Petroleum Business Review, Vol. 8, No. 2, pp. 30–42, April 2024

Oil Revenue, Government Size, and Inflation in Iran: a Markov Switching Approach

Haniyeh Sedaghat Kalmarzi[1*] and Mohammad Hassan Fotros[2]

[1] Ph.D. Graduate, Department of Economics, Razi University, Kermanshah, Iran
[2] Department of Economics, Bu-Ali Sina University, Hamedan, Iran

Highlights

- The relationship between the government size, oil revenue, and inflation in Iran is considered from 1991 to 2021.
- Oil revenues may affect the government size–inflation relation because financing the budget in Iran is based on a relevant extent on oil revenues.
- Government size has a significant positive impact on the inflation rate.
- When oil prices are high, Iran benefits from increased revenue; however, when they fall or there is a disruption in oil exports, it can negatively impact the economy and lead to inflation.

Received: June 10, 2023; *revised:* November 05, 2023; *accepted:* November 06, 2023

Abstract

Iran's economy is intensely affected by the size of the government and oil income. Oil income may influence the relationship between the inflation and government size since financing the budget in Iran is significantly based on oil revenues. Due to the dependence of the government size and oil income on the oil price, Iran's oil revenue–government size–inflation nexus is studied from 1991 to 2021. The estimation results of a Markov switching model recommend that the government size should have a significant positive effect on inflation. Moreover, the growth of oil income is found to have a significant negative impact on the inflation. According to the findings, there are two regimes: a high-inflation regime (Regime 1), and a low-inflation regime (Regime 2). Our findings indicate that there is a moderate chance of remaining in the low-inflation regime (Regime 2) while in this regime. However, there is a higher probability of staying in the high-inflation regime (Regime 1), if initially in this regime, and a lower probability of transitioning from it to the low-inflation regime.

Keywords: Inflation, Oil Revenues, Government Size, Markov Switching Approach

How to cite this article
Sedaghat Kalmarzi, H. and Fotros, M. H., Oil Revenue, Government Size, and Inflation in Iran: a Markov Switching Approach, Petroleum Business Review, Vol. 8, No. 2, p. 30–42, 2024 .DOI: 10.22050/pbr.2023.400554.1303

1. Introduction

The significance of inflation as a variable for policymakers in every economy is well established. However, previous studies have presented conflicting findings regarding the size of government–inflation nexus. This lack of consensus, coupled with a dearth of research on the topic in developing countries, motivated our empirical investigation into the government size–inflation nexus in Iran. As an oil-rich country in the Middle East with an economy heavily reliant on oil revenues, Iran has experienced high levels of inflation, with an average officially reported rate of 22.2% between 1991 and 2021. Figure 1 illustrates the interaction between the growth of oil revenue, the size of the

* Corresponding author:
Email: Sedaghat12h@yahoo.com

government, and inflation in the Iran's economy from 1991 to 2021. The growth of oil revenue exhibited high volatility during this period due to oil sanctions. Additionally, the inflation rate has also experienced significant fluctuations in recent years due to the volatility in the growth of oil income. Finally, the government size has remained relatively stable throughout this period.

