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Monetary-Fiscal Policy Regimes and Policy Dominance in the Iranian Economy

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Abstract

This study identifies monetary and fiscal policy regimes in Iran, and the resulting policy mix, over 1975–2024, the longest period with jointly available data. Monetary policy is a base-money growth rule responding to the inflation gap; fiscal policy is an operating budget balance rule responding to lagged government debt to the central bank, controlling for oil revenue, the output gap and COVID-19. Each rule is a Markov-switching regression with switching intercept, policy coefficient and error variance, estimated by penalized maximum likelihood to exclude degenerate regimes. The number of regimes is selected by sequential parametric-bootstrap likelihood-ratio tests, and time-varying transition probabilities driven by sanctions, war, oil shocks, exchange-rate depreciation and financial repression are tested against constant ones. The data select two monetary and three fiscal regimes. Monetary policy is passive throughout: base-money growth either ignores inflation (coefficient −0.09, in oil-boom years) or accommodates it (0.64). Fiscal policy cycles from a strongly passive regime (debt coefficient 0.11) to a weakly passive regime (0.04) and then an active regime in which deficits widen as debt rises (−0.03). The policy mix is therefore indeterminate in 35 of 50 years and fiscally dominant in 15 (1975–1977, 1986–1988, 2015–2023), when inflation averaged 28.6 percent versus 19.3 percent under indeterminacy; monetary dominance never occurs. Sanctions, war, oil shocks and exchange-rate depreciation do not affect transition probabilities. The active fiscal regime coincides with deep financial repression, but the real deposit rate's effect on transitions is insignificant under a parametric bootstrap ($p = 0.15$). The passive monetary stance and active fiscal regime are robust across 21 alternative specifications, and the regime-switching rules forecast 2019–2024 as accurately as linear rules. Price stability requires an enforceable fiscal rule, removal of financial repression and a monetary instrument that can lean against inflation.

Keywords: Monetary-Fiscal Policy Regimes, Monetary Dominance, Fiscal Dominance, Markov-Switching Model, Iranian Economy.
JEL Classification: C24, E52, E58, E62, E63.

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1. Introduction

The global financial crisis and the Great Recession generated growing interest in the interactions between monetary and fiscal policies and their joint effects on the macroeconomy. The theoretical analysis of policy interactions focuses on how monetary and fiscal authorities can jointly determine the price level and stabilise public debt. The literature points to two distinct, but equally viable, policy combinations. Under the conventional combination, a central bank stabilises inflation by raising nominal interest rates more than one-for-one with inflation, while the fiscal authority adjusts taxes or expenditures to ensure solvency. Under the alternative combination, the roles are reversed: fiscal policy determines the price level and monetary policy stabilises debt. Because these combinations imply substantially different transmission channels for policy shocks, understanding monetary-fiscal interactions is essential (Chang *et al.*, 2021).

Macroeconomic equilibrium depends heavily on the prevailing monetary-fiscal policy regime (Leeper *et al.*, 2017). The 2008 financial crisis and the COVID-19 pandemic further increased attention to these interactions, as many economies combined unconventional monetary measures with large fiscal packages (Liu *et al.*, 2021). Failure to account for how the two policies interact may prevent policymakers from achieving their objectives (Gilak Hakimabadi *et al.*, 2022).

Iran offers a particularly informative case. Government budgets depend heavily on oil revenue, which is exposed to large price swings and to sanctions; government borrowing from the central bank has repeatedly been monetised; nominal interest rates on bank deposits and loans have been set administratively and, in most years, below inflation; and the period since 1975 includes a revolution, an eight-year war, two waves of comprehensive sanctions and a pandemic. Each of these features can change the behaviour of monetary or fiscal authorities, which makes a regime-switching description of policy natural.

This paper revises and extends earlier work on Iranian policy regimes in six directions. First, the sample is extended to 1975–2024, the longest period over which all variables are jointly available, so that it covers the war years, the sanctions episodes and the inflationary episode of 2018–2024. Second, fiscal policy is measured by the operating budget balance relative to GDP, the instrument most directly controlled by the government, while government debt to the central bank, also relative to GDP, is the state variable to which a passive fiscal authority responds. Third, the number of regimes is selected by sequential parametric-bootstrap likelihood-ratio tests combined with explicit identification checks rather than assumed. Fourth, the estimator uses a penalised exact

likelihood that excludes degenerate regimes and a parsimonious switching structure suited to 50 annual observations. Fifth, transition probabilities are allowed to depend on sanctions, war, oil shocks, exchange-rate depreciation and financial repression; to make this feasible in a short sample, we propose a restricted time-varying specification with one slope for the exits from each extreme policy regime. Sixth, the monetary rule is classified with a criterion appropriate for a base-money instrument under administered interest rates, which we document directly, and the classification is reported under three conventions so that the results can be compared with the existing evidence for Iran.

The data select two monetary and three fiscal regimes. Monetary policy is passive throughout the sample. Fiscal policy cycles through a strongly passive, a weakly passive and an active regime, so that the policy mix alternates between indeterminacy (35 years) and fiscal dominance (15 years) and is never one of monetary dominance. Fiscal dominance coincides with the high-inflation episodes of 1975–1977, 1986–1988 and 2015–2023, and with deep financial repression. None of the candidate drivers, including sanctions and oil shocks, significantly shifts the transition probabilities; the real deposit rate comes closest, and once the economy was in the active fiscal regime, it remained there in every year in which the real deposit rate was below about −12 percent, but with 50 observations this association is suggestive rather than statistically established.

The remainder of the paper is organised as follows. Section 2 reviews the theoretical background and previous studies. Section 3 presents the policy rules, the econometric model and the inference procedures. Section 4 describes the data, their time-series properties and the evidence on administered interest rates. Section 5 reports the results, Section 6 the robustness and out-of-sample evidence, and Section 7 discusses the findings and their policy implications. Section 8 concludes.

2. Theoretical Background and Literature Review

2-1. Active and passive policies

According to Leeper (1991), a policy authority is active when it is not constrained by current budgetary conditions and is free to set its instrument and passive when it is constrained by consumer optimisation and the actions of the other authority. Monetary policy is active when it responds strongly to inflation (the Taylor principle) and passive otherwise. Fiscal policy is passive when taxes or primary surpluses respond sufficiently to government debt to keep it on a sustainable path, and active otherwise.

Four combinations follow. Under active monetary and passive fiscal policy (AM/PF), monetary policy anchors the price level and fiscal policy guarantees solvency: this is

monetary dominance and the conventional New Keynesian benchmark, with a unique equilibrium. Under passive monetary and active fiscal policy (PM/AF), the price level adjusts to make the real value of government debt consistent with the present value of surpluses: this is fiscal dominance, associated with the fiscal theory of the price level, and it also yields a unique equilibrium. Under PM/PF neither authority anchors nominal variables and the equilibrium is indeterminate. Under AM/AF both authorities try to anchor nominal variables and no stable equilibrium exists (Leeper, 1991; Liu *et al.*, 2021; Hinterlang & Hollmayr, 2022).

The distinction between fiscal and monetary dominance therefore refers to which authority determines the price level, not to which instrument is more volatile or more frequently used. Fiscal dominance requires both a passive central bank and an active fiscal authority; a passive central bank combined with a passive fiscal authority is not fiscal dominance but indeterminacy. Section 5.6 applies exactly this joint classification.

2-2. Policy rules with a base-money instrument

The thresholds above are defined for interest-rate and tax rules. Alexeeva *et al.* (2022), for example, specify a continuous-time New Keynesian model with government debt in which the central bank sets the real interest rate, $r_t = r + f_M(\pi_t - \pi^*)$, so that $f_M > 0$ (active) is equivalent to a nominal response greater than one, and taxes respond to debt, $\tau_t = \tau + f_F(b_t - b^*)$, with $f_F > r$ for passive fiscal policy.

In Iran the operational instrument of the central bank is the quantity of base money, and nominal interest rates have been set administratively (Komijani *et al.*, 2013; Zorriyeh Mohammadali *et al.*, 2021). Two implications follow. First, with an administered nominal rate, the real rate falls when inflation rises, so the interest-rate instrument is passive in the sense of Leeper (1991) and Alexeeva *et al.* (2022). Section 4.4 confirms this: over 1975–2024 the ceiling on the one-year deposit rate responds to inflation with a coefficient of only 0.14, far below one, and the real deposit rate falls by 0.60 points for each point of inflation ($f_M \approx -0.6 < 0$). The only margin along which monetary policy can lean against inflation is therefore the growth of base money. Second, in a base-money rule $\mu_t = \alpha + \phi(\pi_t - \pi^*)$, a contractionary response to inflation corresponds to $\phi < 0$, as in the base-money rule of McCallum (1988). A positive ϕ means that the central bank accommodates inflation by expanding base money. We therefore classify monetary policy as active when ϕ is significantly negative and passive otherwise, which is also the criterion of Erfani and Talebbeydokhti (2025a).

This criterion differs from the one that applied the interest-rate threshold $\phi > 1$ to base-money growth. For a money-growth instrument that threshold is inappropriate: a response of base-money growth greater than one-for-one to inflation is the most accommodative stance possible, not an active one. To make the role of the criterion transparent, Section 5.2 reports the classification under the sign criterion, under the threshold $\phi < 1$ implied by mapping base-money growth into an interest-rate response through money demand ($\Delta i_t \approx (1-\phi)\pi_t/\eta$ when $m_t - p_t = y_t - \eta i_t$), and under the Taylor-type threshold $\phi > 1$.

2-3. Price determination under indeterminacy

Under PM/PF neither policy pins down the price level. The fiscal authority stabilises debt for any path of prices, and the central bank validates whatever inflation occurs. Equilibrium inflation is then not determined by fundamentals alone: self-fulfilling revisions of expectations (sunspots) and fundamental shocks can move inflation persistently, and the propagation of fundamental shocks itself depends on expectations (Clarida, Galí & Gertler, 2000; Benhabib, Schmitt-Grohé & Uribe, 2001; Lubik & Schorfheide, 2004).

