



Modeling the Impact of Trade Sanctions on Monetary Variables in Iran's Economy

* Mahdi Abdollahpour  ** Seyyed Farzad Hashemi 
*** Mohsen Shahhosseini 

* PhD Student, Department of Financial Management, Shahr-e-Qods Branch, Islamic Azad University, Tehran, Iran. m.abdollahpour2011@gmail.com

** Associate Professor, Department of Financial Management, Shahr-e-Qods Branch, Islamic Azad University, Tehran, Iran. farzadehashemi@yahoo.com

*** Associate Professor, Department of Mathematics, Shahr-e-Qods Branch, Islamic Azad University, Tehran, Iran. mohsen_shahhosseini@yahoo.com

Received: 22.09.2024

Accepted: 30.12.2024

Abstract

Sanctions have had widespread negative effects on Iran's economy, including economic activities and trade exchanges. This study analyzes the impact of sanctions on two major monetary variables, inflation and interest rates, using the Structural Vector Autoregressive (SVAR) model. The results show that sanctions have a significant effect on these variables, leading to a temporary increase, which decreases after a few periods. These changes result from the responses of the variables to the shocks induced by the sanctions.

Keywords: Sanctions, Monetary Variables, Inflation, Interest Rates, Iranian Economy.

Corresponding Author: Seyyed Farzad Hashemi- Farzadehashemi@yahoo.com



Introduction

The Islamic Republic of Iran has faced extensive economic sanctions over the past three decades, which have had profound impacts on the country's economy, particularly monetary variables. Sanctions have led to restrictions on trade, capital flows, and international interactions, which contradict the fundamental principles of economics. Additionally, Iran's monetary and exchange rate policies have been affected by these sanctions.

Literature Review and Theoretical Gap

Previous studies have shown that trade sanctions lead to market instability, increased inflation, and depreciation of the national currency. However, few studies have comprehensively analyzed the effects of sanctions on monetary variables. This research aims to address this gap by providing a framework to analyze the impact of sanctions on monetary variables.

Research Problem Dimensions

Sanctions have had complex effects on Iran's monetary economy, including severe exchange rate fluctuations and rising inflation. These effects may persist even after sanctions are lifted, impacting the long-term stability of the country's economy. This study examines these dimensions and provides a model to manage the negative effects of sanctions on monetary variables.

Research Aim and Key Question

The aim of this study is to present a model for analyzing the impact of trade sanctions on Iran's monetary variables. The main research question is: How do trade sanctions affect Iran's monetary variables, and how can these effects be managed?

Review of Literature

Economic sanctions are non-military tools used to change the behavior of governments. They can be divided into trade sanctions, which involve restrictions on the export and import of goods, and financial sanctions, which limit access to financial resources. The effects of sanctions on economic variables such as investment reduction and inflation increase have been extensively studied.

Main Economic Variables and Their Role

Variables such as inflation and interest rates play a crucial role in economic analysis and policy decision-making. These variables are highly significant when analyzing the effects of sanctions on the macroeconomy and can help improve economic policymaking.

Application of Monetary Variables in the Study

In this study, two key variables, inflation and interest rates, are chosen to analyze the impact of sanctions on Iran's economy. These variables are especially important in response to changes caused by sanctions and offer a more precise analysis of their effects on the country's financial and monetary structure.

Previous Research

Domestic Studies

1. Shirazi, Azerbaijani, and Samiei (2016): This study examined the effects of economic sanctions on Iran's exports using a gravity model. The findings indicated that sanctions had a



significant negative impact on exports between 2012 and 2014, with exports falling by 33% on average.

2. Faraji Dizaji and Farzanegan (2020): This research analyzed the effects of U.S. trade sanctions on global trade with targeted countries. The results indicated that complete sanctions reduced bilateral trade with sanctioned countries by 76%, while partial sanctions reduced it by 16%.

3. Zamani, Haji, Fatroos, and Ghafari Ashtiani (2021): This study used the Markov Switching Model to examine the effects of sanctions and exchange rate volatility in Iran. The findings suggested that sanctions and inflation positively impacted exchange rate volatility.

4. Majidi and Zaruni (2022): This research analyzed the effects of sanctions on Iran's economy, showing that sanctions restricted financial resources, increased unemployment, and inflation, while also creating opportunities such as strengthening domestic production and reducing oil dependency.

International Studies

1. Wang, Chang, et al. (2019): This study examined the impact of economic sanctions on exchange rate volatility in 23 target countries. The results indicated that sanctions significantly affected exchange rate volatility, with the intensity of the effects depending on the type and duration of the sanctions.