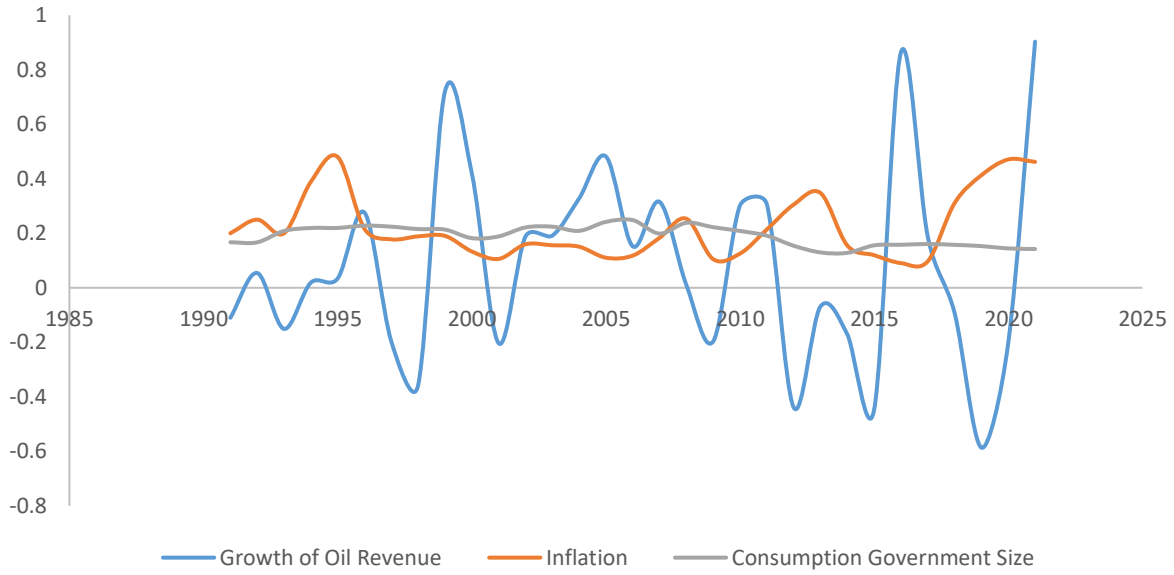

Figure 1

The interaction between the government size, the growth of oil revenue, and inflation

Our paper aims to assess how oil revenue growth impacts inflation in Iran. While there have been numerous studies on the effects of oil price changes on developed countries like Hamilton (2003), Kilian, Rebucci, and Spatafora (2009), Kilian and Hicks (2012), Kilian (2013), and Benhmad (2013), as well as on oil-exporting nations such as Mehrara (2008), Mehrara and Sarem (2009), Berument, Ceylan and Dogan (2010), Cologni and Manera (2013), Iwayemi and Fowowe (2011), Farzanegan and Markwardt (2009), Farzanegan (2011), Esfahani, Mohaddes, and Pesaran (2012), Mohaddes and Pesaran (2013), and El Anshasy and Bradley (2012), we believe that Iran's unique dependence on oil revenue for budget financing warrants further exploration into this topic. This is particularly relevant given Iran's less developed tax system compared to developed countries (Farzanegan, 2011). According to Han and Muligan (2008), investigating a country with a weak tax structure may be consistent with Sargent's (1982) highlighting on inflation as a fiscal occurrence. Their study examined the correlation between the size of government and inflation from a public-finance perspective. They utilized both cross section and time series approaches to analyze how changes in government size affect inflation. Their findings indicated a slight positive correlation between inflation and defense expenditure, as well as a slight negative connection between inflation and non-defense expenditure. Nevertheless, their results differed from previous studies implying a positive link between inflation and government size. Another study conducted by Nademi and Winker (2021) investigated the link between government size and inflation in OPEC member countries from 2000 to 2015. They discovered a non-linear connection between the variables, with a threshold value of 17.76% for government size. Under this threshold value, a rise in government size had a negative effect on inflation, while a growing government size had a positive impact on inflation beyond it. Their paper indicated that previous contradictory evidence may be clarified using a nonlinear model. In contrast, our paper uses a Markov switching model to explain the contrary results in the government size–inflation nexus. Instead of using a threshold model

that assumes a change in government size, this paper assumes a change in inflation due to Iran's volatile inflation rates.

Considering the relationship between inflation, government size, and oil revenue is important for Iran's economy for several reasons. Firstly, Iran has experienced high levels of inflation in the past, which can erode the purchasing power of its citizens and businesses. Understanding the relationship between inflation and other factors such as government size and oil revenue can help policymakers implement effective measures to control inflation and maintain price stability. Secondly, the size of the government plays a crucial role in economic management. A large government can lead to increased public spending, which may put pressure on inflation rates. By analyzing the relationship between government size and inflation, policymakers can make informed decisions regarding fiscal policies, public spending, and taxation. Thirdly, Iran is heavily reliant on oil revenue as a significant source of income for its economy. Fluctuations in oil prices can have a substantial impact on government revenues, budgetary allocations, and overall economic stability. Understanding how changes in oil revenue affect inflation rates and government spending can help policymakers develop strategies to mitigate potential negative effects. Finally, maintaining economic stability is crucial for sustainable growth and development. By considering the relationship between inflation, government size, and oil revenue, policymakers can work toward achieving stable economic conditions that promote investment, job creation, and overall prosperity.

The article is divided into five sections. The second section discusses the theoretical framework of inflation and the role of government and oil revenue in determining price levels. The third section focuses on empirical model specification and data description, while the fourth section presents the empirical results; the final section concludes the paper.

2. Literature review

Inflation alludes to a maintained increment in the price level of products and services, which can be caused by demand-pull or cost-push components (Kibritçioğlu, 2001).