In the Iranian institutional setting the transmission runs as follows. A shock that raises expected inflation, typically an exchange-rate depreciation driven by oil-revenue or sanctions news, raises prices; with administered deposit rates, real rates fall and the demand for money and bank deposits declines; the central bank, whose base-money growth accommodates inflation, supplies the additional liquidity; and because fiscal policy is passive, no fiscal adjustment acts as a nominal anchor either. Inflation therefore becomes persistent and dependent on expectations rather than on a policy target. Financial repression completes the mechanism: because deposit rates are capped, the inflation generated in this way transfers resources from depositors to the government and to the borrowers of the banking system, which lowers the fiscal cost of inflation and weakens the incentive to restore a nominal anchor. Section 5.6 shows that inflation averaged 19 percent in the years of indeterminacy and 29 percent in the years of fiscal dominance.

2-4. Previous studies

Harada and Suzuki (2026) examine the interaction between monetary policy and fiscal conditions in advanced economies over 1980–2025 and find that moderate monetary expansion tends to stabilise budget deficits by raising nominal GDP. Giuli *et al.* (2025)

use a Markov-switching framework to study dominance and conflicts during crises: the United States alternated between monetary and fiscal dominance, the euro area was mainly under monetary dominance, and crisis periods triggered regime shifts. Serem *et al.* (2025) find for Kenya that monetary-fiscal coordination partially mediates the effect of policy on public debt. Liu *et al.* (2021) estimate regimes for China over 1993–2017 and find strong support for passive monetary and active fiscal policy. Hinterlang and Hollmayr (2022) classify monetary and fiscal dominance with machine-learning methods.

For Iran, Tavakolian *et al.* (2019) and Jaafari-Lylab *et al.* (2018) use DSGE models and find fiscal dominance and gains from coordination; Nazari (2018) estimates regime-switching rules over 1971–2016. The studies closest to ours are Erfani and Talebbeydokhti (2025a, 2025b). In the monetary study, base-money growth responds to the deviation of inflation from its Hodrick-Prescott trend in a three-regime MSIA model over 1975–2023; a negative response is classified as active. They find one short active regime (1978, 1993, and 2005), a "highly passive" regime with a response of 0.64 (1983–1992, 1997–2004, and 2009–2015) and a "relatively passive" regime with a response of 0.56. In the fiscal study, tax-revenue growth responds to the gap between government debt to the central bank and its HP trend and to the budget deficit in a three-regime MSIAH model over 1975–2022, and all three regimes are active. Both studies conclude that Iranian policy has been predominantly passive (monetary) and active (fiscal).

This study differs from these papers in five respects that matter for the results. (i) The two rules are analysed jointly, so that the policy mix and its equilibrium properties can be identified year by year. (ii) The fiscal rule uses the operating balance relative to GDP and is shown to form a cointegrating relation with debt once a regime shift is allowed. (iii) The number of regimes is tested rather than chosen by information criteria, which can be unreliable in small samples. (iv) The inflation target is explicit and constant, so that the policy coefficient does not depend on the level of the target; the HP-trend target is examined as a robustness check. (v) Financial repression is measured directly and tested both as a control in the fiscal rule and as a driver of regime transitions.

3. Methodology

3-1. Policy rules

The monetary rule is

$$MBGR_t = \alpha_0(S_t^M) + \phi(S_t^M)\,(\pi_t - \pi^*) + \alpha_y\,\tilde{y}_t + \rho_m\,MBGR_{t-1} + \alpha_c\,COVID_t + \sigma_m(S_t^M)\,\varepsilon_t^m \quad (1)$$

where $MBGR_t$ is the growth rate of the monetary base (percent), π_t is CPI inflation (percent), π^* is the inflation target, $\tilde{y}_t$ is the output gap, $COVID_t$ is a dummy for 2020–2021 and $S_t^M \in \{1, \dots, k_M\}$ is the monetary regime. The target π^* is set to the sample mean of inflation (22.07 percent). Because the target is constant, it shifts only the intercept and leaves ϕ unchanged.

The fiscal rule follows Bohn (1998) and Davig and Leeper (2006):

$$OB_t = \gamma_0(S_t^F) + \gamma_b(S_t^F)\, b_{t-1} + \gamma_y\, \tilde{y}_t + \gamma_o\, oil_t + \rho_1\, OB_{t-1} + \rho_2\, OB_{t-2} + \gamma_c\, COVID_t + \sigma_f(S_t^F)\, \varepsilon_t^f \quad (2)$$

where OB_t is the operating balance (general revenues minus current payments) as a percent of GDP, b_{t-1} is lagged government debt to the central bank as a percent of GDP, oil_t is oil revenue as a percent of GDP and $S_t^F \in \{1, \dots, k_F\}$ is the fiscal regime. Fiscal policy is passive when the operating balance improves significantly in response to debt ($\gamma_b > 0$) and active otherwise. The threshold of zero is the sustainability condition of Bohn (1998); because the real interest rate on government debt net of output growth has been negative for most of the sample, owing to administered rates and high inflation, it is a conservative version of the Leeper (1991) threshold $\gamma_b > r - g$. Because the rule is dynamic, the long-run response of the operating balance to debt in regime j is $\gamma_b(j)/(1 - \rho_1 - \rho_2)$. Two lags of the operating balance are included because with a single lag the residuals of the fiscal rule remain autocorrelated, whereas with two lags they are white noise (Sections 5.7 and 6.2).

In both rules the intercept, the policy coefficient and the error variance switch, while the coefficients on the controls and the autoregressive terms are common across regimes. This partial switching keeps the number of parameters compatible with 50 annual observations and isolates changes in the policy response from changes in the sensitivity to oil, the cycle or past deficits; Section 6.1 compares it with full switching of all coefficients.

3-2. Regime dynamics and time-varying transition probabilities

Each regime variable follows a first-order Markov chain with transition probabilities

$$p_{ij,t} = \Pr(S_t = j \mid S_{t-1} = i) = \frac{\exp(\eta_{ij,t})}{\sum_l \exp(\eta_{il,t})}, \quad \eta_{ii,t} = 0, \quad \eta_{ij,t} = a_{ij} + z_t' c_{ij} \quad (3)$$

With z_t empty the probabilities are constant; otherwise they vary with observed covariates (Diebold, Lee & Weinbach, 1994; Filardo, 1994). With k regimes the unrestricted specification has $k(k-1)$ slope coefficients per covariate. With three fiscal regimes and only a handful of regime changes in 50 years, these slopes are not identified:

the likelihood increases without bound as they diverge, so that transition probabilities become exactly zero or one, a quasi-complete separation analogous to that of logit models. For $k \geq 3$ we therefore estimate a restricted specification in which the covariate affects only the probability of leaving the two extreme regimes, with one common slope for each:

$$\eta_{1j,t} = a_{1j} + c_1 z_t, \quad \eta_{kj,t} = a_{kj} + c_k z_t, \quad \eta_{ij,t} = a_{ij} \quad (1 < i < k) \qquad (4)$$

where regime 1 has the largest and regime k the smallest policy coefficient. The restriction tests the economically relevant hypothesis, namely whether the covariate makes the most passive and the most active regime more or less persistent, with two slopes per covariate, as in the two-regime case. It is estimated starting from the constant-probability estimate with zero slopes, so that the likelihood-ratio statistic is non-negative by construction.

For the monetary rule we consider a sanctions dummy, a sanctions-intensity index, a war dummy (1980–1988), the change in oil revenue relative to GDP and the depreciation of the free-market exchange rate. For the fiscal rule we consider the same sanctions, war and oil covariates and two measures of financial repression: the real deposit rate and the public sector's share of bank credit. We also considered the lagged filtered probability that monetary policy is active, which would link the two chains, but it is constant because no monetary regime is active (Section 5.2). Covariates are standardised. Each candidate is estimated on a common sample; the preferred specification minimises BIC among estimates with a positive-definite Hessian and no parameter on a boundary, and each candidate is tested against constant probabilities by a likelihood-ratio test with two degrees of freedom. When a slope lies on its boundary, the χ^2 approximation is unreliable, so we also compute a parametric-bootstrap p-value: data are simulated from the constant-probability model with the regressors held fixed, both models are re-estimated on each simulated sample with the same procedure, and the p-value is the share of simulated statistics at least as large as the observed one.

3-3. Estimation

The likelihood is evaluated with the filter of Hamilton (1989), and smoothed regime probabilities are obtained with the smoother of Kim (1994). Normal mixture likelihoods are unbounded when a regime variance collapses to zero around a single observation, and in small samples maximum likelihood often converges to such degenerate solutions. We therefore maximise the penalised log-likelihood of Chen, Tan and Zhang (2008),

$$\ell_p(\theta) = \ell(\theta) - a_n \sum_{j=1}^{k} \left(\frac{s^2}{\sigma_j^2} + \log\sigma_j^2 \right), \quad a_n = n^{-1/2} \tag{5}$$

where s^2 is the residual variance of the linear rule. The penalty vanishes asymptotically and leaves non-degenerate solutions essentially unchanged. Reported log-likelihoods and information criteria are unpenalised. Models with constant transition probabilities are estimated from 50 random starting values, and restricted time-varying models from 20 starting values around the constant-probability estimate. Standard errors come from the inverse Hessian, and those of transition probabilities, expected durations $1/(1-p_{ii})$ and long-run responses from the delta method. Regimes are labelled ex post by their policy coefficient, which removes label switching.

3-4. Number of regimes

The number of regimes is selected by a sequential procedure. Models with $k = 1,2,3$ regimes are estimated. A model is considered identified if its Hessian is positive definite, no parameter lies on a boundary and every regime accounts for at least four expected years ($\sum_t \Pr(S_t = j \mid \text{data}) \geq 4$). Starting from $k = 1$, the current k is tested against each larger identified k; the procedure moves to the first alternative that is significant at 5 percent and stops when none is. Because the regime-specific parameters are not identified under the null, the likelihood-ratio statistic does not have a χ^2 distribution (Hansen, 1992; Garcia, 1998); its null distribution is obtained by a parametric bootstrap from the estimated null model with 99 replications (McLachlan, 1987), holding regressors fixed (Hansen, 2000). Testing the current model against every larger identified model, not only against $k+1$, matters: if the true model has $k+2$ regimes, the $(k+1)$-regime model is misspecified and the k versus $k+1$ test may have little power. AIC, BIC and HQ are reported for comparison; in small samples their performance in Markov-switching models depends strongly on sample size and regime separation (Psaradakis & Spagnolo, 2003).

