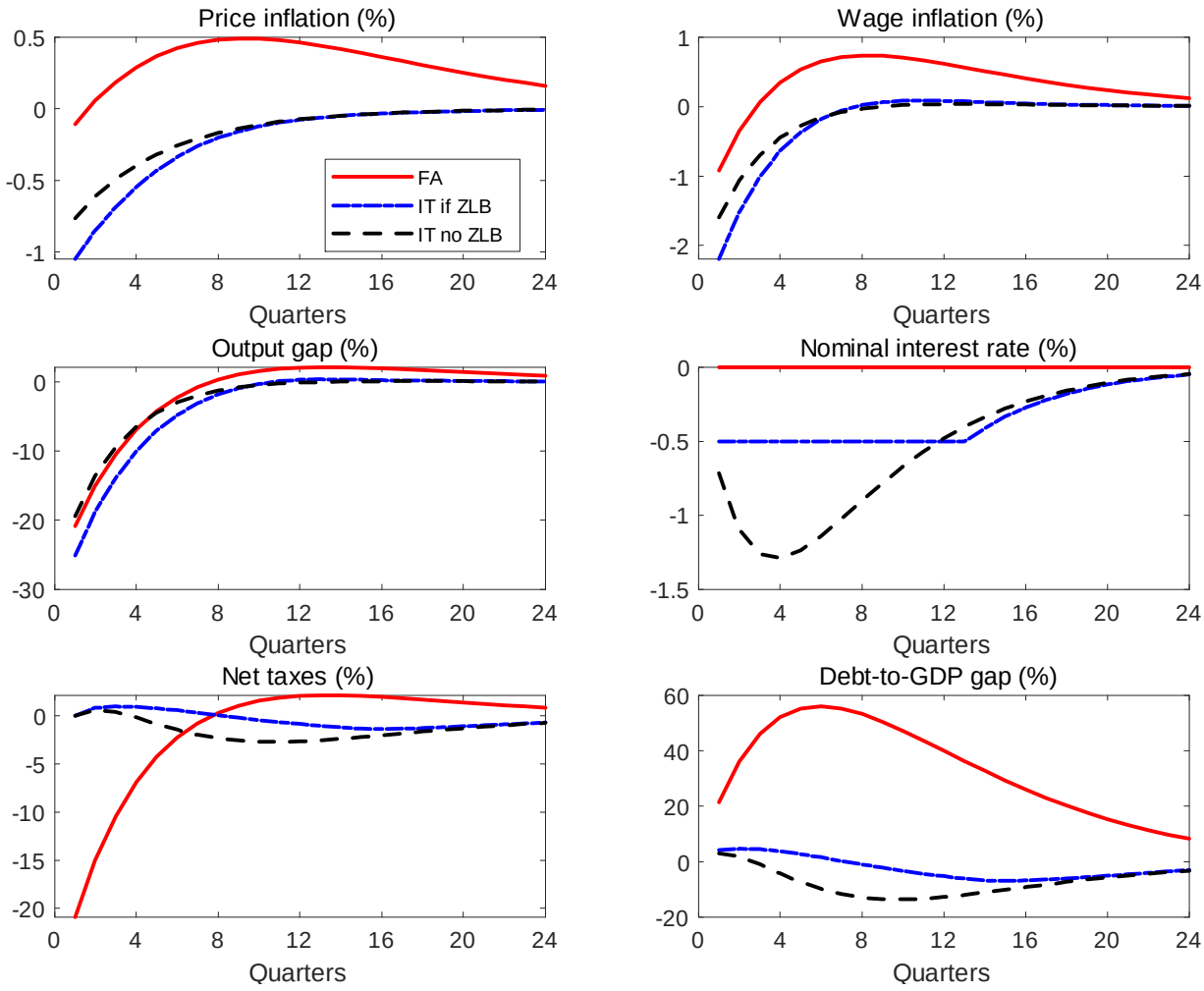

Figure 1: Dynamic effects under fiscal activism (FA) and inflation targeting (IT), with and without ZLB. Deviations from steady state in response to $-3sd$ demand shock.