There are two main theories explaining inflation: Monetarists who believe that inflation is a monetary phenomenon, and the growth of money supply is the main source of inflation, while the fiscal theory of inflation has weak and strong forms that focus on government spending and budget deficits. Sargent and Wallace proposed the weak form, suggesting that inflation should be influenced by the level of harmonization between monetary and fiscal authorities. Leeper, Sims, and Woodford introduced the strong form, arguing that inflation is solely determined by fiscal factors. Iran's economy relies severely on oil incomes with a weak tax organization, making Sargent's highlighting on inflation as a fiscal occurrence appropriate for Iran. This paper aims to explore the driving elements of inflation based on the fiscal theory focusing on government interventions in Iran. Empirical evidence will also be reviewed.

In Iran, tax income and oil income are both significant sources of government income. It creates a possible connection in the government size–inflation nexus as oil revenue must be exchanged for domestic currency to fund government expenditures. If not offset by open market policies, this can result in new base money creation and potentially lead to inflation. Larger governments that require more petrodollars may experience higher inflation than smaller governments that are less reliant on oil revenue.

Developing countries often finance their deficits through borrowing from the community, foreigners, or the banking system. Limited capital markets and decreased foreign financing have led many developing countries to rely on borrowing from the central bank to finance their deficits, resulting in

inflation through a rise in government debt to the central bank and monetary base. This process is known as inflation tax and acts as a hidden tax on people's income. While increasing government size may prevent recessions according to the traditional Keynesian model, some studies have shown a negative connection in the government size–economic growth nexus due to lessening returns on government spending and crowding out private investment. However, other studies discuss that expanding government size can improve economic growth by providing a protection function for private assets and improving the investment environment through public goods (Chen and Lee, 2005).

Armey (1995) proposed a nonlinear link between government size and economic growth, as evidenced by the Laffer curve. Abounoori and Nademi (2010) verified this in Iran, identifying a threshold of approximately 35% for government size. Expanding government size below this threshold can stimulate economic growth but declines it beyond this point.

While increasing economic growth can boost aggregate supply, it may also have an adverse effect on price levels. Additionally, expanding government size beyond the threshold level can impede economic growth but may positively impact price levels.

Afonso et al. (2018) evaluated the relationship between government size, unemployment, and inflation in eight major emerging market economies from 1980 to 2015. Their findings indicate that there is a positive correlation between government size and both unemployment and inflation. The Granger causality test shows that the government size has a causal effect on unemployment and inflation. Their analysis highlights two key points. Firstly, the impact of government size on unemployment and inflation varies depending on how it is measured. When using government consumption spending as a proxy measure for government size, it has a significant positive correlation with both unemployment and inflation. Secondly, indirect taxes such as government consumption spending have a statistically significant positive association with unemployment, while direct taxes have a strong effect on inflation in the countries studied.

To determine the primary factors affecting inflation in Iran, we examined various significant studies on the subject. Bahmani-Oskooee (1995) employed a monetarist model of inflation that incorporated exchange rates and import prices from 1959 to 1990 to investigate the sources of inflation in Iran following the Islamic revolution in 1979. His findings revealed that inflation in Iran not only was due to monetary factors but also resulted from the devaluation of the Rial in free markets and imported inflation. Alavirad and Athawale (2005) concentrated on the budget deficit and estimated an inflation model for Iran from 1963 to 2009. Their results indicated that both budget deficits and liquidity determined inflation in Iran. Kia (2006) examined the factors contributing to inflation in developing nations like Iran, Egypt, and Turkey, both internally and externally. He created a monetary model that highlighted the importance of fiscal and monetary policies for these countries. Kia concluded that government debt, deficits, and other domestic factors played a crucial role in determining inflation in these countries. Specifically for Iran, he found that exchange rates, real government expenditure, and government deficits determined the long-term inflation. However, money supply, domestic interest rates, foreign financing, and imported inflation did have an insignificant impact on Iran's inflation. Additionally, he discovered that debt per gross domestic product (GDP) and foreign interest rates had a negative effect on Iran's inflation. Bonato's (2008) research on Iran's economy explored the money–inflation nexus. He found that there was a lasting connection between the price level and factors such as the money supply, interest rate, real output, and exchange rate. Moreover, he did not find any indication of a significant shift in the relationship between money and inflation in Iran. Previous studies have identified various key variables affecting inflation in Iran such as liquidity (money supply), budget deficit, government debt, real government expenditure, the exchange rate in free market, imported inflation, the interest rate, and real output.