The model with $k = 4$ was not considered: with partial switching it has 27 (monetary) and 29 (fiscal) parameters for 50 observations, and the three-regime monetary model already fails the identification criterion.

3-5. Regime classification and the policy mix

Each regime is labelled with a one-sided test at the 5 percent level: fiscal regimes are passive if γ_b is significantly positive, and monetary regimes are active if ϕ is significantly negative. Regimes that fail the test receive the other label, so a coefficient indistinguishable from zero is classified as active (fiscal) or passive (monetary). The

smoothed probability of each label is the sum of the probabilities of the regimes that carry it. Treating the two chains as conditionally independent, the probability of each policy mix in year t is the product of the corresponding label probabilities, and each year is assigned to the most likely mix.

3-6. Diagnostics

Residual diagnostics use probability-integral-transform residuals, $u_t = \Phi^{-1}\big(\sum_j \Pr(S_t = j \mid \mathcal{F}_{t-1})\, F_j(y_t)\big)$, which are i.i.d. standard normal under correct specification. We report Jarque-Bera, Ljung-Box, McLeod-Li and ARCH-LM tests. Regime separation is measured by the regime classification measure (RCM) of Ang and Bekaert (2002), which equals zero under perfect classification and 100 under none.

4. Data

4-1. Sources and construction

All series are annual and taken from the Economic Time Series Database of the Central Bank of Iran, except where noted. The sample is 1975–2024 (1354–1403 SH), the longest period over which all variables are jointly available; it is bounded by the monetary base, which starts in 1973. Gregorian years refer to the Iranian year that begins in March of that year.

Nominal and real GDP at basic prices are available for four base years (1383, 1390, 1395 and 1400). Each older vintage is rescaled to the newest one at their first common year, which preserves the growth rates of the older vintage. Government finance data are reported under GFS1986 until 1391 and GFS2001 from 1380; the two coincide exactly in the overlap for tax revenue, oil revenue, current payments and development payments. The operating balance is reported directly from 1380; for earlier years it is computed as revenues minus oil revenue minus current payments, which differs from the reported series by about one percent in the overlap. From 1400 the reported operating balance also nets other payments and statutory obligations. Inflation is the annual change in the consumer price index. The output gap is the deviation of log real GDP from its Hodrick-Prescott trend (Hodrick & Prescott, 1997; $\lambda = 100$), computed over 1959–2024 to reduce end-point effects.

Interest-rate, credit and exchange-rate data come from the same database. The deposit rate is the ceiling on the provisional profit rate of one-year investment deposits set by the Central Bank; the lending rate is the average of the expected profit rates on bank facilities in five sectors (trade, industry and mining, agriculture, housing and construction, and

exports). Where the Central Bank reports a range of rates, for example for different types of banks, we use its midpoint; where it reports a one-sided ceiling, we use the ceiling. The public sector's share of bank credit is the ratio of the banking system's claims on the public sector to its claims on the public and non-public sectors. Government debt to the central bank excludes public enterprises; a broader measure that includes them is used as a robustness check. The free-market exchange rate (rials per U.S. dollar) is spliced from the two series that the Central Bank reports under its earlier and its current classification of foreign-exchange markets, which coincide exactly in their overlap; its annual percentage change measures depreciation.

All fiscal variables are expressed as percentages of nominal GDP. Section 6.3 shows that this transformation removes the heteroscedasticity present in the data.

4-2. Sanctions

Sanctions are coded from the legal record compiled by the U.S. Office of Foreign Assets Control (Executive Orders and UN Security Council resolutions), supplemented by the EU oil embargo of 2012, the Joint Comprehensive Plan of Action (UN Security Council Resolution 2231) and the 2018 U.S. withdrawal (Executive Order 13846). A measure is assigned to a year if it was in force for at least half of that Iranian year. Table 1 reports the resulting intensity index. The sanctions dummy equals one in years of intensity 4 (2012–2015 and 2018–2024).

Table 1: Sanctions intensity index

Years	Intensity	Measures
1980	2	Asset freeze and trade embargo (EO 12170, 12205, 12211); lifted January 1981
1988–1994	1	U.S. import ban (EO 12613)
1995–2006	2	U.S. trade and investment embargo (EO 12957, 12959, 13059); Iran Sanctions Act (1996)
2007–2011	3	Plus UN Security Council Resolutions 1737, 1747, 1803 and 1929; CISADA (2010)
2012–2015	4	Plus EU oil embargo and SWIFT disconnection; sanctions on the central bank (EO 13599, NDAA §1245); IFCA
2016–2017	2	JCPOA: UN, EU and U.S. secondary sanctions lifted; U.S. primary embargo remains
2018–2024	4	Re-imposition and "maximum pressure" (EO 13846, 13871, 13876, 13902)

Other years: 0. Source: authors' coding from OFAC, EU Council Decision 2012/35/CFSP and UNSC Resolution 2231.

4-3. Descriptive statistics and time-series properties

Table 2 reports descriptive statistics for the variables used in the analysis.

Table 2: Descriptive statistics, 1975–2024 (N = 50)

Variable	Mean	SD	Min	Max
Operating balance (% of GDP)	−6.93	3.99	−18.46	−2.77
Government debt to the central bank (% of GDP)	12.52	12.58	1.31	43.79
Oil revenue (% of GDP)	8.44	5.90	0.91	30.76
Tax revenue (% of GDP)	5.23	1.04	3.13	7.45
Monetary-base growth (%)	24.36	11.85	3.89	63.80
CPI inflation (%)	22.07	12.03	6.90	53.10
Output gap, HP (%)	0.00	8.09	−26.54	22.51
Nominal deposit rate (%)	12.94	3.90	8.00	23.00
Real deposit rate (%)	−6.77	7.93	−23.69	6.40
Public sector's share of bank credit (%)	37.74	16.89	14.54	63.92
Free-market exchange-rate depreciation (%)	22.87	29.46	−5.83	167.87

Source: authors' calculations.

Table 3 reports unit-root tests. Monetary-base growth, inflation, the output gap, the change in oil revenue, the real deposit rate and exchange-rate depreciation are stationary. The operating balance and the debt ratio appear non-stationary according to ADF, KPSS and Zivot-Andrews (1992) tests, and so does the public sector's share of bank credit. The evidence for oil revenue relative to GDP is mixed: the ADF test rejects a unit root, but the KPSS test rejects stationarity. Unit-root tests have low power when the series switch between regimes (Nelson, Piger & Zivot, 2001), so we test directly whether the fiscal rule is a valid levels relation.

Table 3: Unit-root tests, 1975–2024

Variable	ADF	p	KPSS	p	Zivot-Andrews	Break
Operating balance / GDP	−2.14	0.52	0.87	0.01	−4.63	1981
Debt to central bank / GDP	−3.12	0.13	0.75	0.01	−4.32	1988
Oil revenue / GDP	−3.85	0.02	0.75	0.01	−4.32	1988
Change in oil revenue / GDP	−4.57	<0.01	0.37	0.09	−6.31*	1995
Monetary-base growth	−3.80	0.03	0.11	0.10	−4.79	1978
CPI inflation	−3.77	0.03	0.37	0.09	−5.19*	2013
Output gap (HP)	−6.28	<0.01	0.05	0.10	−6.89*	1981
Real deposit rate	−3.84	0.02	0.12	0.10	−5.47*	2013
Public share of bank credit	−2.44	0.40	0.97	0.01	−3.70	2002
Exchange-rate depreciation	−3.98	0.02	0.22	0.10	−6.50*	2017

*ADF with constant and trend (Said & Dickey, 1984); KPSS null of level stationarity (Kwiatkowski et al., 1992), p-values truncated at 0.01 and 0.10; Zivot-Andrews with a break in intercept and trend, 5% critical value −5.08, * rejection of the unit root.*

Phillips-Ouliaris (1990) tests do not reject the null of no cointegration between the operating balance and lagged debt over the full sample ($p \geq 0.15$), but they are biased against cointegration when the relation shifts. The Gregory-Hansen (1996) tests allowing for a shift in the intercept, and for a shift in both intercept and slope, reject the null at the 5 percent level, with breaks in 1983 and 1992 (Table 4). When oil revenue is added to the cointegrating regression, the Gregory-Hansen statistics fall short of the larger critical values for two regressors, whereas over 1989–2024 the Phillips-Ouliaris test rejects no cointegration for this relation ($p = 0.04$). We therefore treat the operating balance and debt as cointegrated subject to regime shifts, which is precisely the feature that the Markov-switching rule models, and oil revenue as a control. A further check supports the levels specification: a spurious regression would leave strongly autocorrelated residuals (Granger & Newbold, 1974), whereas the residuals of the estimated fiscal rule are white noise (Section 5.7).

Table 4: Cointegration with a regime shift (Gregory-Hansen), operating balance on lagged debt

Regressors	Model	ADF*	Break	5% CV	Reject
Lagged debt	Level shift (C)	−4.92	1983	−4.61	Yes
Lagged debt	Regime shift (C/S)	−5.33	1992	−4.95	Yes
Lagged debt, oil revenue	Level shift (C)	−4.42	1983	−4.92	No
Lagged debt, oil revenue	Regime shift (C/S)	−4.58	1987	−5.50	No

Sample 1975–2024. Critical values from Gregory and Hansen (1996, Table 1), Phillips-Ouliaris tests over 1989–2024: $p = 0.07$ for the relation with lagged debt only and $p = 0.04$ with oil revenue added.

4-4. Administered interest rates and financial repression

We measure financial repression with two indicators. The first is the real one-year deposit rate, computed from the ceiling on the deposit rate and CPI inflation, $r_t = 100\,[(1 + i_t/100)/(1 + \pi_t/100) - 1]$. The second is the public sector's share of banking-system credit.

Table 5 summarises the evidence. The nominal deposit rate responds to inflation with a coefficient of only 0.14, so an interest-rate rule would have a Taylor coefficient far below one. As a result, the real deposit rate falls by 0.60 points for each point of inflation, corresponding to $f_M \approx -0.6$ in the notation of Alexeeva *et al.* (2022). The real deposit rate was negative in 38 of the 50 years, averaging −6.8 percent, and the public sector absorbed on average 38 percent of banking-system credit, between 50 and 64 percent in the 1980s and between 15 and 23 percent since 2005. Both indicators are used in Sections 5 and 6 as drivers of fiscal regime switching and as controls in the fiscal rule.