2. Geroni, Kim, and Ozanne (2022): This research focused on modeling trade and macroeconomic dynamics under the impact of financial and trade sanctions. The results suggested that financial sanctions impose costs on both internal and external actors, with greater costs for external parties. The study also analyzed the effects of sanctions on real exchange rates, consumption, and trade patterns.

Research Methodology

This study is applied in nature, with quantitative data collected for analysis. The research is causal-analytical, and relevant academic papers have been gathered using a library-based approach.

Data and Criteria for Selection

Economic time-series data for this study was extracted from the Central Bank of Iran's website. These data include key monetary variables like inflation and interest rates and cover the period from 1979 to 2022. The selection criteria for the data were based on their importance in the macroeconomy of Iran and the potential impacts of economic sanctions. The data related to sanctions were treated as a dummy variable due to the lack of comprehensive differentiation between the types of sanctions.

Sanctions Variable and Calculation Method

For analyzing the effects of sanctions, a dummy variable was used, with values ranging between 0 and 1, indicating the presence or absence of sanctions. This variable was calculated based on studies by Zahra Vand and Khodabakhshi (2020) and assigned weights according to different types of sanctions (trade and financial) imposed on Iran during the examined period.

Structural Vector Autoregressive Model (SVAR)

To examine the effects of sanctions on macroeconomic variables, the Structural Vector Autoregressive (SVAR) model was employed. This model, developed by Blanchard and Quah



(1986), helps analyze the structural effects of sanctions by applying theoretical and economic constraints. In this model, inflation and interest rates are the dependent variables, while sanctions are the independent variable. The sequence of variables in the model is as follows: sanctions first, followed by inflation and interest rates, to capture their interrelations.

Validity and Reliability of the Research Method

The validity of the method is ensured by the use of the SVAR model, which is based on a well-established theoretical framework. The reliability of the data was tested using appropriate statistical tests such as the Dickey-Fuller test to ensure data stability. This stability enhances the credibility of the results and ensures more accurate analyses.

Findings

Descriptive Analysis of Data

The descriptive statistics of the three variables (Sanctions, Inflation, and Interest Rates) show that the means and standard deviations of the sanctions variable (SN) are 21.37 and 12.97, respectively. The skewness and kurtosis indicate that both sanctions and inflation variables are right-skewed. The Jarque-Bera test shows that the distribution of sanctions and inflation is non-normal, while the interest rates data is normal.

Line Graph of Variables

The line graphs show the trend of changes in each variable from 1979 to 2022. Sanctions fluctuated at different periods, with a reduction between 2016 and 2018 due to a temporary lifting of sanctions. Inflation and interest rates both show increasing trends over time.

Unit Root Test

The Dickey-Fuller test showed that interest rates remain unstable after a structural break, while sanctions and inflation variables become stable after differencing.

Lag Length Determination

Based on the Schwarz Bayesian, Hannan-Quinn, and Akaike criteria, a lag length of 1 was chosen as the optimal lag for the SVAR model. This lag provides the best fit for the data across all criteria.

Research Implications and Conclusion

This study has analyzed the impact of trade sanctions on two key macroeconomic variables— inflation and interest rates. The findings show that while sanctions initially cause shocks that lead to temporary increases in these variables, the effects diminish over time. However, new sanctions lead to renewed shocks, preventing the complete elimination of the effects of previous sanctions. Therefore, the Iranian economy continuously faces the negative impacts of sanctions. The study also finds that inflation and interest rates respond positively to sanction shocks, with gradual returns to equilibrium. These results align with previous research on the diminishing effect of sanctions over time, indicating that sanctioning countries attempt to exacerbate negative effects by imposing new sanctions.

Recommendations

1. Strengthen domestic countermeasures: Internal measures to mitigate the effects of sanctions have been shown to reduce their negative impact. It is recommended to strengthen these



measures and develop plans to reduce dependency on foreign resources while increasing domestic production.

2. Consider the temporary effects of sanctions in economic policy: Policymakers should take the temporary effects of sanctions into account when making economic decisions and plan for potential future shocks.

3. Use analytical tools for sanctions evaluation: Analytical models like SVAR and impulse response functions (IRF) have proven useful in identifying the effects of sanctions. It is suggested that these tools be regularly used in the country's economic analyses.

4. Develop long-term policies to reduce vulnerability to sanctions: Given the ongoing nature of sanctions, long-term policies should be designed to reduce dependence on the global economy and increase economic resilience to protect national economic stability.