3. The role of oil income in determining inflation in Iran

Oil revenue plays a significant role in Iran's economy. Iran is one of the world's largest oil producers, and oil exporting countries. In 2019, oil exports accounted for approximately 70% of Iran's total export revenue. The Iranian government heavily relies on oil revenue to fund its budget and support various social programs. The government uses oil revenues to finance infrastructure projects, education, healthcare, and other public services. However, the over-reliance on oil revenue has also made Iran's economy vulnerable to volatilities in global oil markets. Sanctions have also had a substantial effect on Iran's capacity to export oil and generate income. The resource curse hypothesis is a theory implying that countries with abundant natural resources, such as oil, gas, and minerals, tend to have slower economic growth and development compared to countries with fewer natural resources. This is due to several factors such as over-reliance on the export of these resources, corruption, and political instability. In the case of Iran, the country is rich in oil and gas reserves which have been the mainstay of its economy for decades. However, despite having vast natural resources, Iran has struggled with economic growth and development. The resource curse hypothesis indicates that this is due to several factors. Firstly, Iran's economy is deeply reliant on oil exports, and this over-reliance on a single commodity makes the economy vulnerable to fluctuations in global oil prices. When oil prices are high, Iran's economy booms but when they fall, the economy suffers. Secondly, corruption has been a major issue in Iran's economy. The government controls most of the country's natural resources, and there have been allegations of corruption in the allocation of contracts for the exploration and production of these resources. This has led to inefficiencies in the sector and reduced revenues for the government. Thirdly, political instability has also contributed to Iran's economic woes. The country has been subject to international sanctions due to its nuclear program which has had a negative impact on its economy. Additionally, political unrest within the country has affected investor confidence and hindered economic growth.

Regarding the role of oil revenue in determining inflation in Iran, we can state that Iran heavily relies on oil exports to generate revenue and support its budget. Therefore, variations in oil prices can have a noteworthy effect on the Iranian economy, including inflation. When oil prices rise, Iran's government has more money to spend on public projects and social welfare programs. This increased spending may lead to two different results. The first one is controlling inflation as a result of importing goods to support the supply side. The second one is increasing inflation because of higher demand for goods and services, which can drive up prices and inflation.

Alternatively, when oil prices fall, Iran's government may have less money to spend on public projects and social welfare programs. This reduced spending can cause lower demand for goods and services, which can cause prices to decrease and contribute to deflation. In addition to the direct effect of oil revenue on government spending, fluctuations in oil prices can also affect the value of Iran's currency. When oil prices rise, the value of Iran's currency tends to increase as well. This can make imports cheaper but also make exports more expensive, which can contribute to inflation.

4. Model specification and data description

4.1. Model specification

This section will initially explain the practical model for inflation (inf_t) in Iran's economy, which is based on the relevant elements argued in the former section. We have employed a model based on the study of Nademi and Winker (2022), which includes variables such as government size (gs_t), the growth of money supply or M2 ($gm2_t$), the gap of the exchange rate ($GapExc_t$), the growth of oil revenue ($goil_t$), and a dummy variable for sanctions (DUM_t). The dummy variable has a value of zero

before 2011 and one from 2011 to 2015 and from 2018 to 2021 periods. One of the main limitations of this research is the limited data available for measuring sanctions. We used a dummy variable as an index to represent it. To model inflation in Iran, we have used a Markov switching model due to the presence of two regimes (high and low inflation) in Iran's economy.

$$inf^{(i)}{}_t = \alpha^{(i)} + \beta_0 Inf_{t-1} + \beta_1 gs_t + \beta_2 gm2_t + \beta_3 GapExc_t + \beta_4 goil_t + \beta_5 DUM_t + \varepsilon_t{}^{(i)} \quad (1)$$

where (i) represents these two regimes, namely regimes 1 and 2, with residual variance changing between them. We have estimated this model using the Eviews software.

The Markov switching model is a statistical model used in econometrics to analyze time series data that exhibit regime changes or shifts. It is based on the concept of a Markov chain, which is a mathematical framework used to describe a sequence of events where the probability of transitioning from one state to another depends only on the current state. In the context of the Markov switching model, each state represents a different regime or economic condition. The model assumes that the underlying process switches between these states over time, and the observed data are generated by different regimes with distinct characteristics. The key characteristics of a Markov chain in the context of the Markov switching model are as follows:

- State space: The set of possible states in which the system can be. In econometrics, these states represent different economic regimes or conditions.
- Transition probabilities: These probabilities determine the likelihood of transitioning from one state to another. In other words, they describe how likely it is for the system to switch from one regime to another at any given time.
- Stationarity: A Markov chain is assumed to be stationary if its transition probabilities do not change over time. This assumption allows for consistent estimation and inference in the Markov switching model.