Table 5: Response of administered interest rates to inflation, 1975–2024

Dependent variable	Coefficient on inflation	Newey-West SE	t (H0: 1)
Nominal deposit rate	0.135	0.049	−17.8
Real deposit rate	−0.604	0.047	—
Nominal lending rate	0.122	0.049	−17.8
Real lending rate	−0.623	0.050	—

Newey-West (1987) standard errors with two lags. Real deposit rate negative in 38 of 50 years (mean −6.77 percent). Source: authors' calculations from Central Bank of Iran data.

5. Results

5-1. Number of regimes

Table 6 reports the selection of the number of regimes. For the monetary rule, the bootstrap rejects the linear rule against two regimes (LR = 29.85, p < 0.01), and the three-regime model is not identified because one regime accounts for only 3.8 expected years; AIC, BIC and HQ also select two regimes. For the fiscal rule, two regimes do not improve significantly on the linear rule (LR = 16.15, p = 0.23), but three regimes do (LR = 43.88, p < 0.01). The three-regime model is identified, its smallest regime spans 9.7 expected years, and AIC and HQ also select it. BIC, which penalises the twelve additional parameters heavily in a sample of 50, prefers the linear rule, but its values for one, two and three regimes lie within 3.4 points of each other. The fiscal case illustrates why the test sequence matters: the two-regime model is misspecified when the data contain three regimes, so a procedure that only tested k against $k + 1$ would have stopped at the linear rule. We therefore use two monetary and three fiscal regimes. The three fiscal regimes agree with the number found by Erfani and Talebbeydokhti (2025b); for monetary policy, the third regime found by Erfani and Talebbeydokhti (2025a), which covers three isolated years, is not supported by our identification criterion.

Table 6: Selection of the number of regimes

Rule	k	Parameters	Log-lik.	AIC	BIC	HQ	Min. regime (years)	Identified
Monetary	1	6	−186.33	384.7	396.1	389.0	50.0	Yes
Monetary	2	11	−171.40	**364.8**	**385.8**	**372.8**	14.6	Yes
Monetary	3	18	−165.40	366.8	401.2	379.9	3.8	No
Fiscal	1	8	−74.40	164.8	**180.1**	170.6	50.0	Yes
Fiscal	2	13	−66.33	158.7	183.5	168.1	16.3	Yes
Fiscal	3	20	−52.46	**144.9**	183.2	**159.5**	9.7	Yes

Bootstrap LR test	LR	p (B = 99)	Decision
Monetary: 1 vs 2	29.85	0.000	Reject; k = 2
Fiscal: 1 vs 2	16.15	0.232	Do not reject

Rule	k	Parameters	Log-lik.	AIC	BIC	HQ	Min. regime (years)	Identified
Fiscal: 1 vs 3			43.88		0.000		Reject; k = 3	

Bold: minimum of each criterion within each rule. Source: authors' estimations.

5.2. Monetary policy regimes

None of the time-varying specifications improves significantly on constant transition probabilities (Section 5.4), so the results below use constant probabilities.

Table 7: Monetary-policy rule, two regimes

Parameter	Regime 1	Regime 2
Intercept	41.74 (4.13)	22.29 (1.92)
Inflation gap, ϕ	−0.095 (0.277)	0.637 (0.086)
σ	9.69 (1.95)	4.58 (0.58)
Probability of staying, p_{ii}	0.823 (0.103)	0.918 (0.047)
Expected duration (years)	5.7	12.3
Classification (sign criterion)	Passive	Passive
Common: output gap	−0.038 (0.135)	
Common: lagged base-money growth	−0.154 (0.086)	
Common: COVID-19	−3.20 (3.95)	
Log-likelihood / BIC / RCM	−171.40 / 385.8 / 7.2	

Standard errors in parentheses. Wald test of equal ϕ across regimes: $\chi^2 = 5.84$, $p = 0.016$. Source: authors' estimations.

Both monetary regimes are passive (Table 7 and Fig. 1). In regime 1, which prevails in 1975–1982, 1995–1996 and 2005–2008, base-money growth is high (an intercept of about 42 percent) and does not respond to inflation. These are periods of oil booms or of their immediate aftermath: in regime-1 years base-money growth averaged 36.8 percent and oil revenue 14.1 percent of GDP, against 19.5 and 6.2 percent in regime-2 years, consistent with the conversion of oil revenue into base money when the central bank purchases the government's foreign-exchange receipts. In regime 2, which prevails in 1983–1994, 1997–2004 and 2009–2024, base-money growth accommodates inflation with a coefficient of 0.64. This regime is persistent, with an expected duration of 12 years, and is the long-run (ergodic) regime with probability 0.69.

The results match those of Erfani and Talebbeydokhti (2025a), whose "highly passive" regime has a coefficient of 0.64 and covers 1983–1992, 1997–2004 and 2009–2015, and whose "relatively passive" regime includes 1979–1982, 1994–1996 and 2006–2008. Table 8 shows that the classification depends on the convention, which explains the apparently contradictory findings in the literature: under the sign criterion both regimes

are passive; under the money-demand mapping ($\phi < 1$) both would be classified as active; and under the Taylor convention ($\phi > 1$) both are passive. With administered interest rates, however, the money-demand mapping does not translate base-money growth into a market interest rate, and the real interest rate falls with inflation (Section 4.4), so we adopt the sign criterion.

Table 8: Monetary classification under alternative conventions

Convention	Regime 1 ($\phi = -0.095$)	Regime 2 ($\phi = 0.637$)
Sign: active if $\phi < 0$ (baseline)	Passive (p = 0.37)	Passive (p = 1.00)
Money demand: active if $\phi < 1$	Active (p < 0.001)	Active (p < 0.001)
Taylor convention: active if $\phi > 1$	Passive (p = 1.00)	Passive (p = 1.00)

One-sided p-values for the hypothesis that defines the active label. Source: authors' estimations.

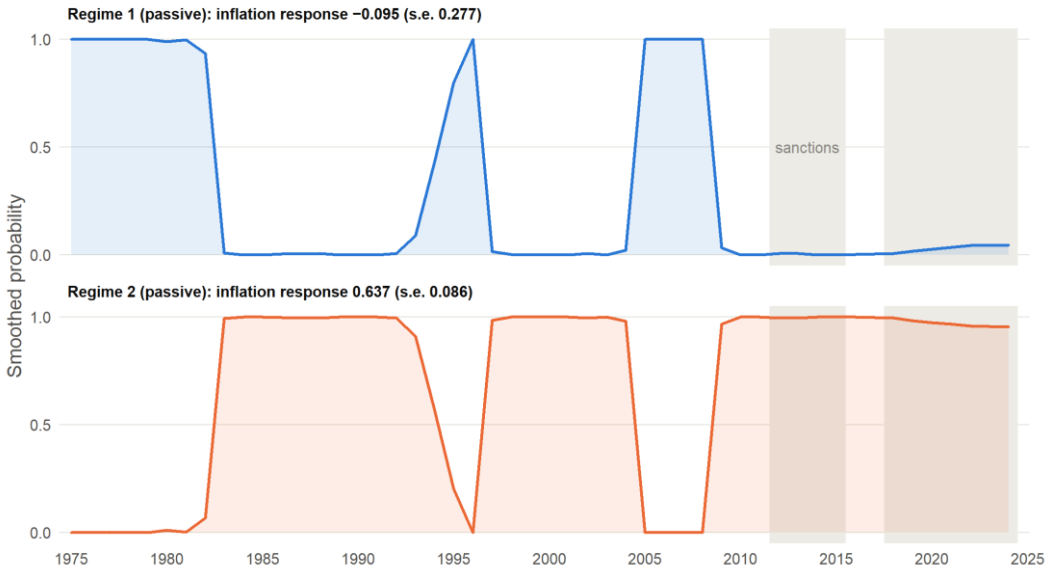

Fig. 1: Smoothed probabilities of the monetary-policy regimes, 1975–2024.

Shaded: sanctions intensity 4. Source: authors' estimations.

5-3. Fiscal policy regimes

Table 9: Fiscal-policy rule, three regimes

Parameter	Regime 1	Regime 2	Regime 3
Intercept	−3.318 (0.236)	−0.454 (0.272)	−0.665 (0.153)
Lagged debt, γ_b	0.109 (0.008)	0.038 (0.019)	−0.031 (0.006)
Long-run debt response, $\gamma_b/(1-\rho_1-\rho_2)$	0.242 (0.028)	0.084 (0.045)	−0.070 (0.015)
σ	0.330 (0.084)	0.865 (0.125)	0.268 (0.053)
Probability of staying, p_{ii}	0.753 (0.142)	0.905 (0.055)	0.822 (0.106)
Expected duration (years)	4.0	10.6	5.6
Classification (one-sided p for $\gamma_b > 0$)	Passive (< 0.001)	Passive (0.027)	Active (1.000)

Parameter	Regime 1	Regime 2	Regime 3
Common: output gap	0.119 (0.014)		
Common: oil revenue / GDP	−0.281 (0.035)		
Common: OB_{t-1}	0.312 (0.058)		
Common: OB_{t-2}	0.239 (0.029)		
Common: COVID-19	−0.309 (0.226)		
Log-likelihood / BIC / RCM	−52.46 / 183.2 / 0.0005		

Standard errors in parentheses. Wald tests of equal γ_b: regimes 1 and 2, $\chi^2 = 11.12$; regimes 2 and 3, $\chi^2 = 12.06$; regimes 1 and 3, $\chi^2 = 199.10$; all $p < 0.001$. Long-run effects of oil revenue and the output gap: −0.625 (0.030) and 0.265 (0.023). Source: authors' estimations.

The three fiscal regimes differ significantly in their response to debt (Table 9 and Fig. 2). Regime 1 is strongly passive: a one-point increase in the debt ratio raises the operating balance by 0.11 points of GDP in the same year and by 0.24 points in the long run. It prevails in 1978–1980, 1989–1994 and 2024. The 1989–1994 episode coincides with post-war reconstruction under the First Development Plan, when the operating deficit fell from 8.5 to 3.6 percent of GDP between 1988 and 1991 and debt to the central bank fell from 44 percent of GDP in 1988 to 18 percent in 1992. The 2024 observation lies at the end of the sample and reflects a sharp increase in the operating deficit (from 3.9 to 6.1 percent of GDP) that is matched by the regime's low intercept rather than by a debt response, so it should not be read as a return to fiscal discipline. Regime 2 is weakly passive: the debt response is 0.04 (0.08 in the long run) and significant only at the 5 percent level in a one-sided test. It is the most volatile regime and prevails in 1981–1985 and 1995–2014. Regime 3 is active: higher debt is associated with a larger operating deficit (−0.03, or −0.07 in the long run), so the fiscal authority finances deficits by borrowing from the central bank rather than stabilising debt. It prevails in 1975–1977, 1986–1988 and 2015–2023.

