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Impact of expenditure on medicines for STD/AIDS on the Instituted Budget after for the end of the Regime that established a ceiling on public expenditure in Brazil

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1. Objective

Estimate the impact of expenditure on medicines for Sexually Transmitted Diseases of Acquired Immunodeficiency Syndrome (STD/AIDS) on the budget approved for 2024, compared to the scenario projected by the financing model of the Unified Health System (acronym in portuguese, SUS) under the fiscal austerity regime (extinguished in 2023).

2. Methodology

This is a time series study of annual expenditure on antiretroviral medicines, obtained from the federal government's Transparency Portal. The budget authorized for the purchase of medicines was obtained from the Law of Budgetary Directives (acronym in portuguese, LDO – 2024) and the budget forecast for the same purpose was calculated according to the methodology established by Constitutional Amendment (CA) 113/2021, which edits CA 95/2016. Expenditure projections were based on the ARIMA econometric forecasting model, using the Box-Jenkins methodology with the aid of Gretl software. The impact of expenditure on budgets was measured by comparing the data.

3. Results

The time series of expenditure on medicines covered the period from 2014 to 2023. The ARIMA(2,1,1) model was the best suited to project expenditure, with statistically significant parameters (p<0.05) (Table 1). The residuals resulted in an average absolute percentage error of 4.96% (Figures 2, 3 and 4). Projections for the year 2024 revealed that expenditure on medicines (R$ 2.3 billion - USD 499.9 million) will be 14.72% lower than the authorized budget (R$2.7 billion - USD 528.2 million), but will be 22.47% higher than the budget projected based on CA 113/2021 (R$ 1.9 billion - USD 371.7 million) (Figures 1 and 5).

Table 1. ARIMA (2,1,1) model, to project spending on antiretroviral medicines, using observations 2015-2023(T=9).

	coefficient	std. error	z	p-value	
const	1,60555e+08	9,75326e+06	16,46	<0,0001	***
phi_1	0,660619	0,132035	5,003	<0,0001	***
phi_2	−0,893218	0,0995703	−8,971	<0,0001	***
theta_1	−1,00000	0,428637	−2,333	0,0196	**

Note:
Estimate using AS 197 (exact ML)
Variable: (1-L) Expenditure
Standard errors based on Hessian
***, **, * Indicating significance levels of 1%, 5% and 10%, respectively
R-squared: 0,965370
Adjusted R-squared: 0,953827