In econometrics, estimating a Markov switching model involves estimating both the parameters associated with each regime (e.g., mean and variance) and the transition probabilities between the regimes. The transition probabilities capture how likely it is for an economy to switch from one regime to another based on past observations. Estimation methods for Markov switching models include maximum likelihood estimation (MLE) and Bayesian methods. MLE involves finding parameter values that maximize the likelihood function given the observed data, while Bayesian methods use prior beliefs about parameter values and update them based on the observed data using Bayes' theorem.

Using a Markov switching model to model inflation in Iran is justified due to several factors, including the presence of two regimes (high and low inflation) in Iran's economy, high volatility in inflation, oil price volatility, budget deficit, and sanctions.

Presence of two regimes: The presence of two distinct regimes (high and low inflation) suggests that the behavior of inflation in Iran should not be constant over time. A Markov switching model allows for capturing the changes in these regimes by incorporating state-dependent dynamics.

High volatility in inflation: Iran has experienced significant volatility in its inflation rate over time. This can be attributed to various factors such as fluctuations in oil prices, budget deficits, and economic sanctions. A Markov switching model can effectively capture this volatility by allowing for different parameters or regimes during the periods of high and low inflation.

Oil price volatility: Iran heavily relies on oil exports as a major source of revenue. Fluctuations in global oil prices can have a significant impact on the country's economy and consequently on its inflation rate. By using a Markov switching model, one can account for the effects of oil price volatility on inflation dynamics.

Budget deficit: High budget deficits can lead to increased money supply and potential inflationary pressures. Iran has faced challenges related to budget deficits, which have contributed to higher levels of inflation at times. A Markov switching model can help capture the relationship between budget deficits and changes in the regime of inflation.

Sanctions: Economic sanctions imposed on Iran have had adverse effects on its economy, including its inflation rate. These sanctions disrupt trade flows, limit access to international markets, and create economic uncertainty, all of which can contribute to higher levels of inflation. A Markov switching model can account for the impact of sanctions by incorporating regime shifts during periods affected by these external factors.

4.2. Data description

Table 1 presents the data description.

Table 1

The data description

Variable	Mean	Standard Deviation	Min	Max
inf_t	0.2219	0.118	0.09	0.48
gs_t	0.1909	0.035	0.12	0.24
$goil_t$	0.0810	0.364	–0.586	0.903

Based on the provided data, we can analyze the following variables related to Iran's economy.

The average inflation rate in Iran is 0.2219, with a minimum of 0.09 and a maximum of 0.48. The data indicate that the size of the government in Iran, as measured by some relevant indicators, has a mean value of 0.035, with a minimum of 0.12 and a maximum of 0.24. The growth rate of oil revenue in Iran has an average value of 0.081, with a minimum value of –0.586 and a maximum value of 0.903.

5. Empirical results

Iran's economy has undergone several structural changes, including sanctions, which have led to using the ADF test with a break point to investigate the unit root. Table 2 presents the results of this test. According to the ADF test, all the variables are stationary at a significance level of 1%, indicating that there is a long-term relationship between them. In the next step, we present the estimation results for the model in Equation (1).

Table 2

The unit root test with the break point (ADF)

Variables	P-Value ADF
inf_t	< 0.01
inf_{t-1}	< 0.01
gs_t	< 0.01
$gm2_t$	< 0.01

$GapExc_t$	< 0.01
$goil_t$	< 0.01

Table 3 lists the results and LR-test outcome, demonstrating the existence of two inflation regimes in Iran's economy. The intercept and variance estimation of these regimes indicate that there is a high-mean and high-variance inflation regime (Regime 1) and a low-mean and low-variance inflation regime (Regime 2).

Table 4 presents the transition probabilities between these two inflation regimes. The likelihood of remaining in Regime 2 (the low-inflation regime) is 0.41, whereas the probability of lasting in Regime 1 (the high-inflation regime) is 0.83. Moreover, the probability of transitioning from Regime 2 to Regime 1 (from the low- to high-inflation regime) is 0.59, whereas the probability of transitioning from Regime 1 to Regime 2 (from the high- to low-inflation regime) is merely 0.17.

Table 3

The estimation results

Variable	Coefficient	P-Value
Intercept (Regime 1)	–0.02	0.32
Intercept (Regime 2)	–0.04	0.000
inf_{t-1}	0.33	0.000
gs_t	0.46	0.000
$gm2_t$	0.16	0.000
$GapExc_t$	0.0000002	0.000
$goil_t$	–0.02	0.000
Dummy	0.19	0.000
Log sigma (1)	–2.30	0.000
Log sigma (2)	–8.69	0.000
Linearity LR-test χ^2 (4)	61.082	0.0000
Portmanteau (autocorrelation test)	3.0079	0.6988
Normality test	1.0050	0.6050
ARCH test	0.47099	0.5004
log-likelihood	76.90	

Table 4

The transition probabilities

Transition probabilities	Regime 1	Regime 2
Regime 1	0.83	0.17
Regime 2	0.59	0.41

The estimation results indicate that:

1. The initial phase of inflation in Iran has a positive effect, indicating the presence of inflation expectations in the economy. This impact is due to several elements: increased spending by individuals who anticipate rising prices, demands for higher wages by workers to maintain their purchasing power in times of high inflation, and cost-push inflation happening by increasing production costs that lead to higher prices for consumers.