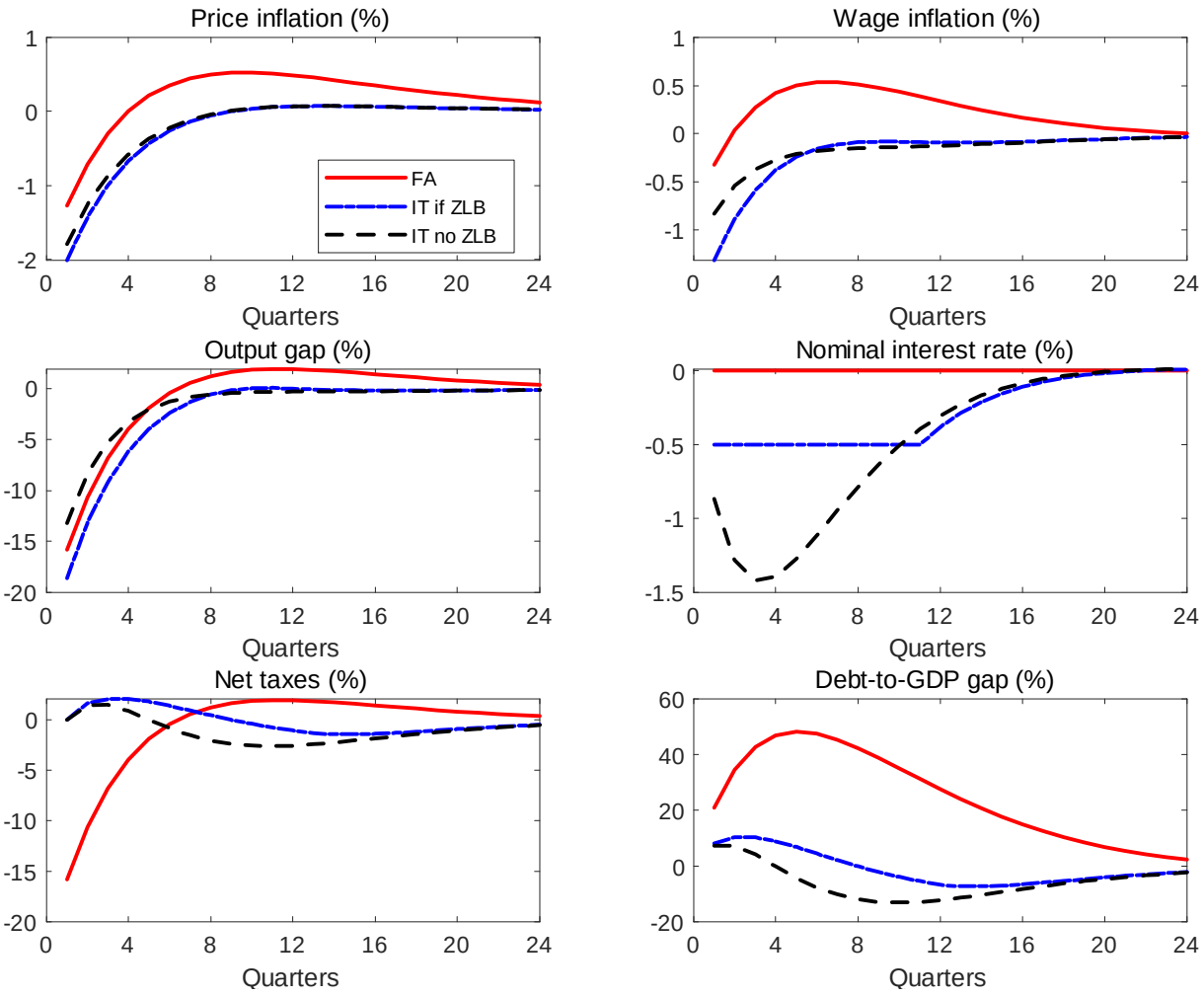

Figure 2: Dynamic effects under fiscal activism (FA) and inflation targeting (IT), with and without ZLB. Deviations from steady state in response to $+3sd$ technology shock.

Table 1: Welfare loss under fiscal activism (FA) and inflation targeting (IT).

Policy regime	$\theta_p = 0.75$ $\theta_w = 0.75$	$\theta_p \approx 0$ $\theta_w = 0.75$	$\theta_p = 0.75$ $\theta_w \approx 0$	$\theta_p \approx 0$ $\theta_w \approx 0$
Panel A: Demand shocks buffeting the economy				
FA	2.85	1.55	3.97	0.00
IT if ZLB	2.86 (24.8)	2.15 (29.1)	9.21 (37.3)	0.00 (39.7)
IT no ZLB	2.14	1.64	3.87	0.00
Panel B: Technology shocks buffeting the economy				
FA	1.61	0.00	2.22	0.00
IT if ZLB	1.58 (24.9)	1.25 (38.6)	4.01 (32.0)	0.00 (36.8)
IT no ZLB	1.26	1.16	2.16	0.00

Notes: Shown is the permanent consumption loss from fluctuations measured in percentage points $\mathbb{L}\%$, and in parenthesis the ZLB frequency in percent under IT. Under FA, the nominal interest rate is pegged to $\rho > 0$ so cannot hit the ZLB.

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