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Figure 1. Forecast of expenses with antiretroviral medicines based on the ARIMA(2,1,1) model (2015-2024).
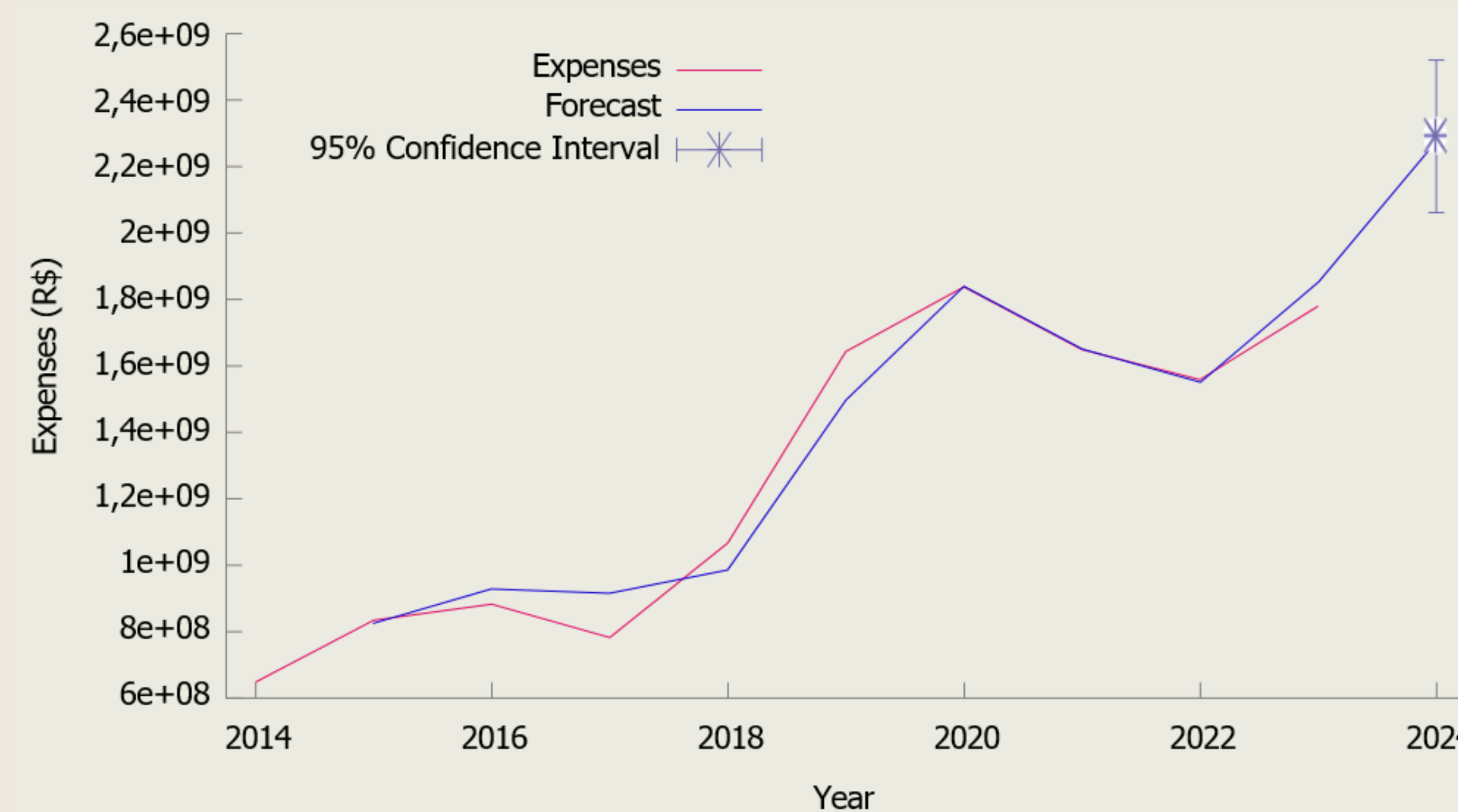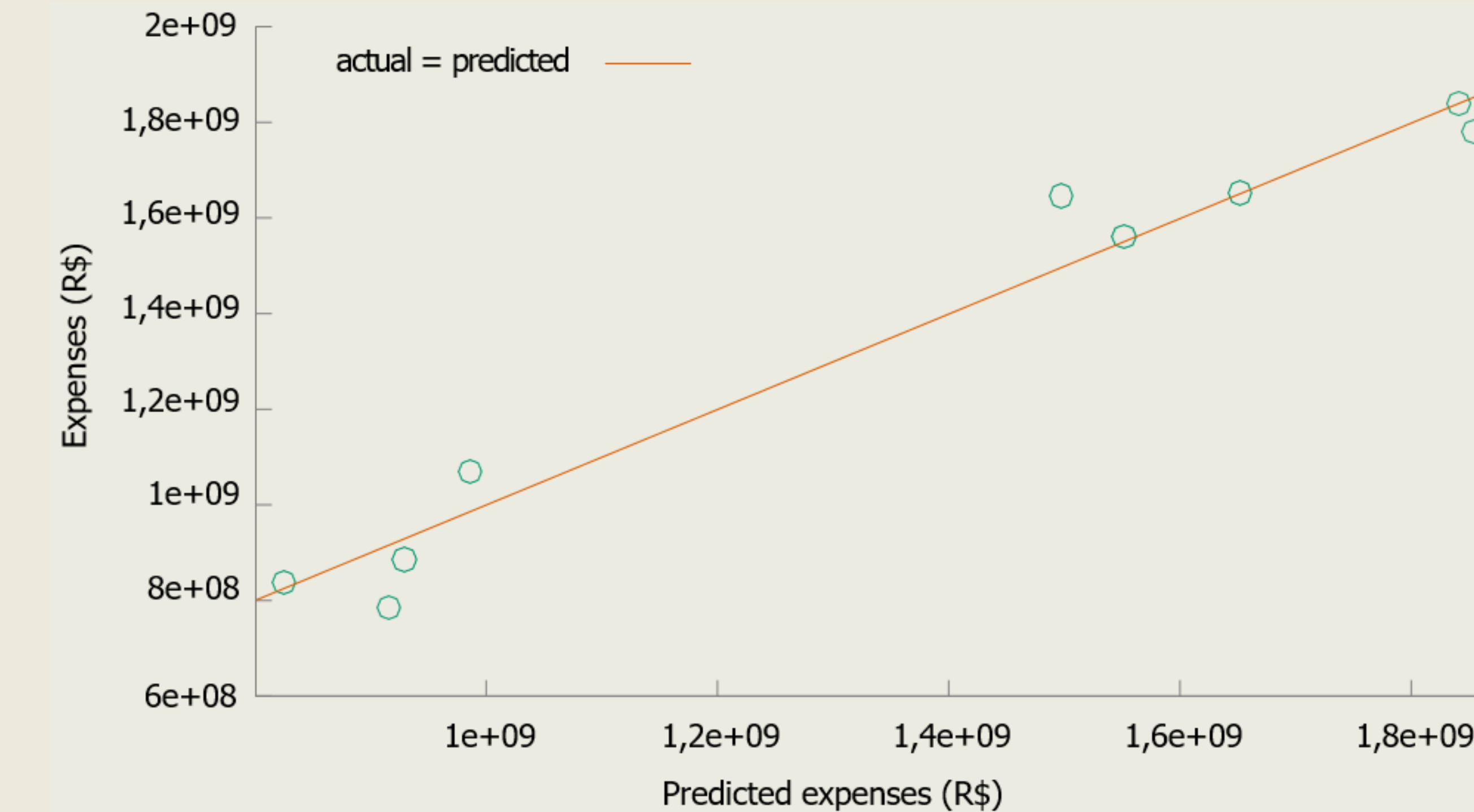