2. The size of the government has a positive effect on inflation, which is consistent with the study of Afonso et al. (2018). There are several reasons for this result. Firstly, when the government spends more money than it collects in taxes, it can result in an increase in the money supply. This increase can lead to inflation as there is more money available for the same amount of goods and services. Secondly, Iran's government provides subsidies for various goods and services like food, fuel, and housing. These subsidies can create artificial demand and distort prices, which can also lead to inflation. Thirdly, Iran's government regulates many industries such as banking, telecommunications, and energy. These regulations can increase costs for businesses, resulting in higher prices for consumers. Finally, Iran has experienced political instability due to sanctions and tensions with other countries. This instability can cause uncertainty in the economy and can ultimately lead to inflation.

3. The increase in liquidity has a favorable effect on inflation as it augments the quantity of money accessible in the economy, which agrees with the study of Bonato (2008). When there is a greater amount of money available, individuals tend to spend more, resulting in an upsurge in demand for goods and services. As demand rises, prices also tend to escalate, which is referred to as demand-pull inflation. Furthermore, the availability of more money in the economy can result in an increase in borrowing and lending, thereby leading to a rise in investment and economic activity, which can contribute to inflation.

4. The difference between the official exchange rate and the free-market exchange rate, also known as the black–market premium, has a significant positive impact on inflation, which is consistent with the work of Bahmani-Oskooee (1995). A wider gap between these rates indicates a higher demand for foreign currency in the free market, causing its price to increase and resulting in more expensive imported goods and higher inflation. Additionally, a large gap creates an incentive for currency speculation and hoarding by individuals and businesses, potentially leading to a shortage of foreign currency in the official market and worsening inflationary pressures.

5. When oil revenue increases, inflation is negatively affected since the government can finance its budget without borrowing from the central bank of Iran. This results in no change in the monetary base. Conversely, if oil revenue decreases, the government faces a budget deficit and must borrow from the central bank to fund its operations. This borrowing rises the government's debt to the central bank, which in turn causes an increase in the monetary base and inflation.

6. The positive impact of the *Dummy* variable for sanctions on inflation can be attributed to several factors. Firstly, sanctions limit Iran's ability to export goods and access international markets, resulting in a decrease in the supply of goods and services. This reduction in supply can cause an increase in prices due to heightened demand for fewer available products. Secondly, sanctions can lead to a depreciation of the Iranian currency, which makes imports more expensive and raises the cost of production for domestic businesses. This increase in costs is often passed on to consumers through higher prices. Lastly, sanctions can discourage foreign investment in Iran, resulting in a decline in economic activity and job creation. This decrease in economic activity can lead to lower production levels and higher prices for goods that are still available.

7. The Portmanteau test analyzing autocorrelation indicates no autocorrelation between residual series. The result of the normality test indicates that the residual series have been distributed by a normal distribution, so the results of the t-statistic and F-statistic are credible for statistical inference. The result of the ARCH test for testing heteroscedasticity indicates that there is homoscedasticity in the residual series.

