

## The effect of the central bank balance sheet on the macroeconomic uncertainty in Iran

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Article Info	Abstract
<p>Original Article</p> <p>Main Object: Economics                      Scope: Iran</p> <p>Received: 13 October 2024                      Revised: 18 November 2024                      Accepted: 25 November 2024                      Published online: 14 December 2024</p> <p><b>Keywords:</b>                      ARDL,                      exchange rate uncertainty,                      exchange rate value uncertainty,                      GARCH, GDP uncertainty,                      inflation rate uncertainty.</p>	<p>The central bank balance sheet is unique in importance; Because this balance sheet is not only a source of money creation, but also reflects its relationship with the government on the one hand and the banking and financial system on the other. The analysis of the balance sheet of the central bank is a topic that has received more attention in the last decade. Like other central banks, the Central Bank of Iran has responsibilities such as stabilizing inflation, and exchange rates, and improving economic growth and financial stability. Therefore, changes in its balance sheet composition can have different effects. This paper investigates the effect of the central bank balance sheet on the uncertainty of macro variables such as exchange rate, inflation rate, stock exchange value, and GDP. The GARCH model has been used to extract the uncertainties and the ARDL model has been used to investigate the relationship between the central bank balance sheet and the target variables in the period 1352-1399. The most important findings of the article indicate a negative and significant relationship between the ratios of foreign exchange reserves to the monetary base with uncertainties. Also, the ratios of gold to monetary base and bonds to monetary base do not significantly affect GDP uncertainty. While the ratio of gold to the monetary base has a negative relationship with exchange rate uncertainty, stock exchange value, and inflation rate, and the ratio of bonds has a positive and significant relationship with exchange rate uncertainty, stock exchange value, and inflation rate. The equity ratio also affects only inflation uncertainty and has a significant and negative relationship with it.</p>

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**Extended Abstract****Introduction**

In accordance with the role and responsibilities that have been assigned for the central bank, the policies of Central Bank of Iran, as evidenced by the modifications to its balance sheet, significantly influence critical macroeconomic variables, including inflation and economic growth. Therefore, it is crucial to investigate the relationship between the central bank's balance sheet and macroeconomic variables. The impact of certain items on the central bank's balance sheet, such as foreign exchange reserves and banks' debt to the central bank, and the policies of the central bank, e.g. the interest rate policy, on variables such as economic growth and inflation has been the subject of various studies in Iran. The results of these studies demonstrate the significance of changes in the bank's balance sheet on the aforementioned variables (Ehsani & Izadi, 2019; Vaez Barzani et al., 2014; Shahabadi & Hatami, 2019; Ahmadyan & Kianvand, 2015).

This article has addressed the factors that set it apart from other studies. First, it has attempted to evaluate the performance of the central bank's balance sheet by employing conventional financial ratios rather than examining the balance sheet items. Conventional financial ratios can be employed to establish a relationship between the quality and quantity of assets and the value of the central bank's liabilities, which are primarily constituted of the monetary base. Additionally, this method can resolve the issue of the mainstream of monetary economics, which has prioritized the role of the quantity equation in determining the value of the monetary unit. The genuine issue of value and demand for the currency is obscured by the quantity equation's emphasis on past values, including money and nominal transactions. While the currency value is assigned by its utility in conducting transactions, its demand is determined by the anticipated future prices at which it will be used to make purchases (Mises's "regression theorem" of money). Since the future prices are determined by the interaction between the demand for money and its future supply, the analysis of the central bank's balance sheet using conventional financial ratios can effectively illustrate the interaction between the demand and supply of money, which in turn enables the examination of its impact on macro variables. The conventional financial ratios have been defined using the article of Bagus and Howden (2016). Secondly, in place of analyzing the relationship between the central bank's balance sheet and macro variables in the form of nominal and real values of macro variables, the uncertainty of selected macroeconomic variables, including the exchange rate in the official market, inflation, and the value of stock exchange transactions at the base price of 2021, has been employed. The process of economic growth and development of the country can be disrupted by the uncertainty of macro variables. Therefore, it is crucial to investigate the extent to which the central bank can either

mitigate or exacerbate the uncertainties associated with macroeconomic variables.