Figure 2. Residual analysis – difference between the observed and predicted values of spending on antiretroviral medicines (2015-2023).

Note:
Mean absolute peercentage error (MAPE): 4,9599
Theil´s U2: 0,34385

Figure 3. Normality test of the residues of the ARIMA (2,1,1) model for forecasting expenses with antiretroviral medicines.
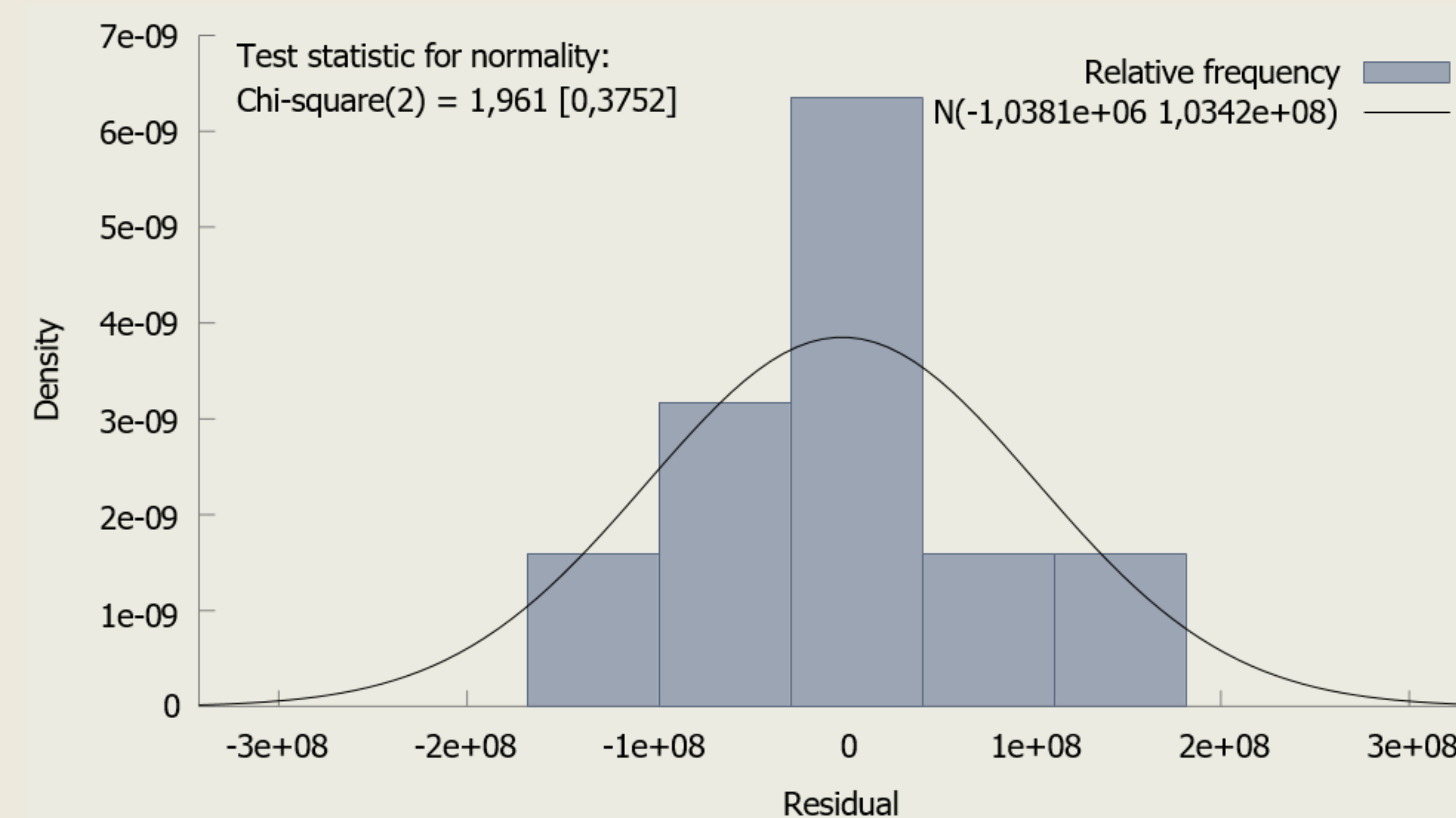