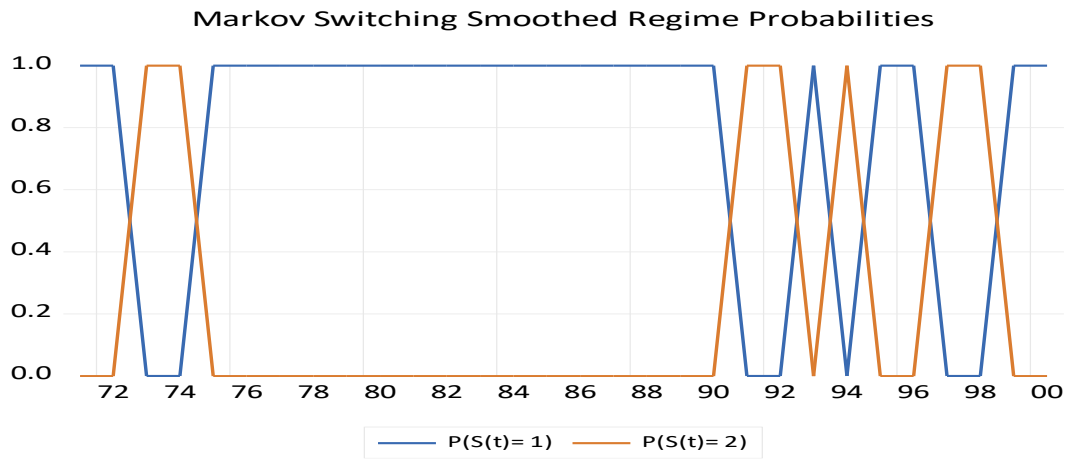

Figure 2

The smoothed probabilities for the two regimes of inflation

Figure 2 indicates the smoothed probabilities for the two regimes of inflation. The smoothed probabilities are calculated by $\Pr(s_{t+\tau} = i|\zeta_t)$, where $s_{t+\tau}$ is the state in time of $t + \tau$, i indicates the regime (i = 0, 1), and ζ_t represents all information about the model at time of t. The smoothed probabilities indicate that Iran's economy has been in low inflation with an average duration of 1.69 years. Further, Iran's economy has been in a high-inflation regime with an average duration of 5.75 years.

6. Conclusions

Iran's economy is heavily influenced by two factors: the size of the government and oil revenue. The government plays a crucial role in managing the economy, with high spending leading to inflation and a budget deficit that may be financed through borrowing or printing more currency. Oil revenue accounts for a large portion of Iran's GDP and foreign exchange earnings, with high prices leading to economic growth and low prices or disruptions negatively impacting the economy.

This work aims to investigate the link between government size, oil revenue, and inflation in Iran using a Markov switching method. The results indicate that government size has a positive impact on inflation, while oil revenue has a negative impact on it. Other factors such as the money supply growth, the exchange rate gap, and sanctions also have a significant positive effect on inflation. The findings are consistent with previous research and indicate that Iran's economy has both high- and low-inflation regimes. It is important for Iran's government to manage spending carefully and diversify the economy beyond reliance on oil exports to prevent budget deficits and mitigate the impact of global oil price variations on inflation rates. There are several policy implications for Iran's economy based on the findings of this study:

1. Government size: The positive impact of government size on inflation indicates that reducing the size and scope of the government can help mitigate inflationary pressures. This can be achieved through measures such as streamlining bureaucracy, reducing unnecessary regulations, and promoting private sector participation in the key sectors of the economy.

2. Oil revenue: The negative impact of oil revenue on inflation implies that diversifying the economy away from heavy reliance on oil can help stabilize prices. Iran can focus on developing non-oil sectors, such as manufacturing, services, and technology industries, to reduce its vulnerability to oil price fluctuations.

3. Money supply growth: Given its significant positive effect on inflation, controlling money supply growth is crucial for managing inflationary pressures. The central bank should adopt a prudent monetary policy framework that ensures money supply growth is in line with economic fundamentals and targets.

4. Exchange rate gap: The significant positive effect of the exchange rate gap on inflation indicates the importance of addressing the exchange rate volatility and narrowing the gap between official and market exchange rates. Implementing effective exchange rate policies that promote stability and reduce speculative activities can help curb inflationary pressures.

5. Sanctions: The significant positive effect of sanctions on inflation highlights the need for diversifying trade partners and reducing reliance on countries imposing sanctions. Iran should explore alternative markets and strengthen economic ties with countries not participating in sanctions to mitigate their impact on domestic prices.

Nomenclature

ADF	Augmented Dickey-Fuller
ARCH	Autoregressive conditional heteroskedasticity
GDP	Gross domestic product
LR-test	Likelihood ratio test
M2	Broad money supply
OPEC	Organization of the Petroleum Exporting Countries

References

Abounoori, E., & Nademi, Y. (2010). Government size threshold and economic growth in Iran. *International Journal of Business and Development Studies, 2*, 95–108.

Afonso, A., Şen, H., & Kaya, A. (2018). Government size, unemployment, and inflation nexus in eight large emerging market economies. *REM Working Paper*, 038–2018.

Alavirad, A., & Athawale, S. (2005). The impact of the budget deficit on inflation in the Islamic Republic of Iran. *OPEC Review, 29*(1), 37–49.

Armey, R. K., & Armey, R. (1995). *The freedom revolution: The new Republican House majority leader tells why big government failed, why freedom works, and how we will rebuild America* (p. 316). Regnery Pub.

Bahmani-Oskooee, M. (1995). Source of inflation in post-revolutionary Iran. *International Economic Journal, 9*(2), 61–72.