The active episodes are not explained by oil alone. Two of them coincide with oil-revenue collapses, the 1986 oil-price collapse during the war and the decline of oil revenue after 2014 that deepened with the 2018 sanctions, but the first (1975–1977) occurred at the peak of the oil boom, when oil revenue exceeded 20 percent of GDP and current spending expanded rapidly. What the three episodes share, on average, is high inflation and deep financial repression: in regime-3 years inflation averaged 28.6 percent and the real deposit rate −10.5 percent, against 21.0 and −8.2 percent in regime 1 and 18.6 and −4.0 percent in regime 2. Section 5.4 tests whether this link extends to the transition probabilities. Oil revenue also enters the rule directly: a one-point increase in oil revenue relative to GDP lowers the operating balance by 0.28 points on impact and by

0.62 points in the long run, consistent with the pro-cyclical expansion of current spending during oil booms. The output gap has the expected positive sign, reflecting automatic stabilisers.

The estimated transition matrix has a distinctive structure. The only transitions with non-negligible probability are from regime 1 to regime 2 ($p_{12} = 0.25$), from regime 2 to regime 3 ($p_{23} = 0.09$) and from regime 3 back to regime 1 ($p_{31} = 0.18$); all other transitions have probabilities below 0.001 and were never observed. The chronology follows this cycle two and a half times: active (1975–1977), passive (1978–1980), weakly passive (1981–1985), active (1986–1988), passive (1989–1994), weakly passive (1995–2014), active (2015–2023) and passive (2024). Fiscal consolidation follows active episodes, discipline then erodes gradually, and the economy tends to slide into the active regime when inflation and financial repression deepen.

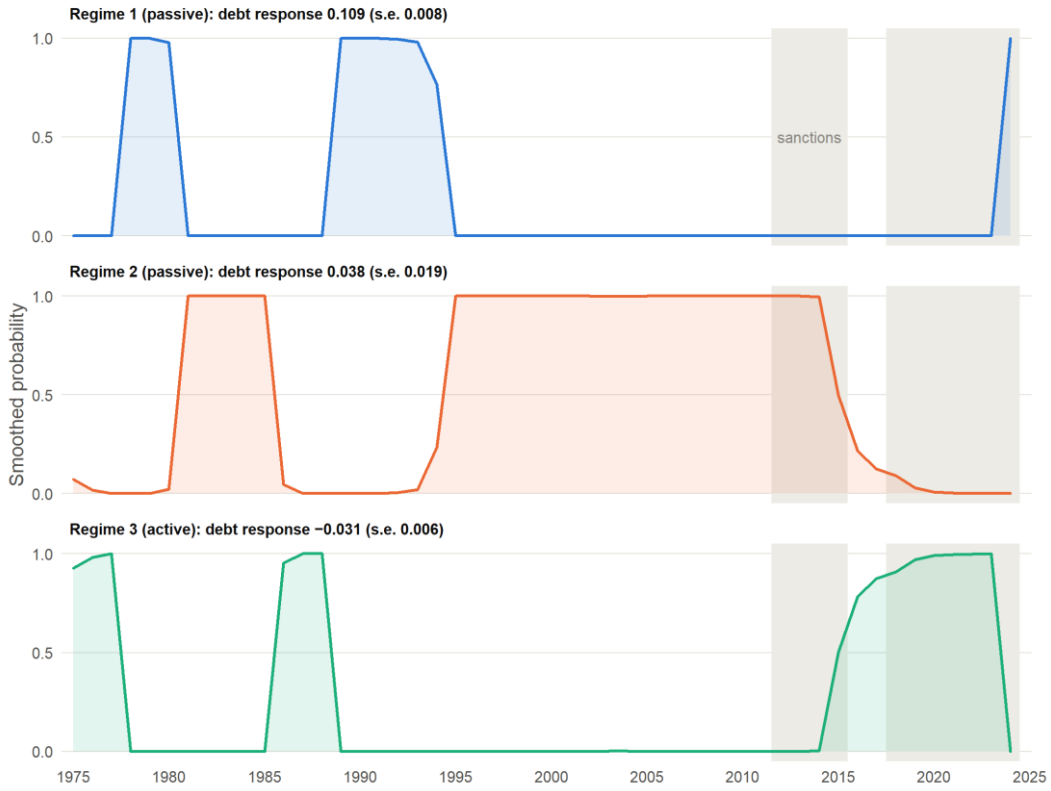

Fig. 2: Smoothed probabilities of the fiscal-policy regimes, 1975–2024.

Shaded: sanctions intensity 4. Source: authors' estimations.

5-4. What drives regime changes? Sanctions, oil, the exchange rate and financial repression

Table 10 reports the tests of time-varying transition probabilities. For the monetary rule, none of the covariates improves significantly on constant probabilities: the smallest p-value is 0.16, for the war dummy, and the depreciation of the free-market exchange rate gives p = 0.65. For the fiscal rule, the sanctions dummy (p = 0.96), the sanctions-intensity index (p = 0.90), the war dummy (p = 0.44), oil shocks (p = 0.91) and the public sector's share of bank credit (p = 0.56) are not significant either.

The real deposit rate gives the largest improvement in fit. It raises the log-likelihood of the fiscal rule by 4.70 (LR = 9.39, p = 0.009 under $\chi^2(2)$) and attains the lowest BIC of all fiscal specifications (181.6 against 183.2 with constant probabilities). Its slope on exits from the active regime, however, lies on the boundary of the parameter space: in every year in which the economy was in the active regime and the real deposit rate was below about −12 percent, the active regime continued, and every exit from it occurred when the rate was higher. This quasi-separation makes the χ^2 approximation unreliable, so we computed a parametric-bootstrap p-value with 99 replications. It is 0.15: when the data are generated by the constant-probability model, a likelihood-ratio statistic as large as 9.39 arises in 15 percent of samples, because with three regimes and 50 observations the active regime is observed in only 15 years and a covariate that happens to separate its few exits can produce a large statistic by chance. The real deposit rate therefore does not significantly affect the fiscal transition probabilities, and the estimates below describe the association in the sample rather than an established effect. In the estimated specification, the probability of remaining in the active regime equals one half when the real deposit rate is −11.7 percent and approaches one below −15 percent (Fig. 3). The slope on exits from the passive regime is negative but imprecise (−1.40 per standard deviation of the real deposit rate, SE 1.18): deep repression also tends to shorten the passive regime, as in 1994–1995, when the real deposit rate reached −24 percent and the passive regime of the reconstruction years ended. The regimes estimated with the real deposit rate coincide with the baseline regimes in 44 of the 50 years. The differences are that 1975 and 2015–2018 move from the active to the weakly passive regime, so that the most recent active episode starts in 2019 rather than 2015 (the real deposit rate was positive in 2015–2017), and that 1994 moves from the passive to the weakly passive regime.

Table 10: Tests of time-varying transition probabilities

Rule	Covariate	Log-lik.	BIC	LR vs constant	df	p	Reliable
Monetary	Constant probabilities	−171.40	**385.8**	—	—	—	Yes
Monetary	Sanctions dummy	−170.45	391.8	1.91	2	0.39	No
Monetary	Sanctions intensity	−169.77	390.4	3.26	2	0.20	Yes
Monetary	War	−169.59	390.0	3.63	2	0.16	Yes
Monetary	Δ oil revenue / GDP	−171.32	393.5	0.17	2	0.92	Yes
Monetary	Exchange-rate depreciation	−170.97	392.8	0.87	2	0.65	Yes
Fiscal	Constant probabilities	−52.46	183.2	—	—	—	Yes
Fiscal	Sanctions dummy	−52.42	190.9	0.08	2	0.96	No
Fiscal	Sanctions intensity	−52.36	190.8	0.21	2	0.90	Yes
Fiscal	War	−51.63	189.3	1.66	2	0.44	Yes
Fiscal	Δ oil revenue / GDP	−52.36	190.8	0.20	2	0.91	Yes
Fiscal	Real deposit rate	−47.77	**181.6**	9.39	2	0.009 (0.15)	No
Fiscal	Public share of bank credit	−51.87	189.8	1.18	2	0.56	Yes

Monetary: two regimes, one slope per origin regime. Fiscal: three regimes, restricted specification (4) with one slope for the exits from regime 1 and one for the exits from regime 3. p: $\chi^2(2)$; in parentheses, parametric-bootstrap p-value (99 replications). "Reliable": positive-definite Hessian and no parameter on a boundary. Bold: minimum BIC within each rule. The lagged probability of active monetary policy is constant because no monetary regime is active and is therefore excluded. Source: authors' estimations.

Two further qualifications apply. First, because the estimate lies on a boundary and is not significant under the bootstrap, we keep constant transition probabilities in the baseline (our selection rule also requires an interior estimate) and treat the financial-repression specification as descriptive evidence on the drivers of fiscal regime changes. Second, the association is contemporaneous. When the real deposit rate is lagged one year, the estimate is interior but the improvement in fit is smaller (LR = 6.04, p = 0.049 under $\chi^2(2)$), BIC rises to 185.0, above the 183.2 of constant probabilities, and neither slope is individually significant (−3.55, SE 2.34, for exits from the passive regime and −1.25, SE 1.05, for exits from the active regime); the latter even has the opposite sign to the contemporaneous estimate, so the lagged real deposit rate does not predict when the active regime ends. The evidence is therefore consistent with active fiscal policy and deep financial repression occurring together, as parts of a financing strategy that relies on the inflation tax, but it does not show that repression drives or predicts the change of regime.