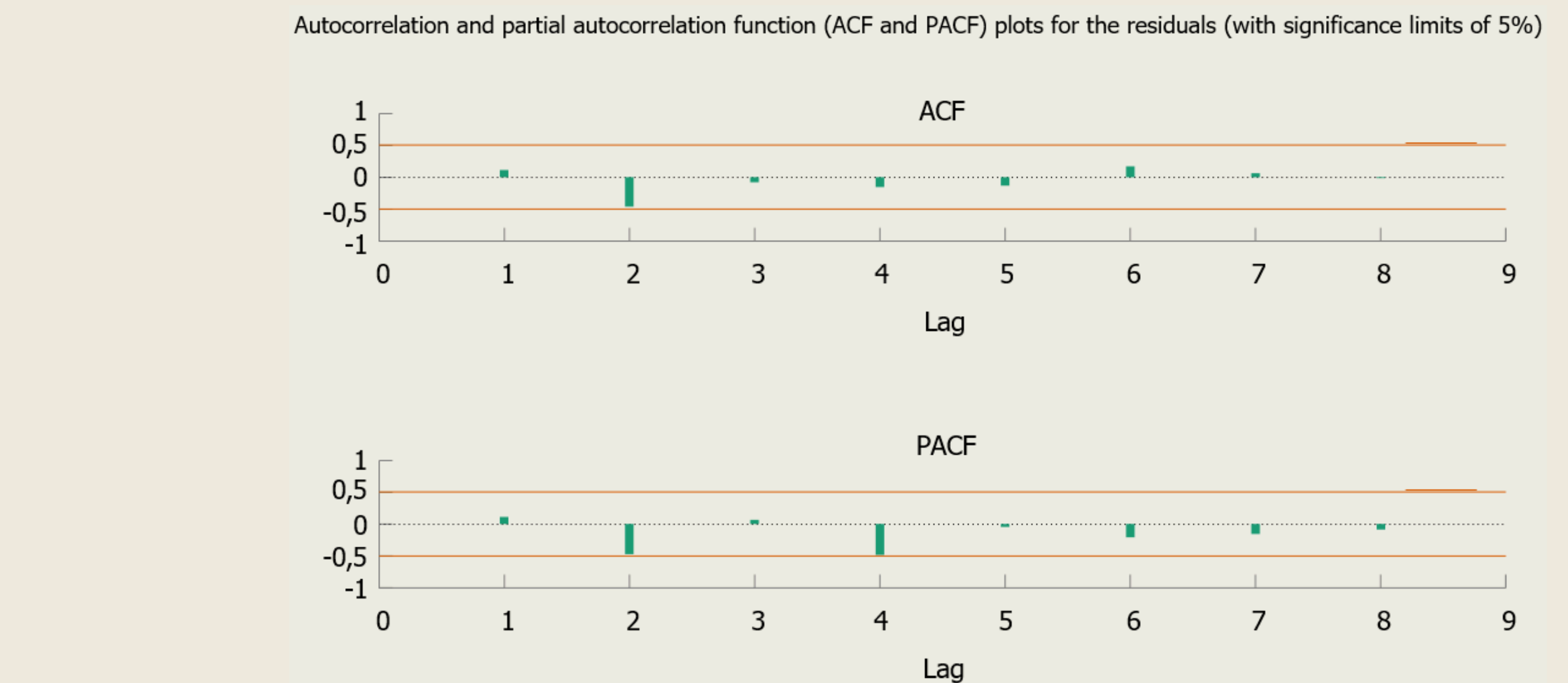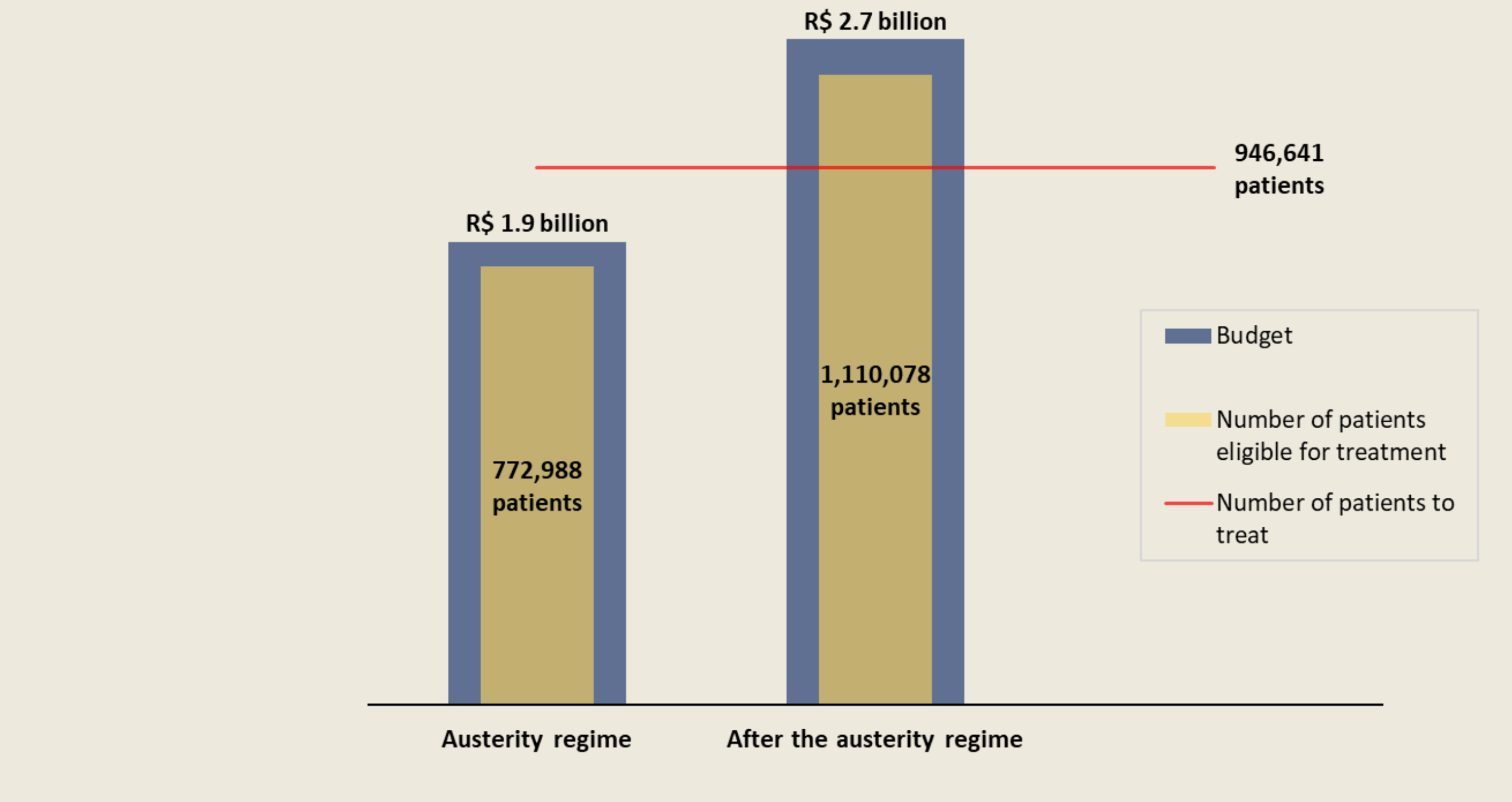**Figure 4. Residual correlogram of the ARIMA model (2,1,1) to predict spending on antiretroviral medicines.**

Figure 5. Number of patients and budget for antiretroviral medicines in 2024, by fiscal regimen.

4. Conclusion

The projections showed a clear recovery in the country's financing capacity with regard to expenditure on STD/AIDS medicines in 2024, as opposed to the lack of resources imposed by the previous fiscal regime, which compromised patients' health care. From this perspective and considering the average annual expenditure of R$2,408.39 per patient in 2023 (USD 471,17), the Brazilian Ministry of Health overcame the condition in which it would stop treating 173,653 STD/AIDS patients in 2024 considering fiscal austerity, in order to treat 163,437 more patients.

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