Benhmad, F. (2013). Dynamic cyclical comovements between oil prices and US GDP: A wavelet perspective. *Energy Policy*, 57, 141-151.

Berument, H., Ceylan, N. B., & Dogan, N. (2010). The impact of oil price shocks on the economic growth of selected MENA countries. *Energy Journal, 31*(1), 149-176.

Bonato, L. (2008). Money and inflation in the Islamic Republic of Iran. *Review of Middle East Economics and Finance, 4*(1), 41–58.

Campillo, M., & Miron, J. A. (1997). Why does inflation differ across countries? In *Reducing inflation: Motivation and strategy* (pp. 335–362). University of Chicago Press.

Carlstrom, C. T., & Fuerst, T. S. (2000). The fiscal theory of the price level. *Economic Review*, 36(1), 22-32.

Chen, S. T., & Lee, C. C. (2005). Government size and economic growth in Taiwan: A threshold regression approach. *Journal of Policy Modeling, 27*(9), 1051–1066.

Cologni, A., & Manera, M. (2013). Exogenous oil shocks, fiscal policies, and sector reallocations in oil-producing countries. *Energy Economics, 35*, 42–57.

Ekanayake, H. K. (2012). The link between fiscal deficit and inflation: do public sector wages matter. *Australia South Asia Research Centre*, 14, 1-34.

El Anshasy, A. A., & Bradley, M. D. (2012). Oil prices and the fiscal policy response in oil-exporting countries. *Journal of Policy Modeling, 34*(5), 605–620.

Esfahani, H. S., Mohaddes, K., & Pesaran, M. H. (2013). Oil exports and the Iranian economy. *The Quarterly Review of Economics and Finance*, 53(3), 221-237.

Farzanegan, M. R. (2011). Oil revenue shocks and government spending behavior in Iran. *Energy Economics, 33*(6), 1055–1069.

Farzanegan, M. R., & Markwardt, G. (2009). The effects of oil price shocks on the Iranian economy. *Energy Economics, 31*(1), 134–151.

Grilli, V., Masciandaro, D., & Tabellini, G. (1991). Political and monetary institutions and public financial policies in the industrial countries. *Economic Policy*, 6(13), 341-392.

Hamilton, J. D. (2003). What is an oil shock? *Journal of Econometrics*, 113(2), 363–398.

Han, S., & Mulligan, C. B. (2008). Inflation and the size of government. *Review-Federal Reserve Bank of Saint Louis*, 90(3), 245-267.

Iwayemi, A., & Fowowe, B. (2011). Impact of oil price shocks on selected macroeconomic variables in Nigeria. *Energy Policy*, 39(2), 603–612.

Kia, A. (2006). Deficits, debt financing, monetary policy, and inflation in developing countries: Internal or external factors? Evidence from Iran. *Journal of Asian Economics, 17*(5), 879–903.

Kibritçioğlu, A. (2001). Causes of inflation in Turkey: A literature survey with special reference to theories of inflation (p. 43). *University of Illinois at Urbana-Champaign*.

Kilian, L. (2013). Oil price shocks: Causes and consequences. *Annual Review of Resource Economics, 6*(1), 133-154.

Kilian, L., & Hicks, B. (2013). Did unexpectedly strong economic growth cause the oil price shock of 2003–2008?. *Journal of Forecasting*, 32(5), 385-394.

Kilian, L., Rebucci, A., & Spatafora, N. (2009). Oil shocks and external balances. *Journal of International Economics, 77*(2), 181–194.

Mehrara, M. (2008). The asymmetric relationship between oil revenues and economic activities: The case of oil-exporting countries. *Energy Policy, 36*(3), 1164–1168.

Mehrara, M., & Sarem, M. (2009). Effects of oil price shocks on industrial production: Evidence from some oil-exporting countries. *OPEC Energy Review, 33*(3–4), 170–183.

Mohaddes, K., & Pesaran, M. H. (2013). One hundred years of oil income and the Iranian economy: A curse or a blessing? (No. 4118). *CESifo Working Paper: Empirical and Theoretical Methods*.

Nademi, Y., & Winker, P. (2022). Non-linear effects of government size on inflation in OPEC countries: A threshold panel approach. *Iranian Economic Review, 26*(1), 199–214.

Sargent, T. J., & Wallace, N. (1981). Some unpleasant monetarist arithmetic. *Federal Reserve Bank of Minneapolis Quarterly Review*, 5(3), 1-17.

Sargent, T. J. (1982). The ends of four big inflations. In *Inflation: Causes and effects* (pp. 41–98). University of Chicago Press.