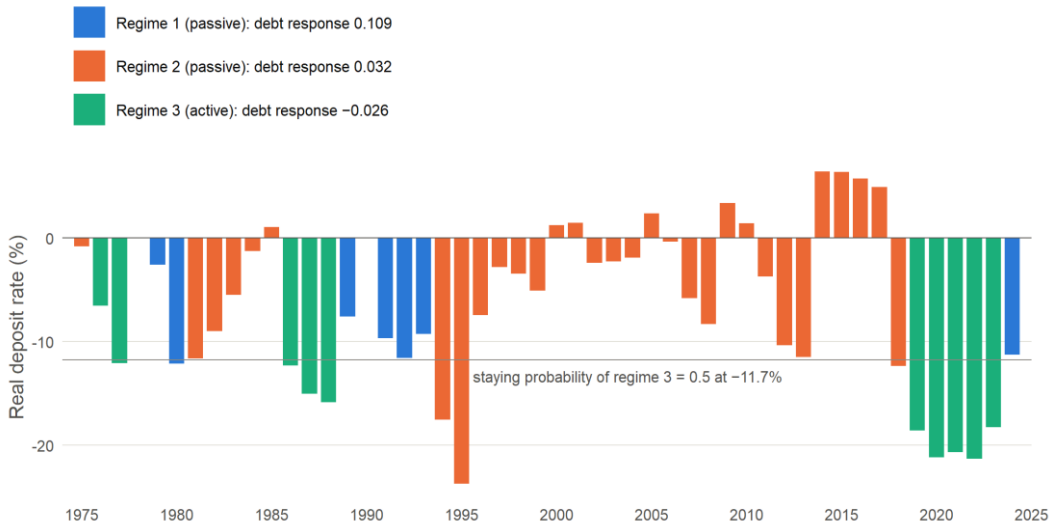

Fig. 3: Real deposit rate and the most likely fiscal regime in the specification with time-varying transition probabilities driven by the real deposit rate, 1975–2024.

The horizontal line marks the real deposit rate at which the probability of remaining in the active regime (regime 3) equals one half. Source: authors' estimations.

5-5. Regime chronology

Table 11 relates the estimated regimes to economic and political events. Sanctions do not affect the transition probabilities significantly (Table 10), but the timing of the regimes is informative. The active fiscal regime coincides with the end of the 1970s oil boom, with the oil-price collapse during the war and with the period of re-imposed sanctions and record inflation after 2018; the long weakly passive regime (1995–2014) spans the debt and exchange-rate crisis of the mid-1990s, the establishment of the Oil Stabilization Fund and the 2003–2008 oil boom; and the non-responsive, high-growth monetary regime coincides with oil booms (the late 1970s and 2005–2008) and with the aftermath of the 1994 exchange-rate crisis. The chronology is therefore consistent with oil and sanctions shocks shaping the timing of regime changes mainly through inflation and financial repression, but the sample of 50 annual observations is too short to estimate the effect of these shocks, or of financial repression, on the transition probabilities precisely.

Table 11: Regime chronology and events

Period	Monetary regime	Fiscal regime	Policy mix	Main events
1975–1977	Non-responsive	Active	PM/AF	Peak and end of the oil boom; inflation rises to 25 percent
1978–1980	Non-responsive	Passive	PM/PF	Revolution (1979); asset freeze (1980); war begins (1980)
1981–1982	Non-responsive	Weakly passive	PM/PF	War; war financing
1983–1985	Accommodative	Weakly passive	PM/PF	War; rationing and multiple

Period	Monetary regime	Fiscal regime	Policy mix	Main events
				exchange rates
1986–1988	Accommodative	Active	PM/AF	Oil-price collapse (1986); last years of the war; U.S. import ban (1987)
1989–1994	Accommodative	Passive	PM/PF	Post-war reconstruction; First Development Plan; external-debt and exchange-rate crisis (1993–1994)
1995–1996	Non-responsive	Weakly passive	PM/PF	Inflation peak (49 percent in 1995); U.S. embargo (1995); ILSA (1996)
1997–2004	Accommodative	Weakly passive	PM/PF	Oil Stabilization Fund (2000); exchange-rate unification (2002)
2005–2008	Non-responsive	Weakly passive	PM/PF	Oil boom; expansionary credit policy; UN sanctions (2007)
2009–2014	Accommodative	Weakly passive	PM/PF	Subsidy reform (2010); oil and banking sanctions (2012); currency crisis (2012–2013)
2015–2023	Accommodative	Active	PM/AF	Oil-price collapse; JCPOA (2016–2017); re-imposed sanctions (2018); COVID-19; inflation above 40 percent (2019–2023)
2024	Accommodative	Passive	PM/PF	End of sample

Regime with the highest smoothed probability. Monetary: non-responsive = regime 1, accommodative = regime 2. Fiscal: passive = regime 1, weakly passive = regime 2, active = regime 3. Source: authors' estimations.

5-6. Policy mix and dominance

Because no monetary regime is active, the policy mix alternates only between indeterminacy (PM/PF) and fiscal dominance (PM/AF) (Table 12 and Fig. 4). Indeterminacy prevails in 35 of the 50 years: 1978–1985, 1989–2014 and 2024, the years in which fiscal policy responded to debt. Fiscal dominance prevails in the 15 years of the active fiscal regime: 1975–1977, 1986–1988 and 2015–2023. Monetary dominance (AM/PF) and the unstable combination (AM/AF) are never observed. The policy mix changes only five times in 50 years.

The two configurations differ markedly. Under fiscal dominance inflation averaged 28.6 percent, the real deposit rate −10.5 percent and the depreciation of the free-market exchange rate 29.2 percent a year; under indeterminacy the corresponding Fig. s were 19.3, −5.2 and 20.2 percent. Inflation was high under both, as expected when no authority anchors the price level, but it was highest when the fiscal authority was active and the price level had to adjust to fiscal needs.

Table 12: Policy mix, 1975–2024

Policy mix	Equilibrium	Years	Count	Mean inflation (%)	Mean real deposit rate (%)
PM/AF	Fiscal dominance (unique)	1975–1977, 1986–1988, 2015–2023	15	28.6	−10.5
PM/PF	Indeterminacy	1978–1985, 1989–2014, 2024	35	19.3	−5.2
AM/PF	Monetary dominance (unique)	—	0	—	—
AM/AF	No stable equilibrium	—	0	—	—

Source: authors' estimations.

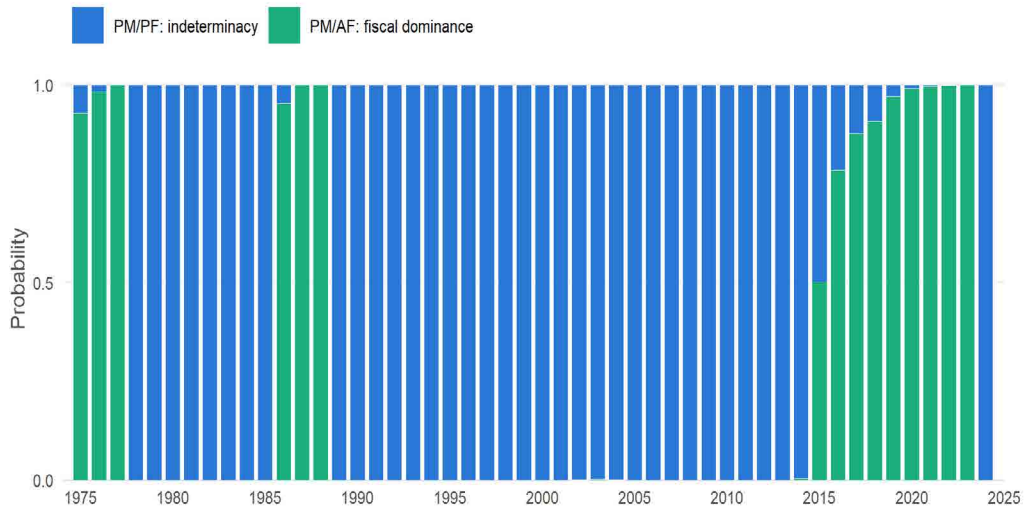

Fig. 4: Probability of each monetary-fiscal policy mix, 1975–2024.

The probabilities of monetary dominance (AM/PF) and of the unstable combination (AM/AF) are zero in every year. Source: authors' estimations.

Fig. 4 shows that the policy mix is driven entirely by the fiscal chain: because both monetary regimes are passive, the probabilities of monetary dominance (AM/PF) and of the unstable combination (AM/AF) are zero in every year, and the probability mass alternates between indeterminacy (PM/PF) and fiscal dominance (PM/AF). The probabilities are close to zero or one in almost all years, consistent with the sharp separation of the fiscal regimes (RCM = 0.0005, Section 5.7), so the classification of each year is clear-cut rather than sensitive to a probability threshold.

5-7. Diagnostics

The probability-integral-transform residuals of both rules pass all diagnostic tests. For the monetary rule, the Jarque-Bera, Ljung-Box Q(2), McLeod-Li and ARCH-LM tests give p = 0.81, 0.58, 0.50 and 0.49; for the fiscal rule, p = 0.60, 0.32, 0.69 and 0.62. With a single lag of the operating balance, the Ljung-Box test rejected the absence of residual autocorrelation in the fiscal rule (p = 0.02), which motivated the second lag. The regime classification measures (7.2 for the monetary and 0.0005 for the fiscal rule) indicate sharp separation of the regimes.

6. Robustness and Out-of-Sample Evaluation

6-1. Switching structure and the standard MSIAH benchmark

Table 13 compares the baseline partial-switching rules with linear rules, with rules in which all coefficients switch and with the standard two-regime MSIAH model estimated with the MSwM package. Full switching raises the likelihood but not enough to justify the additional parameters: BIC rises from 385.8 to 391.2 for the monetary rule and from 183.2 to 207.1 for the fiscal rule.

The MSIAH benchmark illustrates the risk of overfitting. Its monetary model contains a regime in which base-money growth contracts strongly with inflation ($\phi = -1.40$), but that regime lasts 1.2 years on average and has an autoregressive coefficient of 1.34, that is, explosive dynamics within the regime. Its fiscal model attains a lower BIC than the baseline (176.4, on 49 observations) only through a regime with a residual standard deviation of 0.15, an expected duration of 2.0 years and autoregressive coefficients that sum to 1.15. Combined, the two benchmark models imply 27 switches of the policy mix in 49 years and all four combinations, including six years of monetary dominance and two of the unstable combination, against five switches and two combinations in the baseline.

Table 13: Switching structure and the standard MSIAH benchmark

Rule	Specification	Parameters	n	Log-lik.	BIC	Remarks
Monetary	Linear	6	50	−186.33	396.1	
Monetary	Partial switching, k = 2 (baseline)	11	50	−171.40	385.8	RCM 7.2
Monetary	Full switching, k = 2	14	50	−168.20	391.2	RCM 12.2
Monetary	MSIAH(2)-AR(1), MSwM	13	50	−168.47	387.8	Regime 2: $\phi = -1.40$, duration 1.2 years, AR coefficient 1.34
Fiscal	Linear	8	50	−74.40	180.1	

Rule	Specification	Parameters	n	Log-lik.	BIC	Remarks
Fiscal	Partial switching, k = 3 (baseline)	20	50	−52.46	183.2	RCM 0.0005
Fiscal	Full switching, k = 3	30	50	−44.89	207.1	RCM 0.20
Fiscal	MSIAH(2)-AR(2), MSwM	17	49	−55.13	176.4	Regime 2: σ = 0.15, duration 2.0 years, AR coefficients sum to 1.15

Source: authors' estimations.

6-2. Alternative specifications

Table 14 reports 21 alternative specifications: nine for the monetary rule and twelve for the fiscal rule. For each, it reports the policy coefficient in each regime, the regime labels and the share of years in which the most likely label coincides with the baseline.

The monetary results are robust. Both regimes are passive in seven of the nine variants, including the alternative output-gap filters (HP with λ = 6.25 and Hamilton, 2018), the lagged inflation gap, the sub-samples ending in 2018 and starting in 1989, the exclusion of the COVID-19 control and the inclusion of sanctions as a control; the accommodative coefficient ranges from 0.56 to 0.70 in six of these variants and rises to 2.09 with the lagged inflation gap. Two variants, GDP-deflator inflation and the HP-trend inflation target of Erfani and Talebbeydokhti (2025a), produce a short "active" regime that covers about three years, as in that study; in both cases the estimate has a parameter on the boundary of the parameter space, so the active regime is not reliably identified, and the classification of the other 47 years is unchanged (agreement 0.94).

For the fiscal rule, the most responsive regime is passive and the least responsive regime is active in all twelve variants, including a two-regime specification, the post-war sample, controls for sanctions and financial repression, a broader debt measure that includes public enterprises, and a rule for tax revenue. The intermediate regime is the fragile one: its debt response is small in every variant (between −0.02 and 0.09) and is significantly positive in six of the eleven three-regime variants. When the weak debt response of regime 2 is not significant, the years 1981–1985 and 1995–2014 are classified as active, and the agreement with the baseline falls to between 0.24 and 0.54. Among the three-regime variants, the second lag of the operating balance is decisive for this regime: without it the debt response of regime 2 falls to 0.007, but BIC deteriorates from 183.2 to 194.5 and the residuals are autocorrelated. The two-regime fiscal model, which the bootstrap rejects in favour of three regimes, separates a passive regime (0.051) from an active regime (−0.039) and agrees with the baseline labels in 92 percent of the years.

The robust conclusions are therefore that monetary policy was passive in every specification in which the regimes are reliably identified, and that every fiscal specification contains a regime whose debt response is negative or insignificant. In the baseline estimates, monetary dominance never occurs and fiscal dominance prevails in 1975–1977, 1986–1988 and 2015–2023 whatever the label of the intermediate regime; whether the remaining years are best described as indeterminacy or as fiscal dominance depends on whether the weak debt response of 1981–1985 and 1995–2014 is regarded as sufficient to stabilise debt.

Table 14: Alternative specifications

Rule	Variant	n	Policy coefficient by regime	Labels	Agreement
Monetary	Output gap: HP, λ = 6.25	50	−0.097 / 0.635	P / P	1.00
Monetary	Output gap: Hamilton filter	50	−0.069 / 0.564	P / P	1.00
Monetary	Inflation: GDP deflator	50	−1.524 / 0.374	A / P	0.94
Monetary	Lagged inflation gap	50	0.453 / 2.091	P / P	1.00
Monetary	Inflation target: HP trend	50	−9.216 / 0.696	A / P	0.94
Monetary	Sample 1975–2018	44	−1.030 / 0.590	P / P	1.00
Monetary	Sample 1989–2024	36	0.190 / 0.646	P / P	1.00
Monetary	Without COVID-19 control	50	−0.086 / 0.606	P / P	1.00
Monetary	Sanctions as control	50	−0.087 / 0.693	P / P	1.00
Fiscal	Output gap: HP, λ = 6.25	50	0.108 / −0.000 / −0.041	P / A / A	0.54
Fiscal	Output gap: Hamilton filter	50	0.022 / 0.022 / 0.003	P / P / A	0.58
Fiscal	Tax rule: tax revenue / GDP	50	0.105 / 0.004 / −0.017	P / A / A	0.24
Fiscal	Sample 1975–2018	44	0.101 / −0.023 / −0.045	P / A / A	0.43
Fiscal	Sample 1989–2024	36	0.349 / 0.036 / −0.004	P / P / A	0.69
Fiscal	Without COVID-19 control	50	0.109 / 0.038 / −0.028	P / P / A	0.98
Fiscal	Sanctions as control	50	0.134 / 0.094 / −0.129	P / P / A	0.66
Fiscal	Two regimes	50	0.051 / −0.039	P / A	0.92
Fiscal	Control: real deposit rate	50	0.108 / 0.039 / −0.030	P / P / A	1.00
Fiscal	Control: public share of bank credit	50	0.101 / 0.021 / −0.044	P / A / A	0.50
Fiscal	Debt: public sector incl. public enterprises	50	0.115 / 0.038 / −0.019	P / P / A	0.84
Fiscal	One lag of the operating balance	50	0.119 / 0.007 / −0.029	P / A / A	0.44

P: passive; A: active (one-sided tests at 5 percent, Section 3.5). Monetary policy coefficient: response to the inflation gap; fiscal: response to lagged debt. Agreement: share of years in which

the most likely label equals the baseline label. Tax rule: tax revenue / GDP on lagged debt, expenditure / GDP, oil revenue / GDP and the output gap. Source: authors' estimations.

6-3. Data transformation and heteroscedasticity

A fiscal rule estimated in nominal levels (billions of rials) is strongly heteroscedastic: a studentised Breusch-Pagan test (Breusch & Pagan, 1979; Koenker, 1981) rejects homoscedasticity (BP = 25.1, df = 4, $p < 0.001$). This is the reason for expressing all fiscal variables as ratios to GDP. For the fiscal rule in ratios to GDP the test does not reject (BP = 8.9, df = 6, $p = 0.18$). The remaining differences in volatility across periods are captured by the regime-specific variances, which differ by a factor of three across fiscal regimes (σ from 0.27 to 0.86) and by a factor of two across monetary regimes, and the probability-integral-transform residuals show no conditional heteroscedasticity (ARCH-LM $p = 0.49$ for the monetary and 0.62 for the fiscal rule).

6-4. Out-of-sample evaluation, 2019–2024

To assess the rules in the current economic environment, we re-estimate each rule with an expanding window and forecast the policy instrument one year ahead for 2019–2024, using only data available before the forecast year and the realised regressors of that year. Table 15 compares the forecasts of the Markov-switching rules with those of the corresponding linear rules, using the Diebold-Mariano (1995) test with the small-sample correction of Harvey, Leybourne and Newbold (1997).

Table 15: Out-of-sample forecasts of the policy instruments, 2019–2024

Rule	Forecasts	RMSE, Markov switching	RMSE, linear	MAE, Markov switching	MAE, linear	DM statistic	p
Monetary *(base-money growth, %)*	6	8.74	8.39	6.93	6.89	1.93	0.11
Fiscal *(operating balance, % of GDP)*	6	1.02	1.09	0.77	0.68	−0.38	0.72

One-step-ahead forecasts from expanding-window estimates. Source: authors' estimations.

The Markov-switching rules forecast as accurately as the linear rules: for the fiscal rule the root mean squared error is lower (1.02 against 1.09 points of GDP) and the mean absolute error higher, and for the monetary rule the linear rule is slightly more accurate; neither difference is significant. Both rules miss the sharp increase in the operating deficit in 2024 (actual −6.1 percent of GDP against forecasts of −4.0 and −3.6 percent). With six

forecasts the test has little power, so the evidence does not show that the regime-switching rules forecast better; it shows that their regime structure is not obtained at the expense of out-of-sample accuracy in the turbulent period 2019–2024, which is what one would expect if the regimes reflected overfitting.

7. Discussion and Policy Implications

7-1. Indeterminacy and fiscal dominance in Iran

The central finding is that Iranian monetary policy did not anchor the price level at any point in the past half-century. Base-money growth either ignored inflation, in oil-boom periods when oil revenue was converted into base money, or accommodated it. Which equilibrium prevailed therefore depended on fiscal behaviour. In most years (35 of 50), the fiscal authority responded to debt, strongly in 1978–1980 and 1989–1994 and weakly in 1981–1985 and 1995–2014, so that solvency was not in question but the price level had no nominal anchor: the equilibrium was indeterminate. In three episodes, 1975–1977, 1986–1988 and 2015–2023, the operating balance deteriorated as debt rose, so that the price level had to adjust to make the real value of government liabilities consistent with fiscal behaviour: fiscal dominance in the sense of the fiscal theory of the price level. These were the episodes with the highest inflation, the most negative real interest rates and the fastest depreciation of the rial.

Neither configuration delivers a policy-determined anchor for inflation, which is consistent with the persistently high inflation observed throughout the sample. The distinction nevertheless matters for policy. Under indeterminacy, fiscal discipline exists but is not matched by an active central bank, so an active monetary framework would move the economy to monetary dominance. Under fiscal dominance, by contrast, monetary tightening alone would produce the unstable AM/AF combination.

The fiscal regimes follow a recurring cycle: consolidation after each active episode, a gradual erosion of discipline and a slide into the active regime that tends to occur when inflation and financial repression deepen. Oil revenue affects this cycle in two ways. It lowers the operating balance in all regimes, as current spending expands in booms, and the oil-revenue collapses of 1986 and after 2014 preceded two of the three active episodes. Oil, however, does not significantly affect the transition probabilities, and the first active episode occurred during a boom.

These findings agree with Erfani and Talebbeydokhti (2025a, 2025b) on passive monetary policy and on the presence of active fiscal regimes. They differ on the frequency of active fiscal policy: Erfani and Talebbeydokhti (2025b) classify all three

fiscal regimes as active, whereas we find active policy in one regime covering 15 years. The difference stems largely from the fiscal instrument. When we replace the operating balance with tax revenue relative to GDP, two of our three regimes become active (Table 14), as in their study. The operating balance, which also reflects current spending, shows that the government did respond to debt in most years, although weakly in the long period 1995–2014. Our joint analysis adds that even episodes of fiscal discipline did not produce monetary dominance, because the central bank remained passive.

7-2. Unconventional instruments and financial repression

Throughout the sample, nominal deposit and lending rates were set administratively and, in most years, below inflation. This has three consequences for the interpretation of the results. First, the interest rate could not serve as the instrument of an active monetary policy, which is why the monetary rule is specified for base money. Second, because the administered nominal rate responded only weakly to inflation (coefficient 0.14), the real interest rate fell by about 0.6 points for each point of inflation, so in the interest-rate sense monetary policy was passive. Third, negative real rates, observed in 38 of the 50 years, reduced the real cost of government debt and of bank lending to the public sector. Financial repression thus could act as a substitute for fiscal adjustment: it lowered the debt-stabilising surplus required of the government and, together with central-bank financing, made it possible for active fiscal policy to persist.

The estimates are consistent with this interpretation, although they do not establish it. First, the active fiscal regime is the regime of deep financial repression: the real deposit rate averaged −10.5 percent in its years, against −8.2 and −4.0 percent in the two passive regimes. Second, among the candidate drivers of fiscal regime transitions, the real deposit rate improves the fit most: in the sample, once the economy was in the active regime, it remained there in every year in which the real deposit rate was below about −12 percent, and every exit from it coincided with a rise in the real rate above this level (Section 5.4 and Fig. 3). This effect is not statistically significant, however, once the boundary estimate is taken into account (bootstrap $p = 0.15$), and the association is contemporaneous; the lagged real deposit rate does not predict the end of the active regime. The evidence therefore suggests that active fiscal policy and deep repression occur together, as parts of a financing strategy that relies on the inflation tax, rather than that repression causes the change of regime. Third, controlling for the real deposit rate in the fiscal rule leaves the regimes unchanged (agreement 1.00), whereas controlling for the public sector's share of bank credit makes the weak debt response of regime 2

insignificant (Table 14): once the public sector's command over bank credit is taken into account, the weakly passive regime can no longer be distinguished from an active one.

7-3. Policy implications

The results point to a sequence of reforms rather than to a single measure.

1. Since monetary policy has not anchored inflation, the first requirement is that the operating balance respond systematically to debt. In the passive regime, a one-point rise in the debt ratio improves the operating balance by 0.11 points of GDP within the year and by 0.24 points in the long run; the weakly passive regime that prevailed in 1995–2014 delivered only 0.08 points in the long run and eventually gave way to the active regime. A rule that ties a ceiling on the operating deficit to the debt ratio should therefore target a long-run response of at least the size observed in the passive regime.

2. The active fiscal regime is financed by borrowing from the central bank. Statutory limits on direct and indirect lending to the government, such as those introduced by the 2023 Central Bank Act, need to be enforced so that deficits cannot be monetised during oil-revenue shortfalls.

3. The active fiscal regime coincides with deep financial repression, and in every episode it has persisted while the real deposit rate was below about −12 percent; although this association is not statistically significant in a sample of 50 years, it points to the same financing channel as the theory in Section 7.2. Allowing deposit and lending rates to follow inflation and reducing the public sector's command over bank credit would remove a source of deficit financing that operates through the inflation tax on depositors.

4. A one-point increase in oil revenue relative to GDP lowers the operating balance by 0.62 points in the long run, and oil-revenue collapses preceded two of the three active episodes. A binding rule that saves oil revenue above a reference price in the National Development Fund and finances shortfalls from it, rather than from the central bank, would reduce both the pro-cyclicality of current spending and the risk that oil shocks push fiscal policy into the active regime.

5. Fiscal discipline alone yields indeterminacy, as in 1978–1985 and 1989–2014, unless the central bank becomes active. This requires either replacing administered interest rates with a market-based policy rate that can rise more than one-for-one with inflation, or committing base-money growth to contract when inflation exceeds an announced target.

6. An active central bank combined with active fiscal policy has no stable equilibrium. Monetary activism should therefore follow, not precede, the establishment of fiscal

discipline and the removal of financial repression, so that the economy moves from indeterminacy or fiscal dominance to monetary dominance rather than to instability.

7-4. Limitations

The sample contains 50 annual observations, which limits the number of regimes and covariates that can be estimated; quarterly fiscal data with consistent definitions are not available for the full period. Four further limitations deserve emphasis. First, the classification of the weakly passive fiscal regime (1981–1985 and 1995–2014) is sensitive to the specification: its debt response is significantly positive in the baseline and in six of the eleven alternative three-regime specifications. If it is regarded as active, the policy mix in these 25 years is fiscal dominance rather than indeterminacy; the conclusions that monetary dominance never occurred and that fiscal dominance prevailed at least in 1975–1977, 1986–1988 and 2015–2023 do not depend on this choice. Second, since 2008 government debt to the central bank has remained around 2 percent of GDP (3–4 percent including public enterprises), so the debt response in the most recent episodes is identified mainly from earlier episodes of the same regime; the classification of recent years rests on the Markov assumption that a regime's parameters are the same in each episode, and the classification of 2024 reflects a sharp rise in the operating deficit rather than a debt response. Third, the effect of the real deposit rate on the transition probabilities is estimated at a boundary, is not significant under the parametric bootstrap ($p = 0.15$) and is contemporaneous; it describes an association between financial repression and active fiscal policy, not a causal effect, and with only 15 years in the active regime none of the candidate drivers can be estimated precisely. Fourth, the sanctions index is coded from legal records and does not measure enforcement intensity, and the two rules are estimated separately and combined under conditional independence; a joint model with a four-state chain would require considerably more observations.

8. Conclusion

This paper identifies monetary and fiscal policy regimes in Iran over 1975–2024 using Markov-switching policy rules with a bootstrap-selected number of regimes, a penalised exact-likelihood estimator and tests of time-varying transition probabilities, including a restricted specification suited to short samples. Monetary policy is passive throughout, either ignoring or accommodating inflation. Fiscal policy cycles through a strongly passive, a weakly passive and an active regime; the active regime prevails in 1975–1977, 1986–1988 and 2015–2023 and coincides with deep financial repression. The policy mix

is indeterminate in 35 of the 50 years and fiscally dominant in the remaining 15; monetary dominance never occurs. The passive monetary stance and the active fiscal regime are robust across 21 alternative specifications, whereas the classification of the weakly passive fiscal regime depends on the specification; the regime-switching rules forecast as accurately as linear rules over 2019–2024. Establishing price stability in Iran therefore requires, in order, an enforceable fiscal rule, limits on central-bank financing, the gradual removal of financial repression and an oil-revenue smoothing rule, followed by a monetary framework in which the central bank can lean against inflation.

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Author Contribution

This research is derived from the first author's doctoral dissertation. The primary data collection, encompassing all observational and analytical components, was conducted by the first author under the direct supervision and mentorship of the second and third authors.

Conflict of Interest

In adherence to ethical publication standards, the authors affirm that there are no conflicts of interest, either personal or financial, that could have influenced the content or conclusions presented in this research.

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رژیم‌های سیاست پولی-مالی و سلطه سیاستی در اقتصاد ایران

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چکیده

این پژوهش رژیم‌های سیاست پولی و مالی ایران و ترکیب سیاستی را طی ۱۹۷۵ تا ۲۰۲۴م. شناسایی می‌کند. سیاست پولی قاعدهٔ رشد پایهٔ پولی در واکنش به شکاف تورم و سیاست مالی قاعدهٔ تراز عملیاتی بودجه در واکنش به وقفهٔ بدهی دولت به بانک مرکزی است؛ اثر درآمد نفت، شکاف تولید و کووید-۱۹ کنترل می‌شود. هر قاعدهٔ رگرسیونی مارکوف-سوئیچینگ با عرض از مبدأ، ضریب سیاستی و واریانس خطای متغیر است که با حداکثر درست‌نمایی جریمه‌شده برآورد می‌شود. تعداد رژیم‌ها با آزمون‌های متوالی نسبت درست‌نمایی بوت‌استرپ پارامتریک تعیین و احتمالات انتقال متغیر در زمان آزمون شده‌اند. داده‌ها دو رژیم پولی و سه رژیم مالی را برمی‌گزینند. سیاست پولی همواره منفعل است: رشد پایهٔ پولی یا به تورم واکنشی ندارد (ضریب ۰٫۰۹-) یا آن را همراهی می‌کند (۰٫۶۴). سیاست مالی از رژیم منفعل قوی (۰٫۱۱) به منفعل ضعیف (۰٫۰۴) و سپس فعال (۰٫۰۳-) می‌رود. ترکیب سیاستی در ۳۵ سال از ۵۰ سال با عدم تعیین تعادل (تورم ۱۹٫۳ ٪) و در ۱۵ سال (۱۹۷۵ تا ۱۹۷۷، ۱۹۸۶ تا ۱۹۸۸ و ۲۰۱۵ تا ۲۰۲۳) با سلطهٔ مالی (تورم ۲۸٫۶ ٪) همراه است؛ سلطهٔ پولی هرگز رخ نداده است. تحریم، جنگ، تکانه‌های نفتی و کاهش ارزش پول ملی بر احتمالات انتقال اثر ندارند؛ رژیم مالی فعال با سرکوب مالی هم‌زمان است، اما اثر نرخ سود حقیقی سپرده بر انتقال‌ها معنادار نیست (۰٫۱۵). نتایج در ۲۱ تصریح جایگزین پایدارند و پیش‌بینی ۲۰۱۹ تا ۲۰۲۴ به دقت قواعد خطی است. ثبات قیمت‌ها مستلزم قاعدهٔ مالی الزام‌آور، حذف سرکوب مالی و ابزار پولی مقابله‌کننده با تورم است.

کلیدواژگان: رژیم‌های سیاست پولی-مالی، سلطهٔ پولی، سلطهٔ مالی، مدل مارکوف سوئیچینگ، اقتصاد ایران.
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