The GARCH model was employed to quantify the uncertainty of macro variables, and the autoregressive distributed lag (ARDL) model was used to investigate the relationship between the central bank's balance sheet and uncertainties in the period of 1973-2022.

The article is structured as follows: Section 2 delineates the theoretical literature regarding the relationship between the balance sheets of central banks and macroeconomic variables. The signaling channel, portfolio rebalancing, and duration channel have been employed to examine the relationship between macroeconomic variables and central banks' balance sheets in this section. Additionally, this section examines the empirical literature in three distinct categories. The first category examines the impact of the central bank's balance sheet on the economy through the channel of portfolio rebalancing. The second category investigates this effect through the signaling channel, while the third category focuses on the impact of changes in the composition of the central bank's balance sheet on macro variables. The methodology of the article is delineated in Section 3, and the conclusions and findings are presented in Section 4.

### **Aims**

However, the relationship between the balance sheet items uncertainties of selected macroeconomic variables has not been investigated in any of the domestic and foreign studies that will be discussed in the empirical literature section. Considering the significance of the subject, this article attempts to fill this gap.

### **Methods**

The present study examines the influence of the central bank's balance sheet on the uncertainty of the unofficial exchange rate, inflation, and the value of stock exchange transactions. The theoretical literature of this research is founded on the signaling channel, and the empirical literature is derived from the studies of changes in the balance sheet composition of the central bank. The annual data of the balance sheet of the central bank and the macroeconomics of Iran from 1973 to 2022 were employed for this purpose. The uncertainty of the intended variables was detected using the GARCH family model. The present article employs the ARDL model to specify and estimate the models.

### **Findings**

The findings indicate that the uncertainties of the previous period have a positive effect on the uncertainties of the current period so that the uncertainties of the current period increase as the uncertainties of the previous period increase. Additionally, the ratio of foreign exchange reserves to the monetary base has a negative relationship with

uncertainties— a result that is consistent with those of Titzck and End (2021), Asshoff, Belke and Osowski (2020), and Gambacorta, Hofmann, and Peersman (2014).

The ratio of gold and the monetary base is negatively correlated with the uncertainty of the exchange rate, inflation, and the value of stock exchange transactions, but it does not have a significant relationship with the uncertainty of the GDP. This result is similar to those of Sahuc (2016) and Varghese and Zhang (2018). The relationship between the ratio of bonds to the monetary base with the uncertainty of the exchange rate, inflation and the value of stock exchange transactions is positive, and the results are similar to those of Blattner and Joyce (2016) and Altavilla, Carboni, and Motto (2015). The equity ratio only influences inflation uncertainty, as evidenced by the findings of Gambetti and Musso (2017) and Brunnermeier & Sannikov (2016).

### **Conclusion**

While balance sheet analysis in non-financial and banking sectors has a long history, research on central bank balance sheets has been limited. Following the 2008 financial crisis, interest in analyzing central bank balance sheets grew, with various theoretical and empirical methods now employed, such as signaling theory, portfolio rebalancing, and balance sheet composition. These balance sheets not only reflect central bank policies aimed at controlling inflation, stabilizing exchange rates, and promoting growth but also affect key macroeconomic variables.

This paper emphasizes two main points: First, it uses standard financial ratios, as outlined by Bagus and Howden (2016), to analyze the interaction between a central bank's assets and liabilities. Second, it examines how changes in the balance sheet influence uncertainty around key macroeconomic variables (such as exchange rates, inflation, and stock market performance), rather than their levels. This approach aims to clarify the central bank's role in maintaining economic stability and confidence.

This study marks the first step in understanding how central bank balance sheet composition affects macroeconomic uncertainty. It highlights the importance for central banks to carefully consider the impact of their balance sheet structure on economic uncertainty and adopt strategies to minimize such uncertainties. Moreover, central banks should establish clear thresholds for balance sheet components to determine optimal levels for reducing uncertainty

### **Conflict of interest**

The author declared no conflicts of interest.

### Ethical considerations

The author has completely considered ethical issues, including informed consent, plagiarism, data fabrication, misconduct, and/or falsification, double publication and/or redundancy, submission, etc. This article was not authored by artificial intelligence.

### Data availability

The dataset generated and analyzed during the current study is available from the author on reasonable